1 Introduction

This document is a systematic reference manual for the \biblatex package. Look at the sample documents which ship with \biblatex to get a first impression.\footnote{\texttt{\biblatexctan/doc/examples}} For a quick start guide, browse §§ 1.1, 2.1, 2.2, 2.3, 3.1, 3.3, 3.5, 3.6, 3.10.

1 \texttt{\biblatexctan/doc/examples}
1.1 About biblatex

This package provides advanced bibliographic facilities for use with LaTeX in conjunction with BibTeX. The package is a complete reimplementation of the bibliographic facilities provided by LaTeX. It redesigns the way in which LaTeX interacts with BibTeX at a fairly fundamental level. With biblatex, BibTeX is only used to sort the bibliography and to generate labels. Instead of being implemented in bst files, the formatting of the bibliography is entirely controlled by LaTeX macros, hence the name biblatex. Good working knowledge in LaTeX should be sufficient to design new bibliography and citation styles. There is no need to learn BibTeX’s postfix stack language. This package also supports subdivided bibliographies, multiple bibliographies within one document, and separate lists of bibliographic short-hands. Bibliographies may be subdivided into parts and/or segmented by topics. Just like the bibliography styles, all citation commands may be freely defined. The package is completely localized and can interface with the babel package. Please refer to table 1 for a list of languages currently supported by this package.

1.2 License

Copyright © 2006–2011 Philipp Lehman. Permission is granted to copy, distribute and/or modify this software under the terms of the LaTeX Project Public License, version 1.3.¹ This package is author-maintained.

1.3 Feedback

Please use the biblatex project page on SourceForge to report bugs and submit feature requests.² There are two trackers on this page: Bugs for bug reports and Features for feature requests.³ Select a tracker, then click on ‘Add new’ to submit your report or request. I may consider implementing a new feature if the request is reasonable, seems to be relevant to a considerable number of users, and complies with the architecture and philosophy of biblatex. Before making a feature request, please ensure that you have thoroughly studied this manual. If you do not want to report a bug or request a feature but are simply in need of assistance, you might want to consider posting your question on the comp.text.tex newsgroup. I can not provide end-user support by email or via the project page.

1.4 Acknowledgments

The language modules of this package include contributions by the following contributors (in the order of submission): Ignacio Fernández Galván (Spanish), Enrico Gregorio (Italian), Johannes Wilm (Danish/Norwegian), Per Starbäck, Carl-Gustav Werner, Filip Åsbom (Swedish), Augusto Ritter Stoffel (Brazilian), Alexander van Loon (Dutch), Apostolos Syropoulos (Greek), Hannu Väisänen (Finnish), Prokopis (Greek), Mateus Araújo (Brazilian), Andrea Marchitelli (Italian), José Carlos Santos (Portuguese), Oleg Domanov (Russian), Pieter Belmans (Dutch).

¹ http://www.ctan.org/tex-archive/macros/latex/base/lppl.txt
² http://sourceforge.net/projects/biblatex/
³ http://sourceforge.net/tracker2/?group_id=244752
1.5 Prerequisites

This section gives an overview of all resources required by this package and discusses compatibility issues.

1.5.1 Requirements

The resources listed in this section are strictly required for \texttt{biblatex} to function. The package will not work if they are not available.

\begin{description}
\item[e-TeX] The \texttt{biblatex} package requires e-TeX. TeX distributions have been shipping e-TeX binaries for quite some time, the popular distributions use them by default these days. The \texttt{biblatex} package checks if it is running under e-TeX. Simply try compiling your documents as you usually do, the chances are that it just works. If you get an error message, try compiling the document with \texttt{elatex} instead of \texttt{latex} or \texttt{pdfelatex} instead of \texttt{pdflatex}, respectively.
\item[BibTeX] By default, the \texttt{biblatex} package uses BibTeX as a database backend. While a legacy BibTeX binary is sufficient to run \texttt{biblatex}, using \texttt{bibtex8} is recommended. If your TeX distribution does not ship with \texttt{bibtex8}, you can get it from CTAN.\footnote{\url{http://www.ctan.org/tex-archive/biblio/bibtex/8-bit/}}
\item[Biber] Biber is the next-generation backend of \texttt{biblatex}. You only need one backend, either \texttt{BibTeX} or \texttt{Biber}. Biber is available from SourceForge.\footnote{\url{http://biblatex-biber.sourceforge.net/}}
\item[etoolbox] This LaTeX package, which is loaded automatically, provides generic programming facilities required by \texttt{biblatex}. It is available from CTAN.\footnote{\url{http://www.ctan.org/tex-archive/macros/latex/contrib/etoolbox/}}
\item[logreq] This LaTeX package, which is also loaded automatically, provides a frontend for writing machine-readable messages to an auxiliary log file. It is available from CTAN.\footnote{\url{http://www.ctan.org/tex-archive/macros/latex/contrib/logreq/}}
\end{description}

Apart from the above resources, \texttt{biblatex} also requires the standard LaTeX packages \texttt{keyval} and \texttt{ifthen} as well as the \texttt{url} package. These package are included in all common TeX distributions and will be loaded automatically.

1.5.2 Recommended Packages

The packages listed in this section are not required for \texttt{biblatex} to function, but they provide recommended additional functions or enhance existing features. The package loading order does not matter.

\begin{description}
\item[babel] The \texttt{babel} package provides the core architecture for multilingual typesetting. If you are writing in a language other than American English, using this package is strongly recommended. If loaded, \texttt{biblatex} package will detect \texttt{babel} automatically.
\item[cquotes] If this package is available, \texttt{biblatex} will use its language sensitive quotation facilities to enclose certain titles in quotation marks. If not, \texttt{biblatex} uses quotes
\end{description}

\footnotesize
\begin{itemize}
\item[1] \url{http://www.ctan.org/tex-archive/biblio/bibtex/8-bit/}
\item[2] \url{http://biblatex-biber.sourceforge.net/}
\item[3] \url{http://www.ctan.org/tex-archive/macros/latex/contrib/etoolbox/}
\item[4] \url{http://www.ctan.org/tex-archive/macros/latex/contrib/logreq/}
\end{itemize}
suitable for American English as a fallback. When writing in any other language, loading csquotes is strongly recommended.¹

### 1.5.3 Compatible Classes and Packages

The biblatex package provides dedicated compatibility code for the classes and packages listed in this section.

- **hyperref**
  The hyperref package transforms citations into hyperlinks. See the hyperref and backref package options in § 3.1.2.1 for further details. When using the hyperref package, it is preferable to load it after biblatex.

- **showkeys**
  The showkeys package prints the internal keys of, among other things, citations in the text and items in the bibliography. The package loading order does not matter.

- **memoir**
  When using the memoir class, the default bibliography headings are adapted such that they blend well with the default layout of this class. See § 3.11.2 for further usage hints.

- **KOMA-Script**
  When using any of the scrartcl, scrbook, or scrreprt classes, the default bibliography headings are adapted such that they blend with the default layout of these classes. See § 3.11.1 for further usage hints.

### 1.5.4 Incompatible Packages

The packages listed in this section are not compatible with biblatex. Since it reimplements the bibliographic facilities of LaTeX from the ground up, biblatex naturally conflicts with all packages modifying the same facilities. This is not specific to biblatex. Some of the packages listed below are also incompatible with each other for the same reason.

- **babelbib**
  The babelbib package provides support for multilingual bibliographies. This is a standard feature of biblatex. Use the hyphenation field and the package option babel for similar functionality. Note that biblatex automatically adjusts to the main document language if babel is loaded. You only need the above mentioned features if you want to switch languages on a per-entry basis within the bibliography. See §§ 2.2.3 and 3.1.2.1 for details. Also see § 3.7.

- **backref**
  The backref package creates back references in the bibliography. See the package options hyperref and backref in § 3.1.2.1 for comparable functionality.

- **bibtopic**
  The bibtopic package provides support for bibliographies subdivided by topic, type, or other criteria. For bibliographies subdivided by topic, see the category feature in § 3.5.6 and the corresponding filters in § 3.5.2. Alternatively, you may use the keywords field in conjunction with the keyword and notkeyword filters for comparable functionality, see §§ 2.2.3 and 3.5.2 for details. For bibliographies subdivided by type, use the type and nottype filters. Also see § 3.10.4 for examples.

- **bibunits**
  The bibunits package provides support for multiple partial (e.g., per chapter) bibliographies. See chapterbib.

The chapterbib package provides support for multiple partial bibliographies. Use the refsection environment and the section filter for comparable functionality. Alternatively, you might also want to use the refssegment environment and the segment filter. See §§ 3.5.4, 3.5.5, 3.5.2 for details. Also see § 3.10.3 for examples.

The cite package automatically sorts numeric citations and can compress a list of consecutive numbers to a range. It also makes the punctuation used in citations configurable. For sorted and compressed numeric citations, see the sortcites package option in § 3.1.2.1 and the numeric-comp citation style in § 3.3.1. For configurable punctuation, see § 3.8.

citeref Another package for creating back references in the bibliography. See backref.

The inlinebib package is designed for traditional citations given in footnotes. For comparable functionality, see the verbose citation styles in § 3.3.1.

Originally designed for citations in law studies and (mostly German) judicial documents, the jurabib package also provides features aimed at users in the humanities. In terms of the features provided, there are some similarities between jurabib and biblatex but the approaches taken by both packages are quite different. Since both jurabib and biblatex are full-featured packages, the list of similarities and differences is too long to be discussed here.

The mcite package provides support for grouped citations, i.e., multiple items can be cited as a single reference and listed as a single block in the bibliography. The citation groups are defined as the items are cited. This only works with unsorted bibliographies. The biblatex package also supports grouped citations, which are called 'entry sets' or 'reference sets' in this manual. See §§ 3.10.5, 3.5.10, 3.6.10 for details.

A significantly enhanced reimplementation of the mcite package which supports grouping in sorted bibliographies. See mcite.

The multibib package provides support for bibliographies subdivided by topic or other criteria. See bibtopic.

The natbib package supports numeric and author-year citation schemes, incorporating sorting and compression code found in the cite package. It also provides additional citation commands and several configuration options. See the numeric and author-year citation styles and their variants in § 3.3.1, the sortcites package option in § 3.1.2.1, the citation commands in § 3.6, and the facilities discussed in §§ 3.5.7, 3.5.8, 3.8 for comparable functionality. Also see § 3.6.9.

The splitbib package provides support for bibliographies subdivided by topic. See bibtopic.

The ucs package provides support for UTF-8 encoded input. Either use inputenc’s standard utf8 module or a Unicode enabled engine such as XeTeX or LuaTeX instead.
2 Database Guide

This part of the manual documents the BibTeX interface of this package. Note that you can not use biblatex in conjunction with arbitrary bst files because the package depends on a special BibTeX interface.

2.1 Entry Types

This section gives an overview of the entry types supported by biblatex along with the fields supported by each type.

2.1.1 Regular Types

The lists below indicate the fields supported by each entry type. Note that the mapping of fields to an entry type is ultimately at the discretion of the bibliography style. The lists below therefore serve two purposes. They indicate the fields supported by the standard styles which ship with this package and they also serve as a model for custom styles. Note that the 'required' fields are not strictly required in all cases, see § 2.3.2 for details. The fields marked as 'optional' are optional in a technical sense. Bibliographical formatting rules usually require more than just the 'required' fields. The standard styles will generally not perform any formal validity checks, but custom styles may do so. Generic fields like abstract and annotation or label and shorthand are not included in the lists below because they are independent of the entry type. The special fields discussed in § 2.2.3, which are also independent of the entry type, are not included in the lists either.

**article** An article in a journal, magazine, newspaper, or other periodical which forms a self-contained unit with its own title. The title of the periodical is given in the journaltitle field. If the issue has its own title in addition to the main title of the periodical, it goes in the issuetitle field. Note that editor and related fields refer to the journal while translator and related fields refer to the article.

Required fields: author, title, journaltitle, year/date

Optional fields: translator, annotator, commentator, subtitle, titleaddon, editor, editora, editorb, editorc, journalsubtitle, issuetitle, issuesubtitle, language, origlanguage, series, volume, number, eid, issue, month, pages, version, note, issn, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**book** A single-volume book with one or more authors where the authors share credit for the work as a whole. This entry type also covers the function of the @inbook type of traditional BibTeX, see § 2.3.1 for details.

Required fields: author, title, year/date

Optional fields: editor, editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate
**mvbook**  A multi-volume @book. For backwards compatibility, multi-volume books are also supported by the entry type @book. However, it is advisable to make use of the dedicated entry type @mvbook.

Required fields:  author, title, year/date

Optional fields:  editor, editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, language, origlanguage, edition, volumes, series, number, note, publisher, location, isbn, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**inbook**  A part of a book which forms a self-contained unit with its own title. Note that the profile of this entry type is different from standard BibTeX, see § 2.3.1.

Required fields:  author, title, booktitle, year/date

Optional fields:  bookauthor, editor, editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, bookssubtitle, booktitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, chapter, pages, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**bookinbook**  This type is similar to @inbook but intended for works originally published as a stand-alone book. A typical example are books reprinted in the collected works of an author.

**suppbook**  Supplemental material in a @book. This type is closely related to the @inbook entry type. While @inbook is primarily intended for a part of a book with its own title (e.g., a single essay in a collection of essays by the same author), this type is provided for elements such as prefaces, introductions, forewords, afterwords, etc. which often have a generic title only. Style guides may require such items to be formatted differently from other @inbook items. The standard styles will treat this entry type as an alias for @inbook.

**booklet**  A book-like work without a formal publisher or sponsoring institution. Use the field howpublished to supply publishing information in free format, if applicable. The field type may be useful as well.

Required fields:  author/editor, title, year/date

Optional fields:  subtitle, titleaddon, language, howpublished, type, note, location, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**collection**  A single-volume collection with multiple, self-contained contributions by distinct authors which have their own title. The work as a whole has no overall author but it will usually have an editor.

Required fields:  editor, title, year/date
Optional fields: editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**mvcollection**  
A multi-volume @collection. For backwards compatibility, multi-volume collections are also supported by the entry type @collection. However, it is advisable to make use of the dedicated entry type @mvcollection.  
Required fields: editor, title, year/date  
Optional fields: editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, language, origlanguage, edition, volumes, series, number, note, publisher, location, isbn, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**incollection**  
A contribution to a collection which forms a self-contained unit with a distinct author and title. The author refers to the title, the editor to the booktitle, i.e., the title of the collection.  
Required fields: author, editor, title, booktitle, year/date  
Optional fields: editora, editorb, editorc, translator, annotator, commentator, introduction, foreword, afterword, subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, booksubtitle, booktitleaddon, language, origlanguage, volume, part, edition, volumes, series, number, note, publisher, location, isbn, chapter, pages, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**suppcollection**  
Supplemental material in a @collection. This type is similar to @suppbook but related to the @collection entry type. The standard styles will treat this entry type as an alias for @incollection.

**manual**  
Technical or other documentation, not necessarily in printed form. The author or editor is omissible in terms of § 2.3.2.  
Required fields: author/editor, title, year/date  
Optional fields: subtitle, titleaddon, language, edition, type, series, number, version, note, organization, publisher, location, isbn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

**misc**  
A fallback type for entries which do not fit into any other category. Use the field howpublished to supply publishing information in free format, if applicable. The field type may be useful as well. author, editor, and year are omissible in terms of § 2.3.2.  
Required fields: author/editor, title, year/date
online
An online resource. Author, editor, and year are omissible in terms of § 2.3.2. This entry type is intended for sources such as web sites which are intrinsically online resources. Note that all entry types support the url field. For example, when adding an article from an online journal, it may be preferable to use the @article type and its url field.

Required fields: author/editor, title, year/date, url
Optional fields: subtitle, titleaddon, language, version, note, organization, date, month, year, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

patent
A patent or patent request. The number or record token is given in the number field. Use the type field to specify the type and the location field to indicate the scope of the patent, if different from the scope implied by the type. Note that the location field is treated as a key list with this entry type, see § 2.2.1 for details.

Required fields: author, title, number, year/date
Optional fields: holder, subtitle, titleaddon, type, version, location, note, date, month, year, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

periodical
An complete issue of a periodical, such as a special issue of a journal. The title of the periodical is given in the title field. If the issue has its own title in addition to the main title of the periodical, it goes in the issuetitle field. The editor is omissible in terms of § 2.3.2.

Required fields: editor, title, year/date
Optional fields: editora, editorb, editorc, subtitle, issuetitle, issuesubtitle, language, series, volume, number, issue, date, month, year, note, issn, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

suppperiodical
Supplemental material in a @periodical. This type is similar to @suppbook but related to the @periodical entry type. The role of this entry type may be more obvious if you bear in mind that the @article type could also be called @inperiodical. This type may be useful when referring to items such as regular columns, obituaries, letters to the editor, etc. which only have a generic title. Style guides may require such items to be formatted differently from articles in the strict sense of the word. The standard styles will treat this entry type as an alias for @article.

proceedings
A single-volume conference proceedings. This type is very similar to @collection. It supports an optional organization field which holds the sponsoring institution. The editor is omissible in terms of § 2.3.2.

Required fields: editor, title, year/date
Optional fields: subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, eventtitle, eventdate, venue, language, volume, part, volumes, series, number, note, organization, publisher, location, month, isbn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

mvproceedings A multi-volume @proceedings entry. For backwards compatibility, multi-volume proceedings are also supported by the entry type @proceedings. However, it is advisable to make use of the dedicated entry type @mvproceedings.

Required fields: editor, title, year/date
Optional fields: subtitle, titleaddon, eventtitle, eventdate, venue, language, volumes, series, number, note, organization, publisher, location, month, isbn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

inproceedings An article in a conference proceedings. This type is similar to @incollection. It supports an optional organization field.

Required fields: author, editor, title, booktitle, year/date
Optional fields: subtitle, titleaddon, maintitle, mainsubtitle, maintitleaddon, booksubtitle, booktitleaddon, eventtitle, eventdate, venue, language, volume, part, volumes, series, number, note, organization, publisher, location, month, isbn, chapter, pages, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

reference A single-volume work of reference such as an encyclopedia or a dictionary. This is a more specific variant of the generic @collection entry type. The standard styles will treat this entry type as an alias for @collection.

mvreference A multi-volume @reference entry. The standard styles will treat this entry type as an alias for @mvcollection. For backwards compatibility, multi-volume references are also supported by the entry type @reference. However, it is advisable to make use of the dedicated entry type @mvreference.

inreference An article in a work of reference. This is a more specific variant of the generic @incollection entry type. The standard styles will treat this entry type as an alias for @incollection.

report A technical report, research report, or white paper published by a university or some other institution. Use the type field to specify the type of report. The sponsoring institution goes in the institution field.

Required fields: author, title, type, institution, year/date
Optional fields: subtitle, titleaddon, language, number, version, note, location, month, isrn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

set An entry set. This entry type is special, see § 3.10.5 for details.
thesis  A thesis written for an educational institution to satisfy the requirements for a degree. Use the type field to specify the type of thesis.
Required fields: author, title, type, institution, year/date
Optional fields: subtitle, titleaddon, language, note, location, month, isbn, chapter, pages, pagetotal, addendum, pubstate, doi, eprint, eprintclass, eprinttype, url, urldate

unpublished  A work with an author and a title which has not been formally published, such as a manuscript or the script of a talk. Use the fields howpublished and note to supply additional information in free format, if applicable.
Required fields: author, title, year/date
Optional fields: subtitle, titleaddon, language, howpublished, note, location, isbn, date, month, year, addendum, pubstate, url, urldate

xdata  This entry type is special. xdata entries hold data which may be inherited by other entries using the xdata field. Entries of this type only serve as data containers; they may not be cited or added to the bibliography. See § 3.10.6 for details.

custom[a–f]  Custom types for special bibliography styles. Not used by the standard styles.

2.1.2 Type Aliases

The entry types listed in this section are provided for backwards compatibility with traditional BibTeX styles. These aliases are resolved by BibTeX as the data is exported. Bibliography styles will see the entry type the alias points to, not the alias name. All unknown entry types are generally exported as @misc.

conference  A BibTeX legacy alias for @inproceedings.
electronic  An alias for @online.
mastersthesis  Similar to @thesis except that the type field is optional and defaults to the localized term 'Master's thesis'. You may still use the type field to override that.
phdthesis  Similar to @thesis except that the type field is optional and defaults to the localized term 'PhD thesis'. You may still use the type field to override that.
technote  Similar to @report except that the type field is optional and defaults to the localized term 'technical report'. You may still use the type field to override that.

www  An alias for @online, provided for jurabib compatibility.

2.1.3 Unsupported Types

The types in this section are similar to the custom types @custom[a–f], i.e., the standard bibliography styles provide no support for these types. When using the standard styles, they will be treated as @misc entries.

artwork  Works of the visual arts such as paintings, sculpture, and installations.
audio  Audio recordings, typically on audio CD, DVD, audio cassette, or similar media. See also @music.
This special entry type is not meant to be used in the bib file like other types. It is provided for third-party packages like notes2bib which merge notes into the bibliography. The notes should go into the note field. Be advised that the @bibnote type is not related to the \defbibnote command in any way. \defbibnote is for adding comments at the beginning or the end of the bibliography, whereas the @bibnote type is meant for packages which render endnotes as bibliography entries.

Commentaries which have a status different from regular books, such as legal commentaries.

Images, pictures, photographs, and similar media.

Court decisions, court recordings, and similar things.

Laws, bills, legislative proposals, and similar things.

Legal documents such as treaties.

Personal correspondence such as letters, emails, memoranda, etc.

Motion pictures. See also @video.

Musical recordings. This is a more specific variant of @audio.

Musical and theatrical performances as well as other works of the performing arts. This type refers to the event as opposed to a recording, a score, or a printed play.

Reviews of some other work. This is a more specific variant of the @article type. The standard styles will treat this entry type as an alias for @article.

Computer software.

National and international standards issued by a standards body such as the International Organization for Standardization.

Audiovisual recordings, typically on dvd, vhs cassette, or similar media. See also @movie.

This section gives an overview of the fields supported by biblatex. See § 2.2.1 for an introduction to the data types supported by this package and §§ 2.2.2 and 2.2.3 for the actual field listings.

In bib files all bibliographic data is specified in fields. Some of those fields, for example author and editor, may contain a list of items. This list structure is implemented by BibTeX via the keyword 'and', which is used to separate the individual items in the list. The biblatex package implements three distinct data types to handle bibliographic data: name lists, literal lists, and fields. There are also several list and field subtypes. This section gives an overview of the data types.
supported by this package. See §§ 2.2.2 and 2.2.3 for information about the mapping of BibTeX's fields to biblatex's data types.

**Name lists** are parsed and split up into the individual items at the and delimiter. Each item in the list is then dissected into four name components: the first name, the name prefix (von, van, of, da, de, della, ...), the last name, and the name suffix (junior, senior, ...). Name lists may be truncated in the bib file with the keyword 'and others'. Typical examples of name lists are author and editor.

**Literal lists** are parsed and split up into the individual items at the and delimiter but not dissected further. Literal lists may be truncated in the bib file with the keyword 'and others'. There are two subtypes:

**Literal lists** in the strict sense are handled as described above. The individual items are simply printed as is. Typical examples of such literal lists are publisher and location.

**Key lists** are a variant of literal lists which may hold printable data or localization keys. For each item in the list, a test is performed to determine whether it is a known localization key (the localization keys defined by default are listed in § 4.9.2). If so, the localized string is printed. If not, the item is printed as is. A typical example of a key list is language.

**Fields** are usually printed as a whole. There are several subtypes:

**Literal fields** are printed as is. Typical examples of literal fields are title and note.

**Range fields** are literal fields with one special feature: all dashes are normalized and replaced by the command \bibrangedash. Any number of consecutive dashes will only yield a single range dash. A typical example of a range field is the pages field.

**Integer fields** hold unformatted integers which may be converted to ordinals or strings as they are printed. A typical example is the month field.

**Date fields** hold a date specification in yyyy-mm-dd format or a date range in yyyy-mm-dd/yyyy-mm-dd format. Date fields are special in that the date is parsed and split up into its components. See § 2.3.8 for details. A typical example is the date field.

**Verbatim fields** are processed in verbatim mode and may contain special characters. Typical examples of verbatim fields are url and doi.

**Key fields** may hold printable data or localization keys. A test is performed to determine whether the value of the field is a known localization key (the localization keys defined by default are listed in § 4.9.2). If so, the localized string is printed. If not, the value is printed as is. A typical example is the type field.

**Special fields** are fields which require a special format not mentioned above.
The field description will include details on the required format in this case. Typical examples are the fields hyphenation, keywords, and gender from § 2.2.3.

The data type of a field will usually not change, regardless of the type of entry it is used in. However, there are a few special cases. The field descriptions in § 2.2.2 include the details or pointers to the relevant sections in this manual in such cases. For example, the location field, which is a literal list by default, is treated as a key list when used in @patent entries. The series field, which is a literal field by default, is handled in a special way when used in @article entries, see § 2.3.7 for details.

### 2.2.2 Data Fields

The fields listed in this section are the regular ones holding printable data. The name on the left is the name of the field, as used by both BibTeX and biblatex. The biblatex data type is given to the right of the name. See § 2.2.1 for explanation of the various data types.

<table>
<thead>
<tr>
<th>Field</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>abstract</td>
<td>field (literal)</td>
</tr>
<tr>
<td>addendum</td>
<td>field (literal)</td>
</tr>
<tr>
<td>afterword</td>
<td>list (name)</td>
</tr>
<tr>
<td>annotation</td>
<td>field (literal)</td>
</tr>
<tr>
<td>annotator</td>
<td>list (name)</td>
</tr>
<tr>
<td>author</td>
<td>list (name)</td>
</tr>
</tbody>
</table>

**abstract field** (literal)

This field is intended for recording abstracts in a bib file, to be printed by a special bibliography style. It is not used by all standard bibliography styles.

**addendum field** (literal)

Miscellaneous bibliographic data to be printed at the end of the entry. This is similar to the note field except that it is printed at the end of the bibliography entry.

**afterword list** (name)

The author(s) of an afterword to the work. If the author of the afterword is identical to the editor and/or translator, the standard styles will automatically concatenate these fields in the bibliography. See also introduction and foreword.

**annotation field** (literal)

This field may be useful when implementing a style for annotated bibliographies. It is not used by all standard bibliography styles. Note that this field is completely unrelated to annotator. The annotator is the author of annotations which are part of the work cited.

**annotator list** (name)

The author(s) of annotations to the work. If the annotator is identical to the editor and/or translator, the standard styles will automatically concatenate these fields in the bibliography. See also commentator.

**author list** (name)

The author(s) of the title.
**authortype** field (key)

The type of author. This field will affect the string (if any) used to introduce the author. Not used by the standard bibliography styles.

**bookauthor** list (name)

The author(s) of the booktitle.

**bookpagination** field (key)

If the work is published as part of another one, this is the pagination scheme of the enclosing work, i.e., bookpagination relates to pagination like booktitle to title. The value of this field will affect the formatting of the pages and pagetotal fields. The key should be given in the singular form. Possible keys are page, column, line, verse, section, and paragraph. See also pagination as well as § 2.3.10.

**booksubtitle** field (literal)

The subtitle related to the booktitle. If the subtitle field refers to a work which is part of a larger publication, a possible subtitle of the main work is given in this field. See also subtitle.

**booktitle** field (literal)

If the title field indicates the title of a work which is part of a larger publication, the title of the main work is given in this field. See also title.

**booktitleaddon** field (literal)

An annex to the booktitle, to be printed in a different font.

**chapter** field (literal)

A chapter or section or any other unit of a work.

**commentator** list (name)

The author(s) of a commentary to the work. Note that this field is intended for commented editions which have a commentator in addition to the author. If the work is a stand-alone commentary, the commentator should be given in the author field. If the commentator is identical to the editor and/or translator, the standard styles will automatically concatenate these fields in the bibliography. See also annotator.

**date** field (date)

The publication date. See also month and year as well as § 2.3.8.

**doi** field (verbatim)

The Digital Object Identifier of the work.

**edition** field (integer or literal)

The edition of a printed publication. This must be an integer, not an ordinal. Don’t
say edition={First} or edition={1st} but edition={1}. The bibliography style converts this to a language dependent ordinal. It is also possible to give the edition as a literal string, for example “Third, revised and expanded edition”.

**editor** list (name)

The editor(s) of the title, booktitle, or maintitle, depending on the entry type. Use the editortype field to specify the role if it is different from 'editor'. See § 2.3.6 for further hints.

**editora** list (name)

A secondary editor performing a different editorial role, such as compiling, redacting, etc. Use the editoratype field to specify the role. See § 2.3.6 for further hints.

**editorb** list (name)

Another secondary editor performing a different role. Use the editorbtype field to specify the role. See § 2.3.6 for further hints.

**editorc** list (name)

Another secondary editor performing a different role. Use the editorctype field to specify the role. See § 2.3.6 for further hints.

**editortype** field (key)

The type of editorial role performed by the editor. Roles supported by default are editor, compiler, founder, continuator, redactor, reviser, collaborator. The role 'editor' is the default. In this case, the field is omissible. See § 2.3.6 for further hints.

**editoratype** field (key)

Similar to editortype but referring to the editora field. See § 2.3.6 for further hints.

**editorbtype** field (key)

Similar to editortype but referring to the editorb field. See § 2.3.6 for further hints.

**editorctype** field (key)

Similar to editortype but referring to the editorc field. See § 2.3.6 for further hints.

**eid** field (literal)

The electronic identifier of an @article.

**eprint** field (verbatim)

The electronic identifier of an online publication. This is roughly comparable to a
DOI but specific to a certain archive, repository, service, or system. See § 3.10.7 for details. Also see eprinttype and eprintclass.

eprintclass field (literal)
Additional information related to the resource indicated by the eprinttype field. This could be a section of an archive, a path indicating a service, a classification of some sort, etc. See § 3.10.7 for details. Also see eprint and eprinttype.

eprinttype field (literal)
The type of eprint identifier, e.g., the name of the archive, repository, service, or system the eprint field refers to. See § 3.10.7 for details. Also see eprint and eprintclass.

eventdate field (date)
The date of a conference, a symposium, or some other event in @proceedings and @inproceedings entries. This field may also be useful for the custom types listed in § 2.1.3. See also eventtitle and venue as well as § 2.3.8.

eventtitle field (literal)
The title of a conference, a symposium, or some other event in @proceedings and @inproceedings entries. This field may also be useful for the custom types listed in § 2.1.3. Note that this field holds the plain title of the event. Things like “Proceedings of the Fifth XYZ Conference” go into the titleaddon or booktitleaddon field, respectively. See also eventdate and venue.

file field (verbatim)
A local link to a pdf or other version of the work. Not used by the standard bibliography styles.

foreword list (name)
The author(s) of a foreword to the work. If the author of the foreword is identical to the editor and/or translator, the standard styles will automatically concatenate these fields in the bibliography. See also introduction and afterword.

holder list (name)
The holder(s) of a @patent, if different from the author. Not that corporate holders need to be wrapped in an additional set of braces, see § 2.3.3 for details. This list may also be useful for the custom types listed in § 2.1.3.

howpublished field (literal)
A publication notice for unusual publications which do not fit into any of the common categories.

indextitle field (literal)
A title to use for indexing instead of the regular title field. This field may be useful if you have an entry with a title like “An Introduction to ...” and want
that indexed as “Introduction to . . ., An”. Style authors should note that \texttt{biblatex} automatically copies the value of the \texttt{title} field to \texttt{indextitle} if the latter field is undefined.

\begin{description}
\item[institution] list (literal)
The name of a university or some other institution, depending on the entry type. Traditional \LaTeX{} uses the field name \texttt{school} for theses, which is supported as an alias. See also §§ \ref{sec:2.2.5} and \ref{sec:2.3.4}.
\item[introduction] list (name)
The author(s) of an introduction to the work. If the author of the introduction is identical to the editor and/or translator, the standard styles will automatically concatenate these fields in the bibliography. See also foreword and afterword.
\item[isan] field (literal)
The International Standard Audiovisual Number of an audiovisual work. Not used by the standard bibliography styles.
\item[isbn] field (literal)
The International Standard Book Number of a book.
\item[ismn] field (literal)
The International Standard Music Number for printed music such as musical scores. Not used by the standard bibliography styles.
\item[isrn] field (literal)
\item[issn] field (literal)
The International Standard Serial Number of a periodical.
\item[issue] field (literal)
The issue of a journal. This field is intended for journals whose individual issues are identified by a designation such as ‘Spring’ or ‘Summer’ rather than the month or a number. Since the placement of issue is similar to month and number, this field may also be useful with double issues and other special cases. See also month, number, and § \ref{sec:2.3.9}.
\item[issuesubtitle] field (literal)
The subtitle of a specific issue of a journal or other periodical.
\item[issuetitle] field (literal)
The title of a specific issue of a journal or other periodical.
\end{description}
iswc field (literal)
The International Standard Work Code of a musical work. Not used by the standard bibliography styles.

journalsubtitle field (literal)
The subtitle of a journal, a newspaper, or some other periodical.

journaltitle field (literal)
The name of a journal, a newspaper, or some other periodical.

label field (literal)
A designation to be used by the citation style as a substitute for the regular label if any data required to generate the regular label is missing. For example, when an author-year citation style is generating a citation for an entry which is missing the author or the year, it may fall back to label. See § 2.3.2 for details. Note that, in contrast to shorthand, label is only used as a fallback. See also shorthand.

language list (key)
The language(s) of the work. Languages may be specified literally or as localization keys. If localization keys are used, the prefix lang is omissible. See also origlanguage and compare hyphenation in § 2.2.3.

library field (literal)
This field may be useful to record information such as a library name and a call number. This may be printed by a special bibliography style if desired. Not used by the standard bibliography styles.

location list (literal)
The place(s) of publication, i.e., the location of the publisher or institution, depending on the entry type. Traditional BibTeX uses the field name address, which is supported as an alias. See also §§ 2.2.5 and 2.3.4. With @patent entries, this list indicates the scope of a patent and is treated as a key list. This list may also be useful for the custom types listed in § 2.1.3.

mainsubtitle field (literal)
The subtitle related to the maintitle. See also subtitle.

maintitle field (literal)
The main title of a multi-volume book, such as Collected Works. If the title or booktitle field indicates the title of a single volume which is part of multi-volume book, the title of the complete work is given in this field.

maintitleaddon field (literal)
An annex to the maintitle, to be printed in a different font.
The publication month. This must be an integer, not an ordinal or a string. Don’t say `month={January}` but `month={1}`. The bibliography style converts this to a language dependent string or ordinal where required. See also `date` as well as §§ 2.3.9 and 2.3.8.

An addon to be printed immediately after the author name in the bibliography. Not used by the standard bibliography styles. This field may be useful to add an alias or pen name (or give the real name if the pseudonym is commonly used to refer to that author).

Miscellaneous bibliographic data which does not fit into any other field. The `note` field may be used to record bibliographic data in a free format. Publication facts such as “Reprint of the edition London 1831” are typical candidates for the `note` field. See also addendum.

The number of a journal or the volume/number of a book in a series. See also `issue` as well as §§ 2.3.7 and 2.3.9. With `@patent` entries, this is the number or record token of a patent or patent request.

The organization(s) that published a `@manual` or an `@online` resource, or sponsored a conference. See also § 2.3.4.

If the work is a translation, a reprint, or something similar, the publication date of the original edition. Not used by the standard bibliography styles. See also `date`.

If the work is a translation, the language of the original work. See also `language`.

If the work is a translation, a reprint, or something similar, the location of the original edition. Not used by the standard bibliography styles. See also `location` and § 2.3.4.

If the work is a translation, a reprint, or something similar, the publisher of the original edition. Not used by the standard bibliography styles. See also `publisher` and § 2.3.4.
origtitle field (literal)
If the work is a translation, the title of the original work. Not used by the standard bibliography styles. See also title.

pages field (range)
One or more page numbers or page ranges. If the work is published as part of another one, such as an article in a journal or a collection, this field holds the relevant page range in that other work. It may also be used to limit the reference to a specific part of a work (a chapter in a book, for example).

pagetotal field (literal)
The total number of pages of the work.

pagination field (key)
The pagination of the work. The value of this field will affect the formatting the \texttt{\textbackslash postnote} argument to a citation command. The key should be given in the singular form. Possible keys are page, column, line, verse, section, and paragraph. See also bookpagination as well as §§ 2.3.10 and 3.11.3.

part field (literal)
The number of a partial volume. This field applies to books only, not to journals. It may be used when a logical volume consists of two or more physical ones. In this case the number of the logical volume goes in the volume field and the number of the part of that volume in the part field. See also volume.

publisher list (literal)
The name(s) of the publisher(s). See also § 2.3.4.

pubstate field (key)
The publication state of the work, e.g., 'in press'. See § 4.9.2.11 for known publication states.

reprinttitle field (literal)
The title of a reprint of the work. Not used by the standard styles.

series field (literal)
The name of a publication series, such as “Studies in ...”, or the number of a journal series. Books in a publication series are usually numbered. The number or volume of a book in a series is given in the number field. Note that the \texttt{\texttt{\textbackslash article}} entry type makes use of the series field as well, but handles it in a special way. See § 2.3.7 for details.

shortauthor list (name)
The author(s) of the work, given in an abbreviated form. This field is mainly intended for abbreviated forms of corporate authors, see § 2.3.3 for details.
shorteditor list (name)

The editor(s) of the work, given in an abbreviated form. This field is mainly intended for abbreviated forms of corporate editors, see § 2.3.3 for details.

shorthand field (literal)

A special designation to be used by the citation style instead of the usual label. This field is intended for citation aliasing. If defined, it overrides the default label. If any of the cited bibliography entries includes a shorthand field, biblatex automatically builds a list of shorthands which may be printed in addition to the regular bibliography; see § 3.5.3 for details. See also label.

shorthandintro field (literal)

The verbose citation styles which comes with this package use a phrase like “henceforth cited as [shorthand]” to introduce shorthands on the first citation. If the shorthandintro field is defined, it overrides the standard phrase. Note that the alternative phrase must include the shorthand.

shortjournal field (literal)

A short version or an acronym of the journaltile. Not used by the standard bibliography styles.

shortseries field (literal)

A short version or an acronym of the series field. Not used by the standard bibliography styles.

shorttitle field (literal)

The title in an abridged form. This field is usually not included in the bibliography. It is intended for citations in author-title format. If present, the author-title citation styles use this field instead of title.

subtitle field (literal)

The subtitle of the work.

title field (literal)

The title of the work.

titleaddon field (literal)

An annex to the title, to be printed in a different font.

translator list (name)

The translator(s) of the title or booktitle, depending on the entry type. If the translator is identical to the editor, the standard styles will automatically concatenate these fields in the bibliography.
type field (key)
The type of a manual, patent, report, or thesis. This field may also be useful for the custom types listed in § 2.1.3.

url field (verbatim)
The URL of an online publication.

urldate field (date)
The access date of the address specified in the url field. See also § 2.3.8.

venue field (literal)
The location of a conference, a symposium, or some other event in @proceedings and @inproceedings entries. This field may also be useful for the custom types listed in § 2.1.3. Note that the location list holds the place of publication. It therefore corresponds to the publisher and institution lists. The location of the event is given in the venue field. See also eventdate and eventtitle.

version field (literal)
The revision number of a piece of software, a manual, etc.

volume field (literal)
The volume of a multi-volume book or a periodical. See also part.

volumes field (literal)
The total number of volumes of a multi-volume work. Depending on the entry type, this field refers to title or maintitle.

year field (literal)
The year of publication. See also date and § 2.3.8.

2.2.3 Special Fields
The fields listed in this section do not hold printable data but serve a different purpose. They apply to all entry types.

crossref field (entry key)
This field holds an entry key for the cross-referencing feature. Child entries with a crossref field inherit data from the parent entry specified in the crossref field. If the number of child entries referencing a specific parent entry hits a certain threshold, the parent entry is automatically added to the bibliography even if it has not been cited explicitly. The threshold is settable with the mincrossrefs package option from § 3.1.2.1. Style authors should note that whether or not the crossref fields of the child entries are defined on the biblatex level depends on the availability of the parent entry. If the parent entry is available, the crossref fields of the child entries will be defined. If not, the child entries still inherit the data from the parent entry but their crossref fields will be undefined. Whether
the parent entry is added to the bibliography implicitly because of the threshold or explicitly because it has been cited does not matter. See also the xref field in this section as well as § 2.4.1.

**entryset** field (comma-separated values)

This field is specific to entry sets. See § 3.10.5 for details.

**entrysubtype** field (identifier)

This field, which is not used by the standard styles, may be used to specify a subtype of an entry type. This may be useful for bibliography styles which support a finer-grained set of entry types.

**execute** field (code)

A special field which holds arbitrary TeX code to be executed whenever the data of the respective entry is accessed. This may be useful to handle special cases. Conceptually, this field is comparable to the hooks \AtEveryBibitem, \AtEveryLositem, and \AtEveryCitekey from § 4.10.6, except that it is definable on a per-entry basis in the bib file. Any code in this field is executed automatically immediately after these hooks.

**gender** field (sf, sm, sn, pf, pm, pn, pp)

The gender of the author or the gender of the editor, if there is no author. The following identifiers are supported: sf (feminine singular, a single female name), sm (masculine singular, a single male name), sn (neuter singular, a single neuter name), pf (feminine plural, a list of female names), pm (masculine plural, a list of male names), pn (neuter plural, a list of neuter names), pp (plural, a mixed gender list of names). This information is only required by special bibliography and citation styles and only in certain languages. For example, a citation style may replace recurrent author names with a term such as 'idem'. If the Latin word is used, as is custom in English and French, there is no need to specify the gender. In German publications, however, such key terms are usually given in German and in this case they are gender-sensitive.

**hyphenation** field (identifier)

The language of the bibliography entry. The identifier must be a language name known to the babel package. This information may be used to switch hyphenation patterns and localize strings in the bibliography. Note that the language names are case sensitive. The languages currently supported by this package are given in table 1. Note that babel treats the identifier english as an alias for british or american, depending on the babel version. The biblatex package always treats it as an alias for american. It is preferable to use the language identifiers american and british to avoid any possible confusion. Compare language in § 2.2.2.

**indexesorttitle** field (literal)

The title used when sorting the index. In contrast to indextitle, this field is used for sorting only. The printed title in the index is the indextitle or the title field.
Table 1: Supported Languages

<table>
<thead>
<tr>
<th>Language</th>
<th>Region/Dialect</th>
<th>Babel Identifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danish</td>
<td>Denmark</td>
<td>danish</td>
</tr>
<tr>
<td>Dutch</td>
<td>Netherlands</td>
<td>dutch</td>
</tr>
<tr>
<td>English</td>
<td>USA</td>
<td>american, USenglish, english</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>british, UKenglish</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>canadian</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
<td>australian</td>
</tr>
<tr>
<td></td>
<td>New Zealand</td>
<td>newzealand</td>
</tr>
<tr>
<td>Finnish</td>
<td>Finland</td>
<td>finnish</td>
</tr>
<tr>
<td>French</td>
<td>France, Canada</td>
<td>french, francais, canadien</td>
</tr>
<tr>
<td>German</td>
<td>Germany</td>
<td>german, ngerman</td>
</tr>
<tr>
<td></td>
<td>Austria</td>
<td>austrian, naustrian</td>
</tr>
<tr>
<td>Greek</td>
<td>Greece</td>
<td>greek</td>
</tr>
<tr>
<td>Italian</td>
<td>Italy</td>
<td>italian</td>
</tr>
<tr>
<td>Norwegian</td>
<td>Norway</td>
<td>norsk, nynorsk</td>
</tr>
<tr>
<td>Portuguese</td>
<td>Brazil</td>
<td>brazil</td>
</tr>
<tr>
<td></td>
<td>Portugal</td>
<td>portuges</td>
</tr>
<tr>
<td>Russian</td>
<td>Russia</td>
<td>russian</td>
</tr>
<tr>
<td>Spanish</td>
<td>Spain</td>
<td>spanish</td>
</tr>
<tr>
<td>Swedish</td>
<td>Sweden</td>
<td>swedish</td>
</tr>
</tbody>
</table>

This field may be useful if the title contains special characters or commands which interfere with the sorting of the index. Consider this example:

```
title = {The \LaTeX\ Companion},
indextitle = {\LaTeX\ Companion, The},
indexsorttitle = {LATEX Companion},
```

Style authors should note that biblatex automatically copies the value of either the indextitle or the title field to indexsorttitle if the latter field is undefined.

**keywords** field (comma-separated values)

A comma-separated list of keywords. These keywords are intended for the bibliography filters (see §§ 3.5.2 and 3.10.4), they are usually not printed. Note that spaces after commas are ignored.

**options** field (comma-separated <key>=<value> options)

A comma-separated list of entry options in <key>=<value> notation. This field is used to set options on a per-entry basis. See § 3.1.3 for details. Note that citation and bibliography styles may define additional entry options.

**presort** field (string)

A special field used to modify the sorting order of the bibliography. This field is the first item the sorting routine considers when sorting the bibliography, hence it may be used to arrange the entries in groups. This may be useful when creating subdivided bibliographies with the bibliography filters. This field is only used internally during sorting. Please refer to § 3.4 for further details. Also see § 4.5.1.
**sortkey** field (literal)

A field used to modify the sorting order of the bibliography. Think of this field as the master sort key. If present, biblatex uses this field during sorting and ignores everything else, except for the presort field. This field is only used internally during sorting. Please refer to § 3.4 for further details.

**sortname** list (name)

A name or a list of names used to modify the sorting order of the bibliography. If present, this list is used instead of author or editor when sorting the bibliography. It is only used internally during sorting. Please refer to § 3.4 for further details.

**sortshorthand** field (literal)

Similar to sortkey but used in the list of shorthands. If present, biblatex uses this field instead of shorthand when sorting the list of shorthands. This is useful if the shorthand field holds shorthands with formatting commands such as \textbf or \textit. This field is only used internally during sorting.

**sorttitle** field (literal)

A field used to modify the sorting order of the bibliography. If present, this field is used instead of the title field when sorting the bibliography. It is only used internally during sorting. The sorttitle field may come in handy if you have an entry with a title like “An Introduction to…” and want that alphabetized under ‘I’ rather than ‘A’. In this case, you could put “Introduction to…” in the sorttitle field. Please refer to § 3.4 for further details.

**sortyear** field (literal)

A field used to modify the sorting order of the bibliography. If present, this field is used instead of the year field when sorting the bibliography. It is only used internally during sorting. Please refer to § 3.4 for further details.

**xdata** field (comma-separated list of entry keys)

This field inherits data from one or more @xdata entries. Conceptually, the xdata field is related to crossref and xref: crossref establishes a logical parent/child relation and inherits data; xref establishes as logical parent/child relation without inheriting data; xdata inherits data without establishing a relation. The value of the xdata may be a single entry key or a comma-separated list of keys. See § 3.10.6 for further details.

**xref** field (entry key)

This field is an alternative cross-referencing mechanism. It differs from crossref in that the child entry will not inherit any data from the parent entry specified in the xref field. If the number of child entries referencing a specific parent entry hits a certain threshold, the parent entry is automatically added to the bibliography even if it has not been cited explicitly. The threshold is settable with the mincrossrefs package option from § 3.1.2.1. Style authors should note that
whether or not the xref fields of the child entries are defined on the biblatex level depends on the availability of the parent entry. If the parent entry is available, the xref fields of the child entries will be defined. If not, their xref fields will be undefined. Whether the parent entry is added to the bibliography implicitly because of the threshold or explicitly because it has been cited does not matter. See also the crossref field in this section as well as § 2.4.1.

### 2.2.4 Custom Fields

The fields listed in this section are intended for special bibliography styles. They are not used by the standard bibliography styles.

- **name[a–c]** list (name)
  
  Custom lists for special bibliography styles. Not used by the standard bibliography styles.

- **name[a–c]type** field (key)
  
  Similar to authortype and editortype but referring to the fields name[a–c]. Not used by the standard bibliography styles.

- **list[a–f]** list (literal)
  
  Custom lists for special bibliography styles. Not used by the standard bibliography styles.

- **user[a–f]** field (literal)
  
  Custom fields for special bibliography styles. Not used by the standard bibliography styles.

- **verb[a–c]** field (literal)
  
  Similar to the custom fields above except that these are verbatim fields. Not used by the standard bibliography styles.

### 2.2.5 Field Aliases

The aliases listed in this section are provided for backwards compatibility with traditional BibTeX and other applications based on traditional BibTeX styles. Note that these aliases are immediately resolved as the bib file is processed. All bibliography and citation styles must use the names of the fields they point to, not the alias. In bib files, you may use either the alias or the field name but not both at the same time.

- **address** list (literal)
  
  An alias for location, provided for BibTeX compatibility. Traditional BibTeX uses the slightly misleading field name address for the place of publication, i.e., the location of the publisher, while biblatex uses the generic field name location. See §§ 2.2.2 and 2.3.4.
2.3 Usage Notes

The entry types and fields supported by this package should for the most part be intuitive to use for anyone familiar with BibTeX. However, apart from the additional types and fields provided by this package, some of the familiar ones are handled in a way which is in need of explanation. This package includes some compatibility code for bib files which were generated with a traditional BibTeX style in mind. Unfortunately, it is not possible to handle all legacy files automatically because biblatex’s data model is slightly different from traditional BibTeX. Therefore, such bib files will most likely require editing in order to work properly with this package. In sum, the following items are different from traditional BibTeX styles:

- The entry type @inbook. See §§ 2.1.1 and 2.3.1 for details.
- The fields institution, organization, and publisher as well as the aliases address and school. See §§ 2.2.2, 2.2.5, 2.3.4 for details.
- The handling of certain types of titles. See § 2.3.5 for details.
- The field series. See §§ 2.2.2, 2.3.7 for details.
- The fields year and month. See §§ 2.2.2, 2.3.8, 2.3.9 for details.
- The field edition. See § 2.2.2 for details.
- The field key. See § 2.3.2 for details.
Users of the \texttt{jurabib} package should note that the shortauthor field is treated as a name list by \texttt{biblatex}, see § 2.3.3 for details.

2.3.1 The Entry Type \texttt{@inbook}

Use the \texttt{@inbook} entry type for a self-contained part of a book with its own title only. It relates to \texttt{@book} just like \texttt{@incollection} relates to \texttt{@collection}. See § 2.3.5 for examples. If you want to refer to a chapter or section of a book, simply use the book type and add a chapter and/or pages field. Whether a bibliography should at all include references to chapters or sections is controversial because a chapter is not a bibliographic entity.

2.3.2 Missing and Omissible Data

The fields marked as ‘required’ in § 2.1.1 are not strictly required in all cases. The bibliography styles which ship with this package can get by with as little as a title field for most entry types. A book published anonymously, a periodical without an explicit editor, or a software manual without an explicit author should pose no problem as far as the bibliography is concerned. Citation styles, however, may have different requirements. For example, an author-year citation scheme obviously requires an author/editor and a year field.

You may generally use the \texttt{label} field to provide a substitute for any missing data required for citations. How the \texttt{label} field is employed depends on the citation style. The author-year citation styles which come with this package use the \texttt{label} field as a fallback if either the author/editor or the year is missing. The numeric styles, on the other hand, do not use it at all since the numeric scheme is independent of the available data. The author-title styles ignore it as well, because the bare title is usually sufficient to form a unique citation and a title is expected to be available in any case. The \texttt{label} field may also be used to override the non-numeric portion of the automatically generated \texttt{labelalpha} field used by alphabetic citation styles. See § 4.2.4 for details.

Note that traditional \texttt{BibTeX} styles support a \texttt{key} field which is used for alphabetizing if both author and editor are missing. The \texttt{biblatex} package treats key as an alias for \texttt{sortkey}. In addition to that, it offers very fine-grained sorting controls, see §§ 2.2.3 and 3.4 for details. The \texttt{natbib} package employs the \texttt{key} field as a fallback label for citations. Use the \texttt{label} field instead.

2.3.3 Corporate Authors and Editors

Corporate authors and editors are given in the author or editor field, respectively. Note that they must be wrapped in an extra pair of curly braces to prevent \texttt{BibTeX} from treating them as personal names which are to be dissected into their components. Use the shortauthor field if you want to give an abbreviated form of the name or an acronym for use in citations.

\begin{verbatim}
author = {{National Aeronautics and Space Administration}},
shortauthor = {NASA},
\end{verbatim}

The default citation styles will use the short name in all citations while the full name is printed in the bibliography. For corporate editors, use the corresponding
fields editor and shorteditor. Since all of these fields are treated as name lists, it is possible to mix personal names and corporate names, provided that the names of all corporations and institutions are wrapped in braces.

\[
\text{editor} = \{(\text{National Aeronautics and Space Administration})
\text{ and Doe, John}\),
\text{shorteditor} = \{\text{NASA and Doe, John}\).
\]

Users switching from the jurabib package to biblatex should note that the shortauthor field is treated as a name list.

**2.3.4 Literal Lists**

The fields institution, organization, publisher, and location are literal lists in terms of § 2.2. This also applies to origlocation, origpublisher and to the field aliases address and school. All of these fields may contain a list of items separated by the keyword ‘and’. If they contain a literal ‘and’, it must be wrapped in braces.

\[
\text{publisher} = \{\text{William Reid and Company}\),
\text{institution} = \{\text{Office of Information Management and Communications}\),
\text{organization} = \{\text{American Society for Photogrammetry and Remote Sensing and American Congress on Surveying and Mapping}\).
\]

Note the difference between a literal ‘(and)’ and the list separator ‘and’ in the above examples. You may also wrap the entire name in braces:

\[
\text{publisher} = \{(\text{William Reid and Company})\),
\text{institution} = \{(\text{Office of Information Management and Communications})\),
\text{organization} = \{(\text{American Society for Photogrammetry and Remote Sensing and American Congress on Surveying and Mapping})\).
\]

Legacy files which have not been updated for use with biblatex will still work if these fields do not contain a literal ‘and’. However, note that you will miss out on the additional features of literal lists in this case, such as configurable formatting and automatic truncation.

**2.3.5 Titles**

The following examples demonstrate how to handle different types of titles. Let's start with a five-volume work which is referred to as a whole:

\[
@\text{MvBook}\{\text{works},
\text{author} = \{\text{Shakespeare, William}\),
\text{title} = \{\text{Collected Works}\),
\text{volumes} = \{5\),
\text{...}
\]

The individual volumes of a multi-volume work usually have a title of their own. Suppose the fourth volume of the Collected Works includes Shakespeare's sonnets and we are referring to this volume only:
@Book{works:4,  
  author      = {Shakespeare, William},  
  maintitle   = {Collected Works},  
  title       = {Sonnets},  
  volume      = {4},  
  ...  
}

If the individual volumes do not have a title, we put the main title in the title field and include a volume number:

@Book{works:4,  
  author      = {Shakespeare, William},  
  title       = {Collected Works},  
  volume      = {4},  
  ...  
}

In the next example, we are referring to a part of a volume, but this part is a self-contained work with its own title. The respective volume also has a title and there is still the main title of the entire edition:

@InBook{lear,  
  author      = {Shakespeare, William},  
  bookauthor  = {Shakespeare, William},  
  maintitle   = {Collected Works},  
  booktitle   = {Tragedies},  
  title       = {King Lear},  
  volume      = {1},  
  pages       = {53-159},  
  ...  
}

Suppose the first volume of the Collected Works includes a reprinted essay by a well-known scholar. This is not the usual introduction by the editor but a self-contained work. The Collected Works also have a separate editor:

@InBook{stage,  
  author      = {Expert, Edward},  
  bookauthor  = {Shakespeare, William},  
  maintitle   = {Collected Works},  
  booktitle   = {Tragedies},  
  editor      = {Bookmaker, Bernard},  
  title       = {Shakespeare and the Elizabethan Stage},  
  volume      = {1},  
  pages       = {7-49},  
  ...  
}

See § 2.3.7 for further examples.

### 2.3.6 Editorial Roles

The type of editorial role performed by an editor in one of the editor fields (i.e., editor, editora, editorb, editorc) may be specified in the corresponding editor...type field. The following roles are supported by default. The role ‘editor’ is the default. In this case, the editortype field is omissible.
editor  The main editor. This is the most generic editorial role and the default value.

compiler  Similar to editor but used if the task of the editor is mainly compiling.

founder  The founding editor of a periodical or a comprehensive publication project such as a ‘Collected Works’ edition or a long-running legal commentary.

continuator  An editor who continued the work of the founding editor (founder) but was subsequenly replaced by the current editor (editor).

revisor  A secondary editor whose task is revising the work.

redactor  A secondary editor whose task is redacting the work.

collaborator  A secondary editor or a consultant to the editor.

For example, if the task of the editor is compiling, you may indicate that in the corresponding editortype field:

```plaintext
@Collection{...,
    editor  = {Editor, Edward},
    editortype = {compiler},
    ...
}
```

There may also be secondary editors in addition to the main editor:

```plaintext
@Book{...,
    author  = {...},
    editor  = {Editor, Edward},
    editora = {Redactor, Randolph},
    editoratype = {redactor},
    editorb  = {Consultant, Conrad},
    editorbtype = {collaborator},
    ...
}
```

Periodicals or long-running publication projects may see several generations of editors. For example, there may be a founding editor in addition to the current editor:

```plaintext
@Book{...,
    author  = {...},
    editor  = {Editor, Edward},
    editora = {Founder, Frederic},
    editoratype = {founder},
    ...
}
```

Note that only the editor is considered in citations and when sorting the bibliography. If an entry is typically cited by the founding editor (and sorted accordingly in the bibliography), the founder goes into the editor field and the current editor moves to one of the editor... fields:

```plaintext
@Collection{...,
    editor  = {Founder, Frederic},
    editortype = {founder},
    editora  = {Editor, Edward},
    ...
}
```
You may add more roles by initializing and defining a new localization key whose name corresponds to the identifier in the \texttt{editor...type} field. See §§ 3.7 and 4.9.1 for details.

### 2.3.7 Publication and Journal Series

The \texttt{series} field is used by traditional BibTeX styles both for the main title of a multi-volume work and for a publication series, i.e., a loosely related sequence of books by the same publisher which deal with the same general topic or belong to the same field of research. This may be ambiguous. This package introduces a \texttt{maintitle} field for multi-volume works and employs \texttt{series} for publication series only. The volume or number of a book in the series goes in the \texttt{number} field in this case:

```latex
@Book{...,  
  author = {Expert, Edward},  
  title = {Shakespeare and the Elizabethan Age},  
  series = {Studies in English Literature and Drama},  
  number = {57},  
  ...  
}
```

The \texttt{@article} entry type makes use of the \texttt{series} field as well, but handles it in a special way. First, a test is performed to determine whether the value of the field is an integer. If so, it will be printed as an ordinal. If not, another test is performed to determine whether it is a localization key. If so, the localized string is printed. If not, the value is printed as is. Consider the following example of a journal published in numbered series:

```latex
@Article{...,  
  journal = {Journal Name},  
  series = {3},  
  volume = {15},  
  number = {7},  
  year = {1995},  
  ...  
}
```

This entry will be printed as “\textit{Journal Name. 3rd ser. 15.7 (1995)}”. Some journals use designations such as “old series” and “new series” instead of a number. Such designations may be given in the \texttt{series} field as well, either as a literal string or as a localization key. Consider the following example which makes use of the localization key \texttt{newseries}:

```latex
@Article{...,  
  journal = {Journal Name},  
  series = {newseries},  
  volume = {9},  
  year = {1998},  
  ...  
}
```

This entry will be printed as “\textit{Journal Name. New ser. 9 (1998)}”. See § 4.9.2 for a list of localization keys defined by default.
2.3.8 Date Specifications

The date fields date, origdate, eventdate, and urldate require a date specification in `yyyy-mm-dd` format. Date ranges are given as `yyyy-mm-dd/yyyy-mm-dd`. Partial dates are valid provided that date components are omitted at the end only. You may specify an open ended date range by giving the range separator and omitting the end date (e.g., `yyyy/`). See table 2 for some examples of valid date specifications and the formatted date automatically generated by `biblatex`. The formatted date is language specific and will be adapted automatically. If there is no date field in an entry, `biblatex` will also consider the fields year and month for backwards compatibility with traditional BibTeX. Style author should note that date fields like `date` or `origdate` are only available in the `bib` file. All dates are parsed and dissected into their components as the `bib` file is processed. The date components are made available to styles by way of the special fields discussed in § 4.2.4.3. See this section and table 7 on page 127 for further information.

2.3.9 Months and Journal Issues

The `month` field is an integer field. The bibliography style converts the month to a language-dependent string as required. For backwards compatibility, you may also use the following three-letter abbreviations in the `month` field: `jan`, `feb`, `mar`, `apr`, `may`, `jun`, `jul`, `aug`, `sep`, `oct`, `nov`, `dec`. Note that these abbreviations are BibTeX strings which must be given without any braces or quotes. When using them, don’t say `month={jan}` or `month="jan"` but `month=jan`. It is not possible to specify a month such as `month={8/9}`. Use the date field for date ranges instead. Quarterly journals are typically identified by a designation such as ‘Spring’ or ‘Summer’ which should be given in the `issue` field. The placement of the `issue` field in `@article` entries is similar to and overrides the `month` field.

2.3.10 Pagination

When specifying a page or page range, either in the `pages` field of an entry or in the `{postnote}` argument to a citation command, it is convenient to have `biblatex` add prefixes like ‘p.’ or ‘pp.’ automatically and this is indeed what this package does by default. However, some works may use a different pagination scheme or may not be cited by page but rather by verse or line number. This is when the pagination and `bookpagination` fields come into play. As an example, consider the following entry:

<table>
<thead>
<tr>
<th>Date Specification</th>
<th>Formatted Date (Examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>1850</td>
</tr>
<tr>
<td>1997/</td>
<td>1997–</td>
</tr>
<tr>
<td>1967–02</td>
<td>02/1967</td>
</tr>
<tr>
<td>2009–01–31</td>
<td>31/01/2009</td>
</tr>
</tbody>
</table>

Table 2: Date Specifications
The bookpagination field affects the formatting of the pages and pagetotal fields in the list of references. Since page is the default, this field is omissible in the above example. In this case, the page range will be formatted as 'pp. 53–65'. Suppose that, when quoting from this work, it is customary to use verse numbers rather than page numbers in citations. This is reflected by the pagination field, which affects the formatting of the ⟨postnote⟩ argument to any citation command. With a citation like \cite[17]{key}, the postnote will be formatted as 'v. 17'. Setting the pagination field to section would yield ‘§ 17’. See § 3.11.3 for further usage instructions.

The pagination and bookpagination fields are key fields. This package will try to use their value as a localization key, provided that the key is defined. Always use the singular form of the key name in bib files, the plural is formed automatically. The keys page, column, line, verse, section, and paragraph are predefined, with page being the default. The string 'none' has a special meaning when used in a pagination or bookpagination field. It suppresses the prefix for the respective entry. If there are no predefined localization keys for the pagination scheme required by a certain entry, you can simply add them. See the commands \NewBibliographyString and \DefineBibliographyStrings in § 3.7. You need to define two localization strings for each additional pagination scheme: the singular form (whose localization key corresponds to the value of the pagination field) and the plural form (whose localization key must be the singular plus the letter 's'). See the predefined keys in § 4.9.2 for examples.

2.4 Hints and Caveats

This section provides some additional hints concerning the data interface of this package. It also addresses some common problems.

2.4.1 Cross-referencing

2.4.1.1 The crossref field (BibTeX)

The crossref field is a convenient way to establish a parent/child relation between two associated entries. Unfortunately, BibTeX uses symmetric field mapping which reduces the usefulness of the crossref field significantly. The are two issues with symmetric field mapping, as seen in the following example:

@Book{book,
  author = {Author},
  bookauthor = {Author},
  title = {Booktitle},
  booktitle = {Booktitle},
...

The bookpagination field affects the formatting of the pages and pagetotal fields in the list of references. Since page is the default, this field is omissible in the above example. In this case, the page range will be formatted as 'pp. 53–65'. Suppose that, when quoting from this work, it is customary to use verse numbers rather than page numbers in citations. This is reflected by the pagination field, which affects the formatting of the ⟨postnote⟩ argument to any citation command. With a citation like \cite[17]{key}, the postnote will be formatted as 'v. 17'. Setting the pagination field to section would yield ‘§ 17’. See § 3.11.3 for further usage instructions.

The pagination and bookpagination fields are key fields. This package will try to use their value as a localization key, provided that the key is defined. Always use the singular form of the key name in bib files, the plural is formed automatically. The keys page, column, line, verse, section, and paragraph are predefined, with page being the default. The string 'none' has a special meaning when used in a pagination or bookpagination field. It suppresses the prefix for the respective entry. If there are no predefined localization keys for the pagination scheme required by a certain entry, you can simply add them. See the commands \NewBibliographyString and \DefineBibliographyStrings in § 3.7. You need to define two localization strings for each additional pagination scheme: the singular form (whose localization key corresponds to the value of the pagination field) and the plural form (whose localization key must be the singular plus the letter 's'). See the predefined keys in § 4.9.2 for examples.
As BibTeX is not capable of mapping the title field of the parent to the booktitle field of the child, the title of the book needs to be given twice. The style then needs to ignore the booktitle of the parent since it is only required to work around this fundamental limitation of BibTeX. The problem with the subtitle field is the inverse of that. Since the subtitle of the parent would become the subtitle, rather than in the booksubtitle, of the child, we need to add an empty subtitle field to the child entry to prevent inheritance of this field. Of course we also need to duplicate the subtitle in the parent entry to ensure that it is available as booksubtitle in the child entry. In short, using BibTeX’s crossref field tends to bloat database files and corrupt the data model.

### 2.4.1.2 The crossref field (Biber)

With Biber, the limitations of BibTeX’s crossref field belong to the past. Biber features a highly customizable cross-referencing mechanism with flexible data inheritance rules. Duplicating certain fields in the parent entry or adding empty fields to the child entry is no longer required. Entries are specified in a natural way:

```biber
@Book{book,
  author = {Author},
  title = {Booktitle},
  subtitle = {Booksubtitle},
  publisher = {Publisher},
  location = {Location},
  date = {1995},
}
@InBook{inbook,
  crossref = {book},
  title = {Title},
  pages = {5--25},
}
```

The title field of the parent will be copied to the booktitle field of the child, the subtitle becomes the booksubtitle. The author of the parent becomes the bookauthor of the child and, since the child does not provide an author field, it is also duplicated as the author of the child. After data inheritance, the child entry is similar to this:

```biber
@Book{book,
  author = {Author},
  title = {Booktitle},
  subtitle = {Booksubtitle},
  publisher = {Publisher},
  location = {Location},
  date = {1995},
}
@InBook{inbook,
  crossref = {book},
  title = {Title},
  pages = {5--25},
}
```
See appendix A for a list of mapping rules set up by default. Note that all of this is customizable. See § 4.5.3 on how to configure Biber's cross-referencing mechanism. See also § 2.2.3.

2.4.1.3 The xref field

In addition to the crossref field, biblatex supports a simplified cross-referencing mechanism based on the xref field. This is useful if you want to establish a parent/child relation between two associated entries but prefer to keep them independent as far as the data is concerned. The xref field differs from crossref in that the child entry will not inherit any data from the parent. If the parent is referenced by a certain number of child entries, biblatex will automatically add it to the bibliography. The threshold is controlled by the mincrossrefs package option from § 3.1.2.1. The xref field is supported with all backends. See also § 2.2.3.

2.4.2 Capacity Issues

2.4.2.1 BibTeX

A venerable tool originally developed in the 1980s, BibTeX uses static memory allocation, much to the dismay of users working with large bibliographical databases. With a large bib file which contains several hundred entries, BibTeX is very likely to run out of memory. The number of entries it can cope with depends on the number of fields defined by the BibTeX style (bst). Style files which define a considerable number of fields, such as biblatex.bst, are more likely to trigger such problems. Unfortunately, traditional BibTeX does not output a clear error message when it runs out of memory but exposes a rather cryptical kind of faulty behavior. The warning messages printed in this case look like this:

```
Warning--I'm ignoring Jones1995's extra "year" field
--line 422 of file huge.bib
Warning--I'm ignoring Jones1995's extra "volume" field
--line 423 of file huge.bib
```

These warning messages could indeed indicate that the entry Jones1995 is faulty because it includes two year and two volume fields. If that is not the case and the bib file is fairly large, this is most likely a capacity issue. What makes these warnings so confusing is that they are not tied to a specific entry. If you remove the allegedly faulty entry, a different one will trigger similar warnings. This is one reason why switching to bibtex8 or Biber is advisable.
Table 3: Capacity and Switches of \texttt{bibtex8}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Switch</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Default</td>
</tr>
<tr>
<td>max cites</td>
<td>\texttt{--mcites}</td>
<td>750</td>
</tr>
<tr>
<td>max ent ints</td>
<td>\texttt{--mentints}</td>
<td>3000</td>
</tr>
<tr>
<td>max ent strs</td>
<td>\texttt{--mentstrs}</td>
<td>3000</td>
</tr>
<tr>
<td>max fields</td>
<td>\texttt{--mfields}</td>
<td>17250</td>
</tr>
<tr>
<td>max strings</td>
<td>\texttt{--mstrings}</td>
<td>4000</td>
</tr>
<tr>
<td>pool size</td>
<td>\texttt{--mpool}</td>
<td>65530</td>
</tr>
<tr>
<td>wiz fn space</td>
<td>\texttt{--mwizfuns}</td>
<td>3000</td>
</tr>
<tr>
<td>hash prime</td>
<td></td>
<td>4253</td>
</tr>
<tr>
<td>hash size</td>
<td></td>
<td>5000</td>
</tr>
</tbody>
</table>

2.4.2.2 \texttt{bibtex8}

\texttt{bibtex8} is a venerable tool as well and will also run out of memory with its default capacity. Switching from traditional \texttt{BibTeX} to \texttt{bibtex8} is still an improvement because the capacity of the latter may be increased at run-time via command-line switches and it also prints unambiguous error messages, for example:

\begin{verbatim}
17289 fields:
Sorry---you've exceeded \texttt{BibTeX}'s total number of fields 17250
\end{verbatim}

Table 3 gives an overview of the various capacity parameters of \texttt{bibtex8} and the command-line switches used to increase their default values. There are two ways to increase the capacity on the command-line. You may use a high-level switch like \texttt{--huge} to select a different set of defaults or low-level switches such as \texttt{--mfields} to modify a single parameter. The first thing you should always do is run \texttt{bibtex8} with the \texttt{--wolfgang} switch. Don't even bother trying anything else. With a very large database, however, even that capacity may be too small. In this case, you need to resort to the low-level switches. Here is an example of a set of switches which should cope with a \texttt{bib} file containing about 1000 entries:

\begin{verbatim}
bibtex8 --wolfgang --mcites 30000 --mentints 30000 --mentstrs 40000
  --mfields 250000 --mstrings 35000 --mpool 750000 --csfile csfile.csf
auxfile
\end{verbatim}

When taking a closer look at table 3, you will notice that there are two parameters which can not be modified directly, \texttt{hash prime} and \texttt{hash size}. Increasing these values is only possible with the high-level switches. That is why the above command includes the \texttt{--wolfgang} switch in addition to the low-level switches. This situation is very unfortunate because the hash size effectively sets a cap on some other parameters. For example, \texttt{max strings} can not be greater than \texttt{hash size}. If you hit this cap, all you can do is recompile \texttt{bibtex8} with a larger capacity. Also note that the \texttt{wiz_fn_space} parameter is not related to the \texttt{bib} file but to the memory requirements of the \texttt{bst} file. \texttt{biblatex.bst} needs a value of about 6000. The value 10000 implicitly used by the \texttt{--wolfgang} switch is fine.

2.4.2.3 \texttt{Biber}

\texttt{Biber} eliminates all of the above limitations.
2.4.3 Sorting and Encoding Issues

2.4.3.1 BibTeX

Traditional BibTeX can only alphabetize Ascii characters correctly. If the bibliographic data includes non-Ascii characters, they have to be given in Ascii notation. For example, instead of typing a letter like ‘ä’ directly, you need to input it as \"a\", using an accent command and the Ascii letter. This Ascii notation needs to be wrapped in a pair of curly braces. Traditional BibTeX will then ignore the accent and use the Ascii letter for sorting. Here are a few examples:

\begin{verbatim}
author = {S\'{a}nchez, Jos\'{e}},
editor = {Ma\ssmann, R\"udiger},
translator = {Ferdi\`ere, Fr\c{c}ois},
title = {{\OE}uvres compl\`etes},
\end{verbatim}

Apart from it being inconvenient, there are two major issues with this convention. One subtle problem is that the extra set of braces suppresses the kerning on both sides of all non-Ascii letters. But first and foremost, simply ignoring all accents may not be the correct way to handle them. For example, in Danish, the letter ‘å’ is the very last letter of the alphabet, so it should be alphabetized after ‘z’. BibTeX will sort it like an ‘a’. The ‘æ’ ligature and the letter ‘ø’ are also sorted after ‘z’ in this language. There are similar cases in Norwegian. In Swedish, the letter ‘ö’ is the very last letter of the alphabet and the letters ‘å’ and ‘ä’ are also alphabetized after ‘z’, rather than like an ‘a’. What’s more, even the sorting of Ascii characters is done in a rather peculiar way by traditional BibTeX because the sorting algorithm uses Ascii codepage order (0-9,A-Z,a-z). This implies that the lowercase letter ‘a’ would end up after the uppercase ‘Z’, which is not even acceptable in the language BibTeX was originally designed for. The traditional bst files work around this problem by converting all strings used for sorting to lowercase, i.e., sorting is effectively case-insensitive. See also § 2.4.3.4.

2.4.3.2 bibtex8

Switching to bibtex8 will help in such cases. bibtex8 can sort case-sensitively and it can handle 8-bit characters properly, provided that you supply it with a suitable csf file and give the --csfile switch on the command line. This also implies that it is possible to apply language specific sorting rules to the bibliography. The biblatex package comes with csf files for some common Western European encodings. bibtex8 also ships with a few csf files. Note that biblatex bst can not detect if it is running under traditional BibTeX or bibtex8, hence the bibtex8 package option. By default, sorting is case-insensitive since this is required for traditional BibTeX. If the bibtex8 package option is enabled, sorting is case-sensitive.

Since bibtex8 is backwards compatible with traditional BibTeX, it is possible to mix 8-bit input and Ascii notation. This is useful if the encoding used in the bib file does not cover all required characters. There are also a few marginal cases in which the Ascii notation scheme would yield better sorting results. A typical example is the ligature ‘œ’. bibtex8 will handle this ligature like a single character. Depending on the sorting scheme defined in the csf file, it could be treated like
an ‘o’ or alphabetized after the letter ‘o’ but it can not be sorted as ‘oe’. The Ascii notation (\oe) is equivalent to ‘oe’ during sorting:

title = {Œuvres complètes},
title = {{{\OE}uvres complètes},

Sometimes even that is not sufficient and further tricks are required. For example, the letter ‘ß’ in German is particularly tricky. This letter is essentially alphabetized as ‘ss’ but after ‘ss’. The name ‘Baßmann’ would be alphabetized as follows: Basmann/Bassmann/Baßmann/Bastmann. In this case, the Ascii notation (\ss) would yield slightly better sorting results than ‘ß’ in conjunction with a csf file which treats ‘ß’ like ‘s’:

author = {Baßmann, Paul},

To get it absolutely right, however, you need to resort to the sortname field:

author = {Baßmann, Paul},
sortname = {Basszzmann, Paul},

Not only BibTeX, LaTeX needs to know about the encoding as well. See § 2.4.3.4 on how to specify encodings.

2.4.3.3 Biber

Biber handles Ascii, 8-bit encodings such as Latin 1, and UTF-8. It features true Unicode support and is capable of reencoding the bib data on the fly in a robust way. For sorting, Biber uses a Perl implementation of the Unicode Collation Algorithm (uca), as outlined in Unicode Technical Standard #10.1 Collation tailoring based on the Unicode Common Locale Data Repository (cldr) is in the process of being added.2 The bottom line is that Biber will deliver sorting results far superior to both BibTeX and bibtex8 in many cases. If you are interested in the technical details, section 1.8 of Unicode Technical Standard #10 will provide you with a very concise summary of why the inadequateness of traditional BibTeX and even bibtex8 is of a very general nature and not limited to the lack of UTF-8 support.3

Supporting Unicode implies much more than handling UTF-8 input. Unicode is a complex standard covering more than its most well-known parts, the Unicode character encoding and transport encodings such as UTF-8. It also standardizes aspects such as string collation, which is required for language-sensitive sorting. For example, by using the Unicode Collation Algorithm, Biber can handle the character ‘ß’ mentioned as an example in § 2.4.3.2 without any manual intervention. All you need to do to get localized sorting is specify the locale:

\usepackage[backend=biber,sortlocale=de]{biblatex}

If the language of the document corresponds to the main locale of the operating system, sortlocale is omissible as Biber will detect the locale settings of the environment automatically. Note that this will also work with 8-bit encodings such

1 http://unicode.org/reports/tr10/
2 http://cldr.unicode.org/
3 http://unicode.org/reports/tr10/#Common_Misperceptions
as Latin 9, i.e., you can take advantage of Unicode-based sorting even though you are not using utf-8 input. See § 2.4.3.4 on how to specify input and data encodings properly.

2.4.3.4 Specifying Encodings

When using a non-Ascii encoding in the bib file, it is important to understand what biblatex can do for you and what may require manual intervention. The package takes care of the LaTeX side, i.e., it ensures that the data imported from the bbl file is interpreted correctly, provided that the bibencoding package option is set properly. Depending on the backend, the BibTeX side may demand attention, too. When using bibtex8, you need to supply bibtex8 with a matching csf file as it needs to know about the encoding of the bib file to be able to alphabetize the entries correctly. Unfortunately, there is no way for biblatex to pass this information to bibtex8 automatically. The only way is setting its --csfile option on the command line when running bibtex8. When using Biber, all of this is handled automatically and no further steps, apart from setting the bibencoding option in certain cases, are required. Here are a few typical usage scenarios along with the relevant lines from the document preamble:

- Ascii notation in both the tex and the bib file with pdfTeX or traditional TeX (this will work with BibTeX, bibtex8, and Biber):

  \usepackage{biblatex}

- Latin 1 encoding (iso-8859-1) in the tex file, Ascii notation in the bib file with pdfTeX or traditional TeX (BibTeX, bibtex8, Biber):

  \usepackage[latin1]{inputenc}
  \usepackage[bibencoding=ascii]{biblatex}

- Latin 9 encoding (iso-8859-15) in both the tex and the bib file with pdfTeX or traditional TeX (bibtex8, Biber):

  \usepackage[latin9]{inputenc}
  \usepackage[bibencoding=latin9]{biblatex}

  Since bibencoding=auto is the default setting, the option is omissible. The following setup will have the same effect:

  \usepackage[latin9]{inputenc}
  \usepackage{biblatex}

- utf-8 encoding in the tex file, Latin 1 (iso-8859-1) in the bib file with pdfTeX or traditional TeX (bibtex8, Biber):

  \usepackage[utf8]{inputenc}
  \usepackage[bibencoding=latin1]{biblatex}

  The same scenario with XeTeX or LuaTeX in native utf-8 mode:

  \usepackage[bibencoding=latin1]{biblatex}

- Using utf-8 encoding in both the tex and the bib file is not possible with
traditional BibTeX or biblatex since neither of them is capable of handling \texttt{utf-8}. Unless you switch to Biber, you need to use an 8-bit encoding such as Latin 1 (see above) or resort to Ascii notation in this case:

\begin{verbatim}
\usepackage[utf8]{inputenc}
\usepackage[bibencoding=ascii]{biblatex}
\end{verbatim}

The same scenario with XeTeX or LuaTeX in native \texttt{utf-8} mode:

\begin{verbatim}
\usepackage[bibencoding=ascii]{biblatex}
\end{verbatim}

Biber can handle Ascii notation, 8-bit encodings such as Latin 1, and \texttt{utf-8}. It is also capable of reencoding the \texttt{bib} data on the fly (replacing the limited macro-level reencoding feature of \texttt{biblatex}). This will happen automatically if required, provided that you specify the encoding of the \texttt{bib} files properly. In addition to the scenarios discussed above, Biber can also handle the following cases:

- **Transparent \texttt{utf-8} workflow**, i.e., \texttt{utf-8} encoding in both the \texttt{tex} and the \texttt{bib} file with \texttt{pdftex} or traditional TeX:

\begin{verbatim}
\usepackage[utf8]{inputenc}
\usepackage[bibencoding=auto]{biblatex}
\end{verbatim}

Since \texttt{bibencoding=auto} is the default setting, the option is omissible:

\begin{verbatim}
\usepackage[utf8]{inputenc}
\usepackage{biblatex}
\end{verbatim}

The same scenario with XeTeX or LuaTeX in native \texttt{utf-8} mode:

\begin{verbatim}
\usepackage{biblatex}
\end{verbatim}

- **It is even possible to combine an 8-bit encoded \texttt{tex} file with \texttt{utf-8} encoding in the \texttt{bib} file**, provided that all characters in the \texttt{bib} file are also covered by the selected 8-bit encoding:

\begin{verbatim}
\usepackage[latin1]{inputenc}
\usepackage[bibencoding=utf8]{biblatex}
\end{verbatim}

Some workarounds may be required when using traditional TeX or \texttt{pdftex} with \texttt{utf-8} encoding because \texttt{inputenc}'s \texttt{utf8} module does not cover all of Unicode. Roughly speaking, it only covers the Western European Unicode range. When loading \texttt{inputenc} with the \texttt{utf8} option, \texttt{biblatex} will normally instruct Biber to reencode the \texttt{bib} data to \texttt{utf-8}. This may lead to \texttt{inputenc} errors if some of the characters in the \texttt{bib} file are outside the limited Unicode range supported by \texttt{inputenc}.

- **If you are affected by this problem**, try setting the \texttt{safeinputenc} option:

\begin{verbatim}
\usepackage[utf8]{inputenc}
\usepackage[safeinputenc]{biblatex}
\end{verbatim}

If this option is enabled, \texttt{biblatex} will ignore \texttt{inputenc}'s \texttt{utf8} option and use

42
Ascii. Biber will then try to convert the bib data to Ascii notation. For example, it will convert $\$ to $\k\{\$}. This option is similar to setting \textencoding=ascii but will only take effect in this specific scenario (inputenc/inputenx with utf-8). This workaround takes advantage of the fact that both Unicode and the utf-8 transport encoding are backwards compatible with Ascii.

This solution may be acceptable as a workaround if the data in the bib file is mostly Ascii anyway, with only a few strings, such as some authors’ names, causing problems. However, keep in mind that it will not magically make traditional TeX or pdfTeX support Unicode. It may help if the occasional odd character is not supported by inputenc, but may still be processed by TeX when using an accent command (e.g., \d{S} instead of $\$). If you need full Unicode support, however, switch to XeTeX or LuaTeX.

### 2.4.4 Editors and Compiler Scripts

This section is in need of an update to match the new script interface used by biblatex. For the time being, see the documentation of the logreq package\(^1\) and the Biblatex Developer’s Wiki for a draft spec.\(^2\)

### 3 User Guide

This part of the manual documents the user interface of the biblatex package. The user guide covers everything you need to know in order to use biblatex with the default styles that come with this package. You should read the user guide first in any case. If you want to write your own citation and/or bibliography styles, continue with the author guide afterwards.

#### 3.1 Package Options

All package options are given in \langle key⟩=⟨value⟩ notation. The value true is omisible with all boolean keys. For example, giving sortcites without a value is equivalent to sortcites=true.

##### 3.1.1 Load-time Options

The following options must be used as biblatex is loaded, i.e., in the optional argument to \usepackage.

- **style=⟨file⟩** 
  default: numeric
  Loads the bibliography style file.bbx and the citation style file.cbx. See § 3.3 for an overview of the standard styles.

- **bibstyle=⟨file⟩** 
  default: numeric
  Loads the bibliography style file.bbx. See § 3.3.2 for an overview of the standard bibliography styles.

---

1 http://www.ctan.org/tex-archive/macros/latex/contrib/logreq/
citestyle=(file)  

Loads the citation style file.cbx. See § 3.3.1 for an overview of the standard citation styles.

natbib=true, false  

Loads compatibility module which provides aliases for the citation commands of the natbib package. See § 3.6.9 for details.

mcite=true, false  

Loads a citation module which provides mcite/mciteplus-like citation commands. See § 3.6.10 for details.

3.1.2 Preamble Options

3.1.2.1 General

The following options may be used in the optional argument to \usepackage as well as in the configuration file and the document preamble. The default value listed to the right is the package default. Note that bibliography and citation styles may modify the default setting at load time, see § 3.3 for details.

sorting=nty, nyt, nyvt, anyt, anyvt, ynt, ydnt, none, debug, ⟨name⟩  

The sorting order of the bibliography. Unless stated otherwise, the entries are sorted in ascending order. The following choices are available by default:

- nty: Sort by name, title, year.
- nyt: Sort by name, year, title.
- nyvt: Sort by name, year, volume, title.
- anyt: Sort by alphabetic label, name, year, title.
- anyvt: Sort by alphabetic label, name, year, volume, title.
- ynt: Sort by year, name, title.
- ydnt: Sort by year (descending), name, title.
- none: Do not sort at all. All entries are processed in citation order.
- debug: Sort by entry key. This is intended for debugging only.
- ⟨name⟩: Use ⟨name⟩, as defined with \DeclareSortingScheme (§ 4.5.1)  

Biber only

Using any of the ‘alphabetic’ sorting schemes only makes sense in conjunction with a bibliography style which prints the corresponding labels. Note that some bibliography styles initialize this package option to a value different from the package default (nty). See § 3.3.2 for details. Please refer to § 3.4 for an in-depth explanation of the above sorting options as well as the fields considered in the sorting process. See also § 4.5.1 on how to adapt the predefined schemes or define new ones.

sortcase=true, false  

Whether or not to sort the bibliography and the list of shorthands case-sensitively. Note that case-sensitive sorting is only supported by the \bibtex8 and Biber back-
ends. Sorting is always case-insensitive with legacy BibTeX. See the backend option for details.

**sortupper**=true, false

default: true

Biber only

This option corresponds to Biber's --sortupper command-line option. It has no effect with any other backend. If enabled, the bibliography is sorted in 'uppercase before lowercase' order. Disabling this option means 'lowercase before uppercase' order.

**sortlocale**=⟨locale⟩

Biber only

This option corresponds to Biber's --sortlocale command-line option. It has no effect with any other backend. If set, it specifies the locale to be used for sorting. While biblatex provides no default value for this option, Biber will inherit the locale settings from the environment if no locale has been specified explicitly.

**sortlos**=bib, los

default: los

The sorting order of the list of shorthands. The following choices are available:

- *bib*: Sort according to the sorting order of the bibliography.
- *los*: Sort by shorthand.

**sortcites**=true, false

default: false

Whether or not to sort citations if multiple entry keys are passed to a citation command. If this option is enabled, citations are sorted according to the sorting order of the bibliography. This feature works with all citation styles.

**maxnames**=⟨integer⟩

default: 3

A threshold affecting all lists of names (author, editor, etc.). If a list exceeds this threshold, i.e., if it holds more than ⟨integer⟩ names, it is automatically truncated according to the setting of the minnames option. maxnames is the master option which sets both maxbibnames and maxcitenames.

**minnames**=⟨integer⟩

default: 1

A limit affecting all lists of names (author, editor, etc.). If a list holds more than ⟨maxnames⟩ names, it is automatically truncated to ⟨minnames⟩ names. The ⟨minnames⟩ value must be smaller than or equal to ⟨maxnames⟩. minnames is the master option which sets both minbibnames and mincitenames.

**maxbibnames**=⟨integer⟩

default: ⟨maxnames⟩

Similar to maxnames but affects only the bibliography.

**minbibnames**=⟨integer⟩

default: ⟨minnames⟩

Similar to minnames but affects only the bibliography.

**maxcitenames**=⟨integer⟩

default: ⟨maxnames⟩

Similar to maxnames but affects only the citations in the document body.
\texttt{mincitenames=⟨integer⟩} \quad \text{default: ⟨minnames⟩}

Similar to minnames but affects only the citations in the document body.

\texttt{maxitems=⟨integer⟩} \quad \text{default: 3}

Similar to maxnames, but affecting all literal lists (publisher, location, etc.).

\texttt{minitems=⟨integer⟩} \quad \text{default: 1}

Similar to minnames, but affecting all literal lists (publisher, location, etc.).

\texttt{autocite=plain, inline, footnote, superscript, ...}

This option controls the behavior of the \texttt{autocite} command discussed in § 3.6.4. The \texttt{plain} option makes \texttt{autocite} behave like \texttt{cite}, \texttt{inline} makes it behave like \texttt{parencite}, \texttt{footnote} makes it behave like \texttt{footcite}, and \texttt{superscript} makes it behave like \texttt{supercite}. The options \texttt{plain}, \texttt{inline}, and \texttt{footnote} are always available, the \texttt{superscript} option is only provided by the numeric citation styles which come with this package. The citation style may also define additional options. The default setting of this option depends on the selected citation style, see § 3.3.1.

\texttt{autopunct=true, false} \quad \text{default: true}

This option controls whether the citation commands scan ahead for punctuation marks. See § 3.6 and \texttt{\DeclareAutoPunctuation} in § 4.7.5 for details.

\texttt{language=auto, ⟨language⟩} \quad \text{default: auto}

This option controls multilingual support. When set to auto, biblatex will try to get the main document language from the babel package (and fall back to English if babel is not available). This is the default behavior. It is also possible to select the document language manually. In this case, the babel option below will have no effect. Please refer to table 4 for a list of supported languages and the corresponding identifiers.

\texttt{clearlang=true, false} \quad \text{default: true}

If this option is enabled, biblatex will automatically clear the language field of all entries whose language matches the babel language of the document (or the language specified explicitly with the language option) in order to omit redundant language specifications. The language mappings required by this feature are provided by the \texttt{\DeclareRedundantLanguages} command from § 4.9.1.

\texttt{babel=none, hyphen, other, other*} \quad \text{default: none}

This option controls which language environment is used if the babel package is loaded and a bibliography entry includes a hyphenation field (see § 2.2.3). Note that biblatex automatically adjusts to the main document language if babel is loaded. In multilingual documents, it will also continually adjust to the current language as far as citations and the default language of the bibliography is con-
Table 4: Supported Languages

<table>
<thead>
<tr>
<th>Language</th>
<th>Region/Dialect</th>
<th>Identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danish</td>
<td>Denmark</td>
<td>danish</td>
</tr>
<tr>
<td>Dutch</td>
<td>Netherlands</td>
<td>dutch</td>
</tr>
<tr>
<td>English</td>
<td>USA</td>
<td>american</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td>british</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>canadian</td>
</tr>
<tr>
<td></td>
<td>Australia</td>
<td>australian</td>
</tr>
<tr>
<td></td>
<td>New Zealand</td>
<td>newzealand</td>
</tr>
<tr>
<td>Finnish</td>
<td>Finland</td>
<td>finnish</td>
</tr>
<tr>
<td>French</td>
<td>France, Canada</td>
<td>french</td>
</tr>
<tr>
<td>German</td>
<td>Germany</td>
<td>german</td>
</tr>
<tr>
<td></td>
<td>Austria</td>
<td>austrian</td>
</tr>
<tr>
<td>German (new)</td>
<td>Germany</td>
<td>ngerman</td>
</tr>
<tr>
<td></td>
<td>Austria</td>
<td>naustrian</td>
</tr>
<tr>
<td>Greek</td>
<td>Greece</td>
<td>greek</td>
</tr>
<tr>
<td>Italian</td>
<td>Italy</td>
<td>italian</td>
</tr>
<tr>
<td>Norwegian</td>
<td>Norway</td>
<td>norwegian</td>
</tr>
<tr>
<td>Portuguese</td>
<td>Brazil</td>
<td>brazilian</td>
</tr>
<tr>
<td></td>
<td>Portugal</td>
<td>portuguese</td>
</tr>
<tr>
<td>Russian</td>
<td>Russia</td>
<td>russian</td>
</tr>
<tr>
<td>Spanish</td>
<td>Spain</td>
<td>spanish</td>
</tr>
<tr>
<td>Swedish</td>
<td>Sweden</td>
<td>swedish</td>
</tr>
</tbody>
</table>

cerned. This option is for switching languages on a per-entry basis within the bibliography. The possible choices are:

- **none**  
  Disable this feature, i.e., do not use any language environment at all.

- **hyphen**  
  Enclose the entry in a hyphenrules environment. This will load hyphenation patterns for the language specified in the hyphenation field of the entry, if available.

- **other**  
  Enclose the entry in an otherlanguage environment. This will load hyphenation patterns for the specified language, enable all extra definitions which babel and biblatex provide for the respective language, and translate key terms such as ‘editor’ and ‘volume’. The extra definitions include localizations of the date format, of ordinals, and similar things.

- **other***  
  Enclose the entry in an otherlanguage* environment. Please note that biblatex treats otherlanguage* like otherlanguage but other packages may make a distinction in this case.

**block=none, space, par, nbpar, ragged**  
**default: none**

This option controls the extra spacing between blocks, i.e., larger segments of a bibliography entry. The possible choices are:

- **none**  
  Do not add anything at all.

- **space**  
  Insert additional horizontal space between blocks. This is similar to the default behavior of the standard LaTeX document classes.
Starting a new paragraph for every block. This is similar to the `openbib` option of the standard LaTeX document classes.

**nbpar**

Similar to the `par` option, but disallows page breaks at block boundaries and within an entry.

**ragged**

Inserts a small negative penalty to encourage line breaks at block boundaries and sets the bibliography ragged right.

The `newblockpunct` command may also be redefined directly to achieve different results, see § 3.8.1. Also see § 4.7.1 for additional information.

**notetype=foot+end, footonly, endonly**  default: foot+end

This option controls the behavior of `\mkbibfootnote`, `\mkbibendnote`, and similar wrappers from § 4.10.4. The possible choices are:

- **foot+end** Support both footnotes and endnotes, i.e., `\mkbibfootnote` will generate footnotes and `\mkbibendnote` will generate endnotes.
- **footonly** Force footnotes, i.e., make `\mkbibendnote` generate footnotes.
- **endonly** Force endnotes, i.e., make `\mkbibfootnote` generate endnotes.

**hyperref=true, false, auto**  default: auto

Whether or not to transform citations and back references into clickable hyperlinks. This feature requires the `hyperref` package. It also requires support by the selected citation style. All standard styles which ship with this package support hyperlinks. `hyperref=auto` automatically detects if the `hyperref` package has been loaded.

**backref=true, false**  default: false

Whether or not to print back references in the bibliography. The back references are a list of page numbers indicating the pages on which the respective bibliography entry is cited. If there are `refsection` environments in the document, the back references are local to the reference sections. Strictly speaking, this option only controls whether the `biblatex` package collects the data required to print such references. This feature still has to be supported by the selected bibliography style. All standard styles which ship with this package do so.

**backrefstyle=none, three, two, two+, three+, all+**  default: three

This option controls how sequences of consecutive pages in the list of back references are formatted. The following styles are available:

- **none** Disable this feature, i.e., do not compress the page list.
- **three** Compress any sequence of three or more consecutive pages to a range, e.g., the list ‘1, 2, 11, 12, 13, 21, 22, 23, 24’ is compressed to ‘1–3, 21–24’.
- **two** Compress any sequence of two or more consecutive pages to a range, e.g., the above list is compressed to ‘1–2, 11–13, 21–24’.
- **two+** Similar in concept to `two` but a sequence of exactly two consecutive pages is printed using the starting page and the localization string `sequens`, e.g., the above list is compressed to ‘1 sq., 11–13, 21–24’.

48
three+ Similar in concept to two+ but a sequence of exactly three consecutive pages is printed using the starting page and the localization string sequentes, e.g., the above list is compressed to '1 sq., 11 sqq., 21–24'.

all+ Similar in concept to three+ but any sequence of consecutive pages is printed as an open-ended range, e.g., the above list is compressed to '1 sq., 11 sqq., 21 sqq.'.

All styles support both Arabic and Roman numerals. In order to avoid potentially ambiguous lists, different sets of numerals will not be mixed when generating ranges, e.g., the list 'iii, iv, v, 6, 7, 8' is compressed to 'iii–v, 6–8'.

backrefsetstyle=setonly, memonly, setormem, setandmem, memandset, setplusmem, default: setonly

This option controls how back references to @set entries and their members are handled. The following options are available:

- setonly All back references are added to the @set entry. The pageref lists of set members remain blank.
- memonly References to set members are added to the respective member. References to the @set entry are added to all members. The pageref list of the @set entry remains blank.
- setormem References to the @set entry are added to the @set entry. References to set members are added to the respective member.
- setandmem References to the @set entry are added to the @set entry. References to set members are added to the respective member and to the @set entry.
- memandset References to the @set entry are added to the @set entry and to all members. References to set members are added to the respective member.
- setplusmem References to the @set entry are added to the @set entry and to all members. References to set members are added to the respective member and to the @set entry.

indexing=true, false, cite, bib, default: false

This option controls indexing in citations and in the bibliography. More precisely, it affects the \ifciteindex and \ifbibindex commands from § 4.6.2. The option is settable on a global, a per-type, or on a per-entry basis. The possible choices are:

- true Enable indexing globally.
- false Disable indexing globally.
- cite Enable indexing in citations only.
- bib Enable indexing in the bibliography only.

This feature requires support by the selected citation style. All standard styles which ship with this package support indexing of both citations and entries in the bibliography. Note that you still need to enable indexing globally with \makeindex to get an index.
loadfiles=true, false  
\textit{default: false}

This option controls whether external files requested by way of the \texttt{\textbackslash printfile} command are loaded. See also § 3.10.8 and \texttt{\textbackslash printfile} in § 4.4.1. Note that this feature is disabled by default for performance reasons.

refsection=none, part, chapter, section, subsection  
\textit{default: none}

This option automatically starts a new reference section at a document division such as a chapter or a section. This is equivalent to the \texttt{\textbackslash newrefsection} command, see § 3.5.4 for details. The following choice of document divisions is available:

\begin{itemize}
  \item \texttt{none} Disable this feature.
  \item \texttt{part} Start a reference section at every \texttt{\part} command.
  \item \texttt{chapter} Start a reference section at every \texttt{\chapter} command.
  \item \texttt{section} Start a reference section at every \texttt{\section} command.
  \item \texttt{subsection} Start a reference section at every \texttt{\subsection} command.
\end{itemize}

The starred versions if these commands will not start a new reference section.

refsegment=none, part, chapter, section, subsection  
\textit{default: none}

Similar to the refsection option but starts a new reference segment. This is equivalent to the \texttt{\textbackslash newrefsegment} command, see § 3.5.5 for details. When using both options, note that you can only apply this option to a lower-level document division than the one refsection is applied to and that nested reference segments will be local to the enclosing reference section.

citereset=none, part, chapter, section, subsection  
\textit{default: none}

This option automatically executes the \texttt{\textbackslash citereset} command from § 3.6.8 at a document division such as a chapter or a section. The following choice of document divisions is available:

\begin{itemize}
  \item \texttt{none} Disable this feature.
  \item \texttt{part} Perform a reset at every \texttt{\part} command.
  \item \texttt{chapter} Perform a reset at every \texttt{\chapter} command.
  \item \texttt{section} Perform a reset at every \texttt{\section} command.
  \item \texttt{subsection} Perform a reset at every \texttt{\subsection} command.
\end{itemize}

The starred versions if these commands will not trigger a reset.

abbreviate=true, false  
\textit{default: true}

Whether or not to use long or abbreviated strings in citations and in the bibliography. This option affects the localization modules. If this option is enabled, key terms such as ‘editor’ are abbreviated. If not, they are written out.

date=short, long, terse, comp, iso8601  
\textit{default: comp}

This option controls the basic format of printed date specifications. The following choices are available:

\begin{itemize}
  \item \texttt{short} Use the short format with verbose ranges, for example:
\end{itemize}
As seen in the above examples, the actual date format is language specific. Note
that the month name in all long formats is responsive to the abbreviate package
option. The leading zeros in all short formats may be controlled separately with
the datezeros package option.

\textbf{origdate=}short, long, terse, comp, iso8601 \hspace{1cm} \textbf{default:} comp

Similar to the date option but controls the format of the \texttt{origdate}.

\textbf{eventdate=}short, long, terse, comp, iso8601 \hspace{1cm} \textbf{default:} comp

Similar to the date option but controls the format of the \texttt{eventdate}.

\textbf{urldate=}short, long, terse, comp, iso8601 \hspace{1cm} \textbf{default:} short

Similar to the date option but controls the format of the \texttt{urldate}.

\textbf{alldates=}short, long, terse, comp, iso8601

Sets all of the above date options to the same value.

\textbf{datezeros=}true, false \hspace{1cm} \textbf{default:} true

This option controls whether short and terse dates are printed with leading ze-
ros.

\textbf{dateabbrev=}true, false \hspace{1cm} \textbf{default:} true

This option controls whether long and comp dates are printed with long or abbre-
viated month names. The option is similar to the generic abbreviate option but
specific to the date formatting.

\textbf{defernumbers=}true, false \hspace{1cm} \textbf{default:} false

In contrast to standard \LaTeX, the numeric labels generated by this package are
normally assigned to the full list of references at the beginning of the document.
body. If this option is enabled, numeric labels (i.e., the \texttt{labelnumber} field discussed in § 4.2.4) are assigned the first time an entry is printed in any bibliography. See § 3.11.5 for further explanation.

\texttt{\texttt{punctfont=}true,false} \quad \text{default: false}

This option enables an alternative mechanism for dealing with unit punctuation after a field printed in a different font (for example, a title printed in italics). See \texttt{\setpunctfont} in § 4.7.1 for details.

\texttt{\texttt{arxiv=}abs, ps, pdf, format} \quad \text{default: abs}

Path selector for arXiv links. If hyperlink support is enabled, this option controls which version of the document the arXiv \texttt{eprint} links will point to. The following choices are available:

\texttt{abs} \quad \text{Link to the abstract page.}
\texttt{ps} \quad \text{Link to the PostScript version.}
\texttt{pdf} \quad \text{Link to the PDF version.}
\texttt{format} \quad \text{Link to the format selector page.}

See § 3.10.7 for details on support for arXiv and electronic publishing information.

\texttt{\texttt{backend=}bibtex, bibtex8, bibtexu, biber} \quad \text{default: bibtex}

Specifies the database backend. The following backends are supported:

\texttt{\texttt{bibtex}} \quad \text{Legacy BibTeX. Traditional BibTeX supports Ascii encoding only. Sorting is always case-insensitive.}
\texttt{\texttt{bibtex8}} \quad \text{bibtex8, the 8-bit implementation of BibTeX, supports Ascii and 8-bit encodings such as Latin 1. Depending on the \texttt{csf} file, case-sensitive sorting may be supported.}
\texttt{\texttt{bibtexu}} \quad \text{bibtexu is a Unicode-enabled implementation of BibTeX which supports utf-8. Note that bibtexu is not actively supported by biblatex and has not been tested as backend in any way. Biber is the recommended backend.}
\texttt{\texttt{biber}} \quad \text{Biber, the next-generation backend of biblatex, supports Ascii, 8-bit encodings, utf-8, on-the-fly reencoding, locale-specific sorting, and many other features. Locale-specific sorting, case-sensitive sorting, and upper/lowercase precedence are controlled by the options sortlocale, sortcase, and sortupper, respectively.}

This option will typically be set permanently in the configuration file, see § 3.2 for details. Also see § 2.4.3 for further instructions concerning the encoding of \texttt{bib} files.

\texttt{\texttt{texencoding=}auto, \langle encoding \rangle} \quad \text{default: auto}

Specifies the encoding of the \texttt{tex} file. This option affects the data transferred from the backend to biblatex. When using Biber, this corresponds to Biber's \texttt{--bblencoding} option. The following choices are available:
auto Try to auto-detect the input encoding. If the \texttt{inputenc/inputenx/luainputenc} package is available, \texttt{biblatex} will get the main encoding from that package. If not, it assumes \texttt{UTF-8} encoding if XeTeX or LuaTeX has been detected, and Ascii otherwise.

\texttt{(encoding)} Specifies the \texttt{(encoding)} explicitly. This is for odd cases in which auto-detection fails or you want to force a certain encoding for some reason.

Note that setting \texttt{texencoding=(encoding)} will also affect the \texttt{bibencoding} option if \texttt{bibencoding=auto}.

\texttt{bibencoding=auto, (encoding)} default: auto

Specifies the encoding of the \texttt{bib} files. When using \texttt{Biber}, this corresponds to \texttt{Biber's \--bibencoding} option. The following choices are available:

\texttt{auto} Use this option if the workflow is transparent, i.e., if the encoding of the \texttt{bib} file is identical to the encoding of the \texttt{tex} file.

\texttt{(encoding)} If the encoding of the \texttt{bib} file is different from the one of the \texttt{tex} file, you need to specify it explicitly.

By default, \texttt{biblatex} assumes that the \texttt{tex} file and the \texttt{bib} file use the same encoding (\texttt{bibencoding=auto}). Note that some backends only support a limited number of encodings. See § 2.4.3 for further instructions.

\texttt{safeinputenc=true, false} default: false \texttt{Biber only}

If this option is enabled, \texttt{biblatex} will automatically force \texttt{texencoding=ascii} if the \texttt{inputenc/inputenx} package has been loaded and the input encoding is \texttt{UTF-8}, i.e., it will ignore any macro-based \texttt{UTF-8} support and use Ascii only. \texttt{Biber} will then try to convert any non-Ascii data in the \texttt{bib} file to Ascii. For example, it will convert \$\texttt{S}\$ to \texttt{\textbackslash d(\texttt{S})}. See § 2.4.3.4 for an explanation of why you may want to enable this option.

\texttt{bibwarn=true, false} default: true

By default, \texttt{biblatex} will report warnings issued by the backend concerning the data in the \texttt{bib} file as \LaTeX{} warnings. Use this option to suppress such warnings.

\texttt{mincrossrefs=(integer)} default: 2

Sets the minimum number of cross references to \texttt{(integer)} when requesting a \texttt{BibTeX} run.\footnote{If an entry which is cross-referenced by other entries in the \texttt{bib} file hits this threshold, it is included in the bibliography even if it has not been cited explicitly. This is a standard feature of \texttt{BibTeX} and not specific to \texttt{biblatex}. See the description of the \texttt{crossref} field in § 2.2.3 for further information.} Note that this package option merely affects the format of certain requests written to the transcript file. It will not have any effect if the editor or compiler script launching \texttt{BibTeX} does not include dedicated \texttt{biblatex} support or
if BibTeX is manually launched from the command-line. This option also affects the handling of the \texttt{xref} field. See the field description in § 2.2.3 as well as § 2.4.1 for details.

### 3.1.2.2 Style-specific

The following options are provided by the standard styles (as opposed to the core package). Technically, they are preamble options like those in § 3.1.2.1.

- **\texttt{isbn} = \texttt{true}, \texttt{false}**  
  - default: \texttt{true}
  - This option controls whether the fields isbn/issn/isrn are printed.

- **\texttt{url} = \texttt{true}, \texttt{false}**  
  - default: \texttt{true}
  - This option controls whether the \texttt{url} field and the access date is printed. The option only affects entry types whose \texttt{url} information is optional. The \texttt{url} field of \texttt{@online} entries is always printed.

- **\texttt{doi} = \texttt{true}, \texttt{false}**  
  - default: \texttt{true}
  - This option controls whether the field doi is printed.

- **\texttt{eprint} = \texttt{true}, \texttt{false}**  
  - default: \texttt{true}
  - This option controls whether eprint information is printed.

### 3.1.2.3 Internal

The default settings of the following preamble options are controlled by bibliography and citation styles. Apart from the \texttt{pagetracker} and \texttt{firstinits} options, which you may want to adapt, there is normally no need to set them explicitly.

- **\texttt{pagetracker} = \texttt{true}, \texttt{false}, \texttt{page}, \texttt{spread}**  
  - default: \texttt{false}
  - This option controls the page tracker which is required by the \texttt{\ifsamepage} and \texttt{\iffirstonpage} tests from § 4.6.2. The possible choices are:

  - \texttt{true}  
    - Enable the tracker in automatic mode. This is like \texttt{spread} if LaTeX is in twoside mode, and like \texttt{page} otherwise.

  - \texttt{false}  
    - Disable the tracker.

  - \texttt{page}  
    - Enable the tracker in page mode. In this mode, tracking works on a per-page basis.

  - \texttt{spread}  
    - Enable the tracker in spread mode. In this mode, tracking works on a per-spread (double page) basis.

  Note that this tracker is disabled in all floats, see § 4.11.5.

- **\texttt{citecounter} = \texttt{true}, \texttt{false}, \texttt{context}**  
  - default: \texttt{false}
  - This option controls the citation counter which is required by \texttt{citecounter} from § 4.6.2. The possible choices are:

  As of this writing, no LaTeX editors or compiler scripts with dedicated \texttt{biblatex} support are known, but this will hopefully change in the future.
<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>true</strong></td>
<td>Enable the citation counter in global mode.</td>
</tr>
<tr>
<td><strong>false</strong></td>
<td>Disable the citation counter.</td>
</tr>
<tr>
<td><strong>context</strong></td>
<td>Enable the citation counter in context-sensitive mode. In this mode, citations in footnotes and in the body text are counted independently.</td>
</tr>
</tbody>
</table>

**citetracker**=true, false, context, strict, constrict  
(default: false)

This option controls the citation tracker which is required by the \ifciteseen and \ifentryseen tests from § 4.6.2. The possible choices are:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>true</strong></td>
<td>Enable the tracker in global mode.</td>
</tr>
<tr>
<td><strong>false</strong></td>
<td>Disable the tracker.</td>
</tr>
<tr>
<td><strong>context</strong></td>
<td>Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked independently.</td>
</tr>
<tr>
<td><strong>strict</strong></td>
<td>Enable the tracker in strict mode. In this mode, an item is only considered by the tracker if it appeared in a stand-alone citation, i.e., if a single entry key was passed to the citation command.</td>
</tr>
<tr>
<td><strong>constrict</strong></td>
<td>This mode combines the features of context and strict.</td>
</tr>
</tbody>
</table>

Note that this tracker is disabled in all floats, see § 4.11.5.

**ibidtracker**=true, false, context, strict, constrict  
(default: false)

This option controls the ‘ibidem’ tracker which is required by the \ifciteibid test from § 4.6.2. The possible choices are:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>true</strong></td>
<td>Enable the tracker in global mode.</td>
</tr>
<tr>
<td><strong>false</strong></td>
<td>Disable the tracker.</td>
</tr>
<tr>
<td><strong>context</strong></td>
<td>Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.</td>
</tr>
<tr>
<td><strong>strict</strong></td>
<td>Enable the tracker in strict mode. In this mode, potentially ambiguous references are suppressed. A reference is considered ambiguous if either the current citation (the one including the ‘ibidem’) or the previous citation (the one the ‘ibidem’ refers to) consists of a list of references.¹</td>
</tr>
<tr>
<td><strong>constrict</strong></td>
<td>This mode combines the features of context and strict. It also keeps track of footnote numbers and detects potentially ambiguous references in footnotes in a stricter way than the strict option. In addition to the conditions imposed by the strict option, a reference in a footnote will only be considered as unambiguous if the current citation and the previous citation are given in the same footnote or in immediately consecutive footnotes.</td>
</tr>
</tbody>
</table>

Note that this tracker is disabled in all floats, see § 4.11.5.

¹ For example, suppose the initial citation is “Jones, Title; Williams, Title” and the following one “ibidem”. From a technical point of view, it is fairly clear that the ‘ibidem’ refers to ‘Williams’ because this is the last reference processed by the previous citation command. To a human reader, however, this may not be obvious because the ‘ibidem’ may also refer to both titles. The strict mode avoids such ambiguous references.
**opcittracker=true, false, context, strict, constrict**  
*default: false*

This option controls the ‘opcit’ tracker which is required by the \ifopcit test from § 4.6.2. This feature is similar to the ‘ibid’ tracker, except that it tracks citations on a per-author/editor basis, i.e., \ifopcit will yield true if the cited item is the same as the last one by this author/editor. The possible choices are:

- **true**: Enable the tracker in global mode.
- **false**: Disable the tracker.
- **context**: Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
- **strict**: Enable the tracker in strict mode. In this mode, potentially ambiguous references are suppressed. See ibidtracker=strict for details.
- **constrict**: This mode combines the features of context and strict. See the explanation of ibidtracker=constrict for details.

Note that this tracker is disabled in all floats, see § 4.11.5.

**loccittracker=true, false, context, strict, constrict**  
*default: false*

This option controls the ‘loccit’ tracker which is required by the \ifloccit test from § 4.6.2. This feature is similar to the ‘opcit’ tracker except that it also checks whether the ⟨postnote⟩ arguments match, i.e., \ifloccit will yield true if the citation refers to the same page cited before. The possible choices are:

- **true**: Enable the tracker in global mode.
- **false**: Disable the tracker.
- **context**: Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
- **strict**: Enable the tracker in strict mode. In this mode, potentially ambiguous references are suppressed. See ibidtracker=strict for details. In addition to that, this mode also checks if the ⟨postnote⟩ argument is numerical (based on \ifnumerals from § 4.6.2).
- **constrict**: This mode combines the features of context and strict. See the explanation of ibidtracker=constrict for details. In addition to that, this mode also checks if the ⟨postnote⟩ argument is numerical (based on \ifnumerals from § 4.6.2).

Note that this tracker is disabled in all floats, see § 4.11.5.

**idemtracker=true, false, context, strict, constrict**  
*default: false*

This option controls the ‘idem’ tracker which is required by the \ifciteidem test from § 4.6.2. The possible choices are:

- **true**: Enable the tracker in global mode.
- **false**: Disable the tracker.
- **context**: Enable the tracker in context-sensitive mode. In this mode, citations in footnotes and in the body text are tracked separately.
- **strict**: This is an alias for true, provided only for consistency with the other trackers. Since ‘idem’ replacements do not get ambiguous in
the same way as ‘ibidem’ or ‘op. cit.’, the strict tracking mode does not apply to them.

**strict** This mode is similar to context with one additional condition: a reference in a footnote will only be considered as unambiguous if the current citation and the previous citation are given in the same footnote or in immediately consecutive footnotes.

Note that this tracker is disabled in all floats, see § 4.11.5.

**parentracker**=true, false  
(default: true)

This option controls the parenthesis tracker which keeps track of nested parentheses and brackets. This information is used by \parentext and \bracketext from § 3.6.5, \mkbibparen and \mkbibbracket from § 4.10.4 and \bibopenparen, \bibcloseparen, \bibopenbracket, \bibclosebracket (also § 4.10.4).

**maxparens**=(integer)  
(default: 3)

The maximum permitted nesting level of parentheses and brackets. If parentheses and brackets are nested deeper than this value, biblatex will issue errors.

**firstinits**=true, false  
(default: false)

When enabled, all first and middle names will be rendered as initials. The option will affect the \iffirstinits test from § 4.6.2.

**terseinits**=true, false  
(default: false)

This option controls the format of initials generated by biblatex. If enabled, initials are rendered using a terse format without dots and spaces. For example, the initials of Donald Ervin Knuth would be rendered as ‘D. E.’ by default, and as ‘DE’ if this option is enabled. With Biber, the option works by redefining some macros which control the format of initials. See § 3.11.4 for details.  

**labelalpha**=true, false  
(default: false)

Whether or not to provide the special fields labelalpha and extraalpha, see § 4.2.4 for details. With Biber, this option is also settable on a per-type basis. See also maxalphanames and minalphanames.

**maxalphanames**=(integer)  
(default: 3)

Similar to the maxnames option but customizes the format of the labelalpha field.

**minalphanames**=(integer)  
(default: 1)

Similar to the minnames option but customizes the format of the labelalpha field.

**labelnumber**=true, false  
(default: false)

Whether or not to provide the special field labelnumber, see § 4.2.4 for details. This option is also settable on a per-type basis.
labelyear=true, false  
Whether or not to provide the special fields labelyear and extrayear, see § 4.2.4 for details. With Biber, this option is also settable on a per-type basis.

singletitle=true, false  
Whether or not to provide the data required by the \ifsingletitle test, see § 4.6.2 for details. With Biber, this option is also settable on a per-type basis.

uniquename=true, false, init, full, allinit, allfull, mininit, minfull  
Whether or not to update the uniquename counter, see § 4.6.2 for details. This feature will disambiguate individual names in the labelname list. This option is also settable on a per-type basis. The possible choices are:

true  
An alias for full.
false  
Disable this feature.
init  
Disambiguate names using initials only.
full  
Disambiguate names using initials or full names, as required.
allinit  
Similar to init but disambiguates all names in the labelname list, beyond maxnames/minnames/uniquelist.
allfull  
Similar to full but disambiguates all names in the labelname list, beyond maxnames/minnames/uniquelist.
mininit  
A variant of init which only disambiguates names in lists with identical last names.
minfull  
A variant of full which only disambiguates names in lists with identical last names.

Note that the uniquename option will also affect uniquelist, the \ifsingletitle test, and the extrayear field. See § 4.11.4 for further details and practical examples.

uniquelist=true, false, minyear  
Whether or not to update the uniquelist counter, see § 4.6.2 for details. This feature will disambiguate the labelname list if it has become ambiguous after maxnames/minnames truncation. Essentially, it overrides maxnames/minnames on a per-field basis. This option is also settable on a per-type basis. The possible choices are:

true  
Disambiguate the labelname list.
false  
Disable this feature.
minyear  
Disambiguate the labelname list only if the truncated list is identical to another one with the same labelyear. This mode of operation is useful for author-year styles and requires labelyear=true.

Note that the uniquelist option will also affect the \ifsingletitle test and the extrayear field. See § 4.11.4 for further details and practical examples. See § 4.11.4 for further details and practical examples.
3.1.3 Entry Options

Entry options are package options which can be adjusted on a per-entry basis in the options field from § 2.2.3.

3.1.3.1 Preamble/Type/Entry Options

The following options are settable on a per-entry basis in the options field. In addition to that, they may also be used in the optional argument to \usepackage as well as in the configuration file and the document preamble. This is useful if you want to change the default behavior globally.

**useauthor**=true, false  
default: true

Whether the author is used in labels and considered during sorting. This may be useful if an entry includes an author field but is usually not cited by author for some reason. Setting useauthor=false does not mean that the author is ignored completely. It means that the author is not used in labels and ignored during sorting. The entry will then be alphabetized by editor or title. With the standard styles, the author is printed after the title in this case. See also § 3.4. With Biber, this option is also settable on a per-type basis.

**useeditor**=true, false  
default: true

Whether the editor replaces a missing author in labels and during sorting. This may be useful if an entry includes an editor field but is usually not cited by editor. Setting useeditor=false does not mean that the editor is ignored completely. It means that the editor does not replace a missing author in labels and during sorting. The entry will then be alphabetized by title. With the standard styles, the editor is printed after the title in this case. See also § 3.4. With Biber, this option is also settable on a per-type basis.

**usetranslator**=true, false  
default: false

Whether the translator replaces a missing author/editor in labels and during sorting. Setting usetranslator=true does not mean that the translator overrides the author/editor. It means that the translator is considered as a fallback if the author/editor is missing or if useauthor and useeditor are set to false. In other words, in order to cite a book by translator rather than by author, you need to set the following options: With Biber, this option is also settable on a per-type basis.

@Book{...,  
    options = {useauthor=false, usetranslator=true},  
    author = {...},  
    translator = {...},  
    ...

With the standard styles, the translator is printed after the title by default. See also § 3.4.
Whether the name prefix (von, van, of, da, de, della, etc.) is considered when printing the last name in citations. This also affects the sorting and formatting of the bibliography as well as the generation of certain types of labels. If this option is enabled, biblatex always precedes the last name with the prefix. For example, Ludwig van Beethoven would be cited as “Beethoven” and alphabetized as “Beethoven, Ludwig van” by default. If this option is enabled, he is cited as “van Beethoven” and alphabetized as “Van Beethoven, Ludwig” instead. With Biber, this option is also settable on a per-entry basis.

The indexing option is also settable per-type or per-entry basis. See § 3.1.2.1 for details.

3.1.3.2 Type/Entry Options

The following options are only settable on a per-entry basis in the options field. They are not available globally.

If this option is enabled, the entry is excluded from the bibliography but it may still be cited. With Biber, this option is also settable on a per-entry basis.

If this option is enabled, the entry is excluded from the list of shorthands. It is still included in the bibliography and it may also be cited by shorthand. With Biber, this option is also settable on a per-entry basis.

If this option is enabled, biblatex will not assign any labels to the entry. It is not required for normal operation. Use it with care. If enabled, biblatex cannot guarantee unique citations for the respective entry and citations styles which require labels may fail to create valid citations for the entry. With Biber, this option is also settable on a per-entry basis.

Setting this option is equivalent to skipbib, skiplos, and skiplab. It is not required for normal operation. Use it with care. With Biber, this option is also settable on a per-entry basis.

3.1.4 Legacy Options

The following legacy option may be used globally in the optional argument to \documentclass or locally in the optional argument to \usepackage:

This option is provided for backwards compatibility with the standard LaTeX document classes. openbib is similar to block=par.

Deprecation warning: This option is retained for backwards compatibility only, and it may be removed in a future version of biblatex.

60
3.2 Global Customization

Apart from writing new citation and bibliography styles, there are numerous ways to customize the styles which ship with this package. Customization will usually take place in the preamble, but there is also a configuration file for permanent adaptions. The configuration file may also be used to initialize the package options to a value different from the package default.

3.2.1 Configuration File

If available, this package will load the configuration file `biblatex.cfg`. This file is read at the end of the package, immediately after the citation and bibliography styles have been loaded.

3.2.2 Setting Package Options

The load-time package options in § 3.1.1 must be given in the optional argument to `\usepackage`. The package options in § 3.1.2 may also be given in the preamble. The options are executed with the following command:

\ExecuteBibliographyOptions\{⟨entrytype, . . .⟩\}{⟨key=value, . . .⟩}

This command may also be used in the configuration file to modify the default setting of a package option. Certain options are also settable on a per-type basis. In this case, the optional ⟨entrytype⟩ argument specifies the entry type. The ⟨entrytype⟩ argument may be a comma-separated list of values.

3.3 Standard Styles

This section provides a short description of all bibliography and citation styles which ship with the `biblatex` package. If you want to write your own styles, see § 4.

3.3.1 Citation Styles

The citation styles which come with this package implement several common citation schemes. All standard styles cater for the shorthand field and support hyperlinks as well as indexing.

**numeric** This style implements a numeric citation scheme similar to the standard bibliographic facilities of LaTeX. It should be employed in conjunction with a numeric bibliography style which prints the corresponding labels in the bibliography. It is intended for in-text citations. The style will set the following package options at load time: `autocite=inline`, `labelnumber=true`. This style also provides an additional preamble option called `subentry` which affects the handling of entry sets. If this option is disabled, citations referring to a member of a set will point to the entire set. If it is enabled, the style supports citations like “[5c]” which point to a subentry in a set (the third one in this example). See the style example for details.

**numeric-comp** A compact variant of the numeric style which prints a list of more than two consecutive numbers as a range. This style is similar to the cite package and the `sort&compress` option of the `natbib` package in numerical mode. For example, in-
stead of “[8, 3, 1, 7, 2]” this style would print “[1–3, 7, 8]”. It is intended for in-text citations. The style will set the following package options at load time: autocite=inline, sortcites=true, labelnumber=true. It also provides the subentry option.

**numeric-verb**
A verbose variant of the numeric style. The difference affects the handling of a list of citations and is only apparent when multiple entry keys are passed to a single citation command. For example, instead of “[2, 5, 6]” this style would print “[2]; [5]; [6]”. It is intended for in-text citations. The style will set the following package options at load time: autocite=inline, sortcites=true, labelnumber=true. It also provides the subentry option.

**alphabetic**
This style implements an alphabetic citation scheme similar to the alpha.bst style of traditional BibTeX. The alphabetic labels resemble a compact author-year style to some extent, but the way they are employed is similar to a numeric citation scheme. For example, instead of “Jones 1995” this style would use the label “[Jon95]”. “Jones and Williams 1986” would be rendered as “[JW86]”. This style should be employed in conjunction with an alphabetic bibliography style which prints the corresponding labels in the bibliography. It is intended for in-text citations. The style will set the following package options at load time: autocite=inline, labelalpha=true.

**alphabetic-verb**
A verbose variant of the alphabetic style. The difference affects the handling of a list of citations and is only apparent when multiple entry keys are passed to a single citation command. For example, instead of “[Doe92; Doe95; Jon98]” this style would print “[Doe92]; [Doe95]; [Jon98]”. It is intended for in-text citations. The style will set the following package options at load time: autocite=inline, labelalpha=true.

**authoryear**
This style implements an author-year citation scheme. If the bibliography contains two or more works by the same author which were all published in the same year, a letter is appended to the year. For example, this style would print citations such as “Doe 1995a; Doe 1995b; Jones 1998”. This style should be employed in conjunction with an author-year bibliography style which prints the corresponding labels in the bibliography. It is primarily intended for in-text citations, but it could also be used with citations given in footnotes. The style will set the following package options at load time: autocite=inline, labelyear=true, uniquename=full, uniquelist=true.

**authoryear-comp**
A compact variant of the authoryear style which prints the author only once if subsequent references passed to a single citation command share the same author. If they share the same year as well, the year is also printed only once. For example, instead of “Doe 1995b; Doe 1992; Jones 1998; Doe 1995a” this style would print “Doe 1992, 1995a,b; Jones 1998”. It is primarily intended for in-text citations, but it could also be used with citations given in footnotes. The style will set the following package options at load time: autocite=inline, sortcites=true, labelyear=true, uniquename=full, uniquelist=true.

**authoryear-ibid**
A variant of the authoryear style which replaces repeated citations by the abbrevi-
ation *ibidem* unless the citation is the first one on the current page or double-page spread, or the *ibidem* would be ambiguous in the sense of the package option `ibidtracker=constrict`. The style will set the following package options at load time: `autocite=inline, labelyear=true, uniquename=full, uniquelist=true, ibidtracker=constrict, pagetracker=true`. This style also provides an additional preamble option called `ibidpage`. See the style example for details.

**authoryear-icomp**

A style combining `authoryear-comp` and `authoryear-ibid`. The style will set the following package options at load time: `autocite=inline, labelyear=true, uniquename=full, uniquelist=true, ibidtracker=constrict, pagetracker=true, sortcites=true`. This style also provides an additional preamble option called `ibidpage`. See the style example for details.

**authortitle**

This style implements a simple author-title citation scheme. It will make use of the `shorttitle` field, if available. It is intended for citations given in footnotes. The style will set the following package options at load time: `autocite=footnote, uniquename=full, uniquelist=true`.

**authortitle-comp**

A compact variant of the `authortitle` style which prints the author only once if subsequent references passed to a single citation command share the same author. For example, instead of “Doe, *First title; Doe, Second title*” this style would print “Doe, *First title, Second title*”. It is intended for citations given in footnotes. The style will set the following package options at load time: `autocite=footnote, sortcites=true, uniquename=full, uniquelist=true`.

**authortitle-ibid**

A variant of the `authortitle` style which replaces repeated citations by the abbreviation *ibidem* unless the citation is the first one on the current page or double-page spread, or the *ibidem* would be ambiguous in the sense of the package option `ibidtracker=constrict`. It is intended for citations given in footnotes. The style will set the following package options at load time: `autocite=footnote, uniquename=full, uniquelist=true, ibidtracker=constrict, pagetracker=true`. This style also provides an additional preamble option called `ibidpage`. See the style example for details.

**authortitle-icomp**

A style combining the features of `authortitle-comp` and `authortitle-ibid`. The style will set the following package options at load time: `autocite=footnote, uniquename=full, uniquelist=true, ibidtracker=constrict, pagetracker=true, sortcites=true`. This style also provides an additional preamble option called `ibidpage`. See the style example for details.

**authortitle-terse**

A terse variant of the `authortitle` style which only prints the title if the bibliography contains more than one work by the respective author/editor. This style will make use of the `shorttitle` field, if available. It is suitable for in-text citations as well as citations given in footnotes. The style will set the following package options at load time: `autocite=inline, singletitle=true, uniquename=full, uniquelist=true`.

**authortitle-tcomp**

A style combining the features of `authortitle-comp` and `authortitle-terse`. This style will make use of the `shorttitle` field, if available. It is suitable for in-
text citations as well as citations given in footnotes. The style will set the following package options at load time: \texttt{autocite=inline}, \texttt{sortcites=true}, \texttt{singletitle=true}, \texttt{uniquename=full}, \texttt{uniquelist=true}.

\textbf{authortitle-tcomp} A style combining the features of \texttt{authortitle-icomp} and \texttt{authortitle-terse}. In other words: a variant of the \texttt{authortitle-tcomp} style with an \texttt{ibidem} feature. This style is suitable for in-text citations as well as citations given in footnotes. It will set the following package options at load time: \texttt{autocite=inline}, \texttt{ibidtracker=constrict}, \texttt{pagetracker=true}, \texttt{sortcites=true}, \texttt{singletitle=true}, \texttt{uniquename=full}, \texttt{uniquelist=true}. This style also provides an additional preamble option called \texttt{ibidpage}. See the style example for details.

\textbf{verbose} A verbose citation style which prints a full citation similar to a bibliography entry when an entry is cited for the first time, and a short citation afterwards. If available, the \texttt{shorttitle} field is used in all short citations. If the \texttt{shorthand} field is defined, the shorthand is introduced on the first citation and used as the short citation thereafter. This style may be used without a list of references and shorthands since all bibliographic data is provided on the first citation. It is intended for citations given in footnotes. The style will set the following package options at load time: \texttt{autocite=footnote}, \texttt{citetracker=context}. This style also provides an additional preamble option called \texttt{citepages}. See the style example for details.

\textbf{verbose-ibid} A variant of the \texttt{verbose} style which replaces repeated citations by the abbreviation \texttt{ibidem} unless the citation is the first one on the current page or double-page spread, or the \texttt{ibidem} would be ambiguous in the sense of \texttt{ibidtracker=strict}. This style is intended for citations given in footnotes. The style will set the following package options at load time: \texttt{autocite=footnote}, \texttt{citetracker=context}, \texttt{ibidtracker=constrict}, \texttt{pagetracker=true}. This style also provides additional preamble options called \texttt{ibidpage} and \texttt{citepages}. See the style example for details.

\textbf{verbose-note} This style is similar to the \texttt{verbose} style in that it prints a full citation similar to a bibliography entry when an entry is cited for the first time, and a short citation afterwards. In contrast to the \texttt{verbose} style, the short citation is a pointer to the footnote with the full citation. If the bibliography contains more than one work by the respective author/editor, the pointer also includes the title. If available, the \texttt{shorttitle} field is used in all short citations. If the \texttt{shorthand} field is defined, it is handled as with the \texttt{verbose} style. This style may be used without a list of references and shorthands since all bibliographic data is provided on the first citation. It is exclusively intended for citations given in footnotes. The style will set the following package options at load time: \texttt{autocite=footnote}, \texttt{citetracker=context}, \texttt{singletitle=true}. This style also provides additional preamble options called \texttt{pageref} and \texttt{citepages}. See the style example for details.

\textbf{verbose-inote} A variant of the \texttt{verbose-note} style which replaces repeated citations by the abbreviation \texttt{ibidem} unless the citation is the first one on the current page or double-page spread, or the \texttt{ibidem} would be ambiguous in the sense of \texttt{ibidtracker=strict}. This style is exclusively intended for citations given in footnotes. It will set the fol-
lowing package options at load time: autocite=footnote, citetracker=context, ibidtracker=constrict, singletitle=true, pagetracker=true. This style also provides additional preamble options called ibidpage, pageref, and citepages. See the style example for details.

**verbose-trad1**
This style implements a traditional citation scheme. It is similar to the verbose style in that it prints a full citation similar to a bibliography entry when an item is cited for the first time, and a short citation afterwards. Apart from that, it uses the scholarly abbreviations *ibidem*, *idem*, *op. cit.*, and *loc. cit.* to replace recurrent authors, titles, and page numbers in repeated citations in a special way. If the shorthand field is defined, the shorthand is introduced on the first citation and used as the short citation thereafter. This style may be used without a list of references and shorthands since all bibliographic data is provided on the first citation. It is intended for citations given in footnotes. The style will set the following package options at load time: autocite=footnote, citetracker=context, ibidtracker=constrict, idemtracker=constrict, opcittracker=context, loccittracker=context. This style also provides additional preamble options called ibidpage, strict, and citepages. See the style example for details.

**verbose-trad2**
Another traditional citation scheme. It is also similar to the verbose style but uses scholarly abbreviations like *ibidem* and *idem* in repeated citations. In contrast to the verbose-trad1 style, the logic of the *op. cit.* abbreviations is different in this style and *loc. cit.* is not used at all. It is in fact more similar to verbose-ibid and verbose-inote than to verbose-trad1. The style will set the following package options at load time: autocite=footnote, citetracker=context, ibidtracker=constrict, idemtracker=constrict. This style also provides additional preamble options called ibidpage, strict, and citepages. See the style example for details.

**verbose-trad3**
Yet another traditional citation scheme. It is similar to the verbose-trad2 style but uses the scholarly abbreviations *ibidem* and *op. cit.* in a slightly different way. The style will set the following package options at load time: autocite=footnote, citetracker=context, ibidtracker=constrict, loccittracker=constrict. This style also provides additional preamble options called strict and citepages. See the style example for details.

**reading**
A citation style which goes with the bibliography style by the same name. It simply loads the authortitle style.

The following citation styles are special purpose styles. They are not intended for the final version of a document:

**draft**
A draft style which uses the entry keys in citations. The style will set the following package options at load time: autocite=plain.

**debug**
This style prints the entry key rather than some kind of label. It is intended for debugging only and will set the following package options at load time: autocite=plain.
3.3.2 Bibliography Styles

All bibliography styles which come with this package use the same basic format for the individual bibliography entries. They only differ in the kind of label printed in the bibliography and the overall formatting of the list of references. There is a matching bibliography style for every citation style. Note that some bibliography styles are not mentioned below because they simply load a more generic style. For example, the bibliography style authortitle-comp will load the authortitle style.

**numeric**
This style prints a numeric label similar to the standard bibliographic facilities of LaTeX. It is intended for use in conjunction with a numeric citation style. Note that the shorthand field overrides the default label. The style will set the following package options at load time: labelnumber=true. This style also provides an additional preamble option called subentry which affects the formatting of entry sets. If this option is enabled, all members of a set are marked with a letter which may be used in citations referring to a set member rather than the entire set. See the style example for details.

**alphabetic**
This style prints an alphabetic label similar to the alpha.bst style of traditional BibTeX. It is intended for use in conjunction with an alphabetic citation style. Note that the shorthand field overrides the default label. The style will set the following package options at load time: labelalpha=true, sorting=anyt.

**authoryear**
This style differs from the other styles in that the publication date is not printed towards the end of the entry but rather after the author/editor. It is intended for use in conjunction with an author-year citation style. Recurring author and editor names are replaced by a dash unless the entry is the first one on the current page or double-page spread. This style provides an additional preamble option called dashed which controls this feature. It also provides a preamble option called mergedate. See the style example for details. The style will set the following package options at load time: labelyear=true, sorting=nyt, pagetracker=true, mergedate=true.

**authortitle**
This style does not print any label at all. It is intended for use in conjunction with an author-title citation style. Recurring author and editor names are replaced by a dash unless the entry is the first one on the current page or double-page spread. This style also provides an additional preamble option called dashed which controls this feature. See the style example for details. The style will set the following package options at load time: pagetracker=true.

**verbose**
This style is similar to the authortitle style. It also provides an additional preamble option called dashed. See the style example for details. The style will set the following package options at load time: pagetracker=true.

**reading**
This special bibliography style is designed for personal reading lists, annotated bibliographies, and similar applications. It optionally includes the fields annotation, abstract, library, and file in the bibliography. If desired, it also adds various kinds of short headers to the bibliography. This style also provides the addi-
tional preamble options entryhead, entrykey, annotation, abstract, library, and file which control whether or not the corresponding items are printed in the bibliography. See the style example for details. See also § 3.10.8. The style will set the following package options at load time: loadfiles=true, entryhead=true, entrykey=true, annotation=true, abstract=true, library=true, file=true.

The following bibliography styles are special purpose styles. They are not intended for the final version of a document:

- **draft** This draft style includes the entry keys in the bibliography. The bibliography will be sorted by entry key. The style will set the following package options at load time: sorting=debug.

- **debug** This style prints all bibliographic data in tabular format. It is intended for debugging only and will set the following package options at load time: sorting=debug.

### 3.4 Sorting Options

This package supports various sorting schemes for the bibliography. The sorting scheme is selected with the sorting package option from § 3.1.2.1. Apart from the regular data fields there are also some special fields which may be used to optimize the sorting of the bibliography. Appendices b1 and b2 give an outline of the alphabetic sorting schemes supported by biblatex. Chronological sorting schemes are listed in appendix b3. A few explanations concerning these schemes are in order.

The first item considered in the sorting process is always the presort field of the entry. If this field is undefined, biblatex will use the default value 'mm' as a pre-sort string. The next item considered is the sortkey field. If this field is defined, it serves as the master sort key. Apart from the presort field, no further data is considered in this case. If the sortkey field is undefined, sorting continues with the name. The package will try using the sortname, author, editor, and translator fields, in this order. Which fields are considered also depends on the setting of the useauthor, useeditor, and usetranslator options. If all three of them are disabled, the sortname field is ignored as well. Note that all name fields are responsive to maxnames and minnames. If no name field is available, either because all of them are undefined or because useauthor, useeditor, and usetranslator are disabled, biblatex will fall back to the sorttitle and title fields as a last resort. The remaining items are, in various order: the sortyear field, if defined, or the first four digits of the year field otherwise; the sorttitle field, if defined, or the title field otherwise; the volume field, which is padded to four digits with leading zeros, or the string 0000 otherwise. Note that the sorting schemes shown in appendix b2 include an additional item: labelalpha is the label used by 'alphabetic' bibliography styles. Strictly speaking, the string used for sorting is labelalpha + extraalpha. The sorting schemes in appendix b2 are intended to be used in conjunction with alphabetic styles only.

The chronological sorting schemes presented in appendix b3 also make use of the presort and sortkey fields, if defined. The next item considered is the sortyear or the year field, depending on availability. The ynt scheme extracts

---

67
the first four Arabic figures from the field. If both fields are undefined, the string 9999 is used as a fallback value. This means that all entries without a year will be moved to the end of the list. The ydnt scheme is similar in concept but sorts the year in descending order. As with the ynt scheme, the string 9999 is used as a fallback value. The remaining items are similar to the alphabetic sorting schemes discussed above. Note that the ydnt sorting scheme will only sort the date in descending order. All other items are sorted in ascending order as usual.

Using special fields such as sortkey, sortname, or sorttitle is usually not required. The biblatex package is quite capable of working out the desired sorting order by using the data found in the regular fields of an entry. You will only need them if you want to manually modify the sorting order of the bibliography or if any data required for sorting is missing. Please refer to the field descriptions in § 2.2.3 for details on possible uses of the special fields. Also note that using bibtex8 or Biber instead of legacy bibtex is strongly recommended.

3.5 Bibliography Commands

3.5.1 Resources

\addbibresource{⟨options⟩}{⟨resource⟩}

Adds a ⟨resource⟩, such as a .bib file, to the default resource list. This command is only available in the preamble. It replaces the \bibliography legacy command. Note that files must be specified with their full name, including the extension. Do not omit the .bib extension from the filename. Also note that the ⟨resource⟩ is a single resource. Invoke \addbibresource multiple times to add more resources, for example:

\addbibresource{bibfile1.bib}
\addbibresource{bibfile2.bib}
\addbibresource[location=remote]{http://www.citeulike.org/bibtex/group/9517}
\addbibresource[location=remote,label=lan]{ftp://192.168.1.57/~user/file.bib}

Since the ⟨resource⟩ string is read in a verbatim-like mode, it may contain arbitrary characters. The only restriction is that any curly braces must be balanced. The following ⟨options⟩ are available:

label=⟨identifier⟩

Assigns a label to a resource. The ⟨identifier⟩ may be used in place of the full resource name in the optional argument of refsection (see 3.5.4).

location=⟨location⟩

default: local

The location of the resource. The ⟨location⟩ may be either local for local resources or remote for urls. Remote resources require Biber. The protocols http and ftp are supported. The remote url must be a fully qualified path to a bib file or a url which returns a bib file.

type=⟨type⟩

default: file

The type of resource. Currently, the only supported type is file.
The data type (format) of the resource. The following formats are currently supported:

- **bibtex**: BibTeX format.
- **ris**: Research Information Systems (ris) format. Note that an ID tag is required in all ris records. The ID value corresponds to the entry key. Support for this format is experimental.
- **zoterordfxml**: Zotero RDF/XML format. Support for this format is experimental. Refer to the Biber manual for details.
- **endnotexml**: EndNote xml format. Support for this format is experimental. Refer to the Biber manual for details.

\addglobalbib\{⟨options⟩\}{⟨resource⟩}

This command differs from \addbibresource in that the ⟨resource⟩ is added to the global resource list. The difference between default resources and global resources is only relevant if there are reference sections in the document and the optional argument of refsection (§ 3.5.4) is used to specify alternative resources which replace the default resource list. Any global resources are added to all reference sections.

\addsectionbib\{⟨options⟩\}{⟨resource⟩}

This command differs from \addbibresource in that the resource ⟨options⟩ are registered but the ⟨resource⟩ not added to any resource list. This is only required for resources which 1) are given exclusively in the optional argument of refsection (3.5.4) and 2) require options different from the default settings. In this case, \addsectionbib is employed to qualify the ⟨resource⟩ prior to using it by setting the appropriate ⟨options⟩ in the preamble. The label option may be useful to assign a short name to the resource.

\bibliography\{⟨bibfile, . . .⟩\}

The legacy command for adding bibliographic resources, supported for backwards compatibility. Like \addbibresource, this command is only available in the preamble and adds resources to the default resource list. Its argument is a comma-separated list of bib files. The .bib extension may be omitted from the filename. Invoking this command multiple times to add more files is permissible. This command is deprecated. Please consider using \addbibresource instead.

### 3.5.2 The Bibliography

\printbibliography\{⟨key=⟨value⟩, . . .⟩\}

This command prints the bibliography. It takes one optional argument, which is a list of options given in ⟨key=⟨value⟩ notation. The following options are available:

env=(name) default: bibliography/shorthands

The 'high-level' layout of the bibliography and the list of shorthands is controlled
by environments defined with \defbibenvironment. This option selects an environ-
ment. The \textit{name} corresponds to the identifier used when defining the environ-
ment with \defbibenvironment. By default, the \printbibliography command
uses the identifier bibliography; \printshorthands uses shorthands. See also
§§ 3.5.3 and 3.5.7.

heading=(name) default: bibliography/shorthands

The bibliography and the list of shorthands typically have a chapter or section
heading. This option selects the heading \textit{name}, as defined with \defbibheading.
By default, the \printbibliography command uses the heading bibliography;
\printshorthands uses shorthands. See also §§ 3.5.3 and 3.5.7.

title=(text)

This option overrides the default title provided by the heading selected with the
heading option, if supported by the heading definition. See § 3.5.7 for details.

prenote=(name)

The prenote is an arbitrary piece of text to be printed after the heading but be-
fore the list of references. This option selects the prenote \textit{name}, as defined with
\defbibnote. By default, no prenote is printed. The note is printed in the standard
text font. It is not affected by \bibsetup and \bibfont but it may contain its own
font declarations. See § 3.5.8 for details.

postnote=(name)

The postnote is an arbitrary piece of text to be printed after the list of references.
This option selects the postnote \textit{name}, as defined with \defbibnote. By default,
no postnote is printed. The note is printed in the standard text font. It is not af-
fected by \bibsetup and \bibfont but it may contain its own font declarations.
See § 3.5.8 for details.

section=(integer) default: 0

Print only entries cited in reference section \textit{integer}. The reference sections are
numbered starting at 1. All citations given outside a \texttt{refsection} environment are
assigned to section 0. See § 3.5.4 for details and § 3.10.3 for usage examples. When
giving a chain of multiple filters, the section filter must always be given first.

segment=(integer) default: 0

Print only entries cited in reference segment \textit{integer}. The reference segments are
numbered starting at 1. All citations given outside a \texttt{refsegment} environment are
assigned to segment 0. See § 3.5.5 for details and § 3.10.3 for usage examples.

type=(entrytype)

Print only entries whose entry type is \textit{entrytype}. 
\texttt{notype}={\texttt{entrytype}}

Print only entries whose entry type is not \texttt{entrytype}. This option may be used multiple times.

\texttt{subtype}={\texttt{subtype}}

Print only entries whose entrysubtype is defined and \texttt{subtype}.

\texttt{notsubtype}={\texttt{subtype}}

Print only entries whose entrysubtype is undefined or not \texttt{subtype}. This option may be used multiple times.

\texttt{keyword}={\texttt{keyword}}

Print only entries whose keywords field includes \texttt{keyword}. This option may be used multiple times.

\texttt{notkeyword}={\texttt{keyword}}

Print only entries whose keywords field does not include \texttt{keyword}. This option may be used multiple times.

\texttt{category}={\texttt{category}}

Print only entries assigned to category \texttt{category}. This option may be used multiple times.

\texttt{notcategory}={\texttt{category}}

Print only entries not assigned to category \texttt{category}. This option may be used multiple times.

\texttt{filter}={\texttt{name}}

Filter the entries with filter \texttt{name}, as defined with \texttt{\textbackslash defbibfilter}. See § 3.5.9 for details.

\texttt{check}={\texttt{name}}

Filter the entries with check \texttt{name}, as defined with \texttt{\textbackslash defbibcheck}. See § 3.5.9 for details.

\texttt{prefixnumbers}={\texttt{string}}

This option applies to numerical citation/bibliography styles only and requires that the \texttt{defernumbers} option from § 3.1.2.1 be enabled globally. Setting this option will implicitly enable \texttt{resetnumbers} for the current bibliography. The option assigns the \texttt{string} as a prefix to all entries in the respective bibliography. For example, if the \texttt{string} is A, the numerical labels printed will be [A1], [A2], [A3], etc. This is useful for subdivided numerical bibliographies where each subbibliography uses a different prefix. The \texttt{string} is available to styles in the \texttt{prefixnumber} field of all affected entries. See § 4.2.4.2 for details.
This option applies to numerical citation/bibliography styles only and requires that the `defernumbers` option from § 3.1.2.1 be enabled globally. If enabled, it will reset the numerical labels assigned to the entries in the respective bibliography, i.e., the numbering will restart at 1. Use this option with care as `biblatex` can not guarantee unique labels globally if they are reset manually.

`omitnumbers=true, false`

This option applies to numerical citation/bibliography styles only and requires that the `defernumbers` option from § 3.1.2.1 be enabled globally. If enabled, `biblatex` will not assign a numerical label to the entries in the respective bibliography. This is useful when mixing a numerical subbibliography with one or more subbibliographies using a different scheme (e.g., author-title or author-year).

`\bibysection{⟨key=value, ...⟩}`

This command automatically loops over all reference sections. This is equivalent to giving one `\printbibliography` command for every section but has the additional benefit of automatically skipping sections without references. Note that `\bibysection` starts looking for references in section 1. It will ignore references given outside of `refsection` environments since they are assigned to section 0. See § 3.10.3 for usage examples. The options are a subset of those supported by `\printbibliography`. Valid options are `env`, `heading`, `prenote`, `postnote`.

`\bibysegment{⟨key=value, ...⟩}`

This command automatically loops over all reference segments. This is equivalent to giving one `\printbibliography` command for every segment but has the additional benefit of automatically skipping segments without references. Note that `\bibysegment` starts looking for references in segment 1. It will ignore references given outside of `refsegment` environments since they are assigned to segment 0. See § 3.10.3 for usage examples. The options are a subset of those supported by `\printbibliography`. Valid options are `env`, `heading`, `prenote`, `postnote`.

`\bibycategory{⟨key=value, ...⟩}`

This command loops over all bibliography categories. This is equivalent to giving one `\printbibliography` command for every category but has the additional benefit of automatically skipping empty categories. The categories are processed in the order in which they were declared. See § 3.10.3 for usage examples. The options are a subset of those supported by `\printbibliography`. Valid options are `env`, `prenote`, `postnote`, `section`. Note that `heading` is not available with this command. The name of the current category is automatically used as the heading name. This is equivalent to passing `heading=⟨category⟩` to `\printbibliography` and implies that there must be a matching heading definition for every category.

`\printbibheading{⟨key=value, ...⟩}`

This command prints a bibliography heading defined with `\defbibheading`. It
takes one optional argument, which is a list of options given in \( \langle \text{key} \rangle = \langle \text{value} \rangle \) notation. The options are a small subset of those supported by \texttt{\textbackslash printbibliography}. Valid options are \texttt{heading} and \texttt{title}. By default, this command uses the heading bibliography. See § 3.5.7 for details. Also see §§ 3.10.3 and 3.10.4 for usage examples.

### 3.5.3 The List of Shorthands

If any entry includes a shorthand field, biblatex automatically builds a list of shorthands which may be printed in addition to the regular bibliography. The following command prints the list of shorthands.

\begin{verbatim}
\texttt{\textbackslash printshorthands[\langle \text{key}=\text{value}, \ldots \rangle]}
\end{verbatim}

This command prints the list of shorthands. It takes one optional argument, which is a list of options given in \( \langle \text{key} \rangle = \langle \text{value} \rangle \) notation. Valid options are all options supported by \texttt{\textbackslash printbibliography} (§ 3.5.2) except \texttt{prefixnumbers}, \texttt{resetnumbers}, and \texttt{omitnumbers}. If there are any \texttt{refsection} environments in the document, the list of shorthands will be local to these environments; see § 3.5.4 for details. By default, this command uses the heading shorthands. See § 3.5.7 for details.

### 3.5.4 Bibliography Sections

The \texttt{refsection} environment is used in the document body to mark a reference section. This environment is useful if you want separate, independent bibliographies and lists of shorthands in each chapter, section, or any other part of a document. Within a reference section, all cited works are assigned labels which are local to the environment. Technically, reference sections are completely independent from document divisions such as \texttt{\textbackslash chapter} and \texttt{\textbackslash section} even though they will most likely be used per chapter or section. See the \texttt{refsection} package option in § 3.1.2.1 for a way to automate this. Also see § 3.10.3 for usage examples.

\begin{verbatim}
\texttt{\textbackslash begin\{refsection\}[\langle \text{resource}, \ldots \rangle]}
\texttt{\textbackslash end\{refsection\}}
\end{verbatim}

The optional argument is a comma-separated list of resources specific to the reference section. If the argument is omitted, the reference section will use the default resource list, as specified with \texttt{\textbackslash addbibresource} in the preamble. If the argument is provided, it replaces the default resource list. Global resources specified with \texttt{\textbackslash addglobalbib} are always considered. \texttt{refsection} environments may not be nested, but you may use \texttt{refsegment} environments within a \texttt{refsection} to subdivide it into segments. Use the section option of \texttt{\textbackslash printbibliography} to select a section when printing the bibliography, and the corresponding option of \texttt{\textbackslash printshorthands} when printing the list of shorthands. Bibliography sections are numbered starting at 1. The number of the current section is also written to the transcript file. All citations given outside a \texttt{refsection} environment are assigned to section 0. If \texttt{\textbackslash printbibliography} is used within a \texttt{refsection}, it will automatically select the current section. The section option is not required in this case. This also applies to \texttt{\textbackslash printshorthands}. 

73
\newrefsection{⟨resource, …⟩}

This command is similar to the refsection environment except that it is a stand-alone command rather than an environment. It automatically ends the previous reference section (if any) and immediately starts a new one. Note that the reference section started by the last \newrefsection command in the document will extend to the very end of the document. Use \endrefsection if you want to terminate it earlier.

### 3.5.5 Bibliography Segments

The refsegment environment is used in the document body to mark a reference segment. This environment is useful if you want one global bibliography which is subdivided by chapter, section, or any other part of the document. Technically, reference segments are completely independent from document divisions such as \chapter and \section even though they will typically be used per chapter or section. See the refsegment package option in § 3.1.2.1 for a way to automate this. Also see § 3.10.3 for usage examples.

\begin{refsegment}
\end{refsegment}

The difference between a refsection and a refsegment environment is that the former creates labels which are local to the environment whereas the latter provides a target for the segment filter of \printbibliography without affecting the labels. They will be unique across the entire document. refsegment environments may not be nested, but you may use them in conjunction with refsection to subdivide a reference section into segments. In this case, the segments are local to the enclosing refsection environment. Use the refsegment option of \printbibliography to select a segment when printing the bibliography. The reference segments are numbered starting at 1 and the number of the current segment will be written to the transcript file. All citations given outside a refsegment environment are assigned to segment 0. In contrast to the refsection environment, the current segment is not selected automatically if \printbibliography is used within a refsegment environment.

\newrefsegment

This command is similar to the refsegment environment except that it is a stand-alone command rather than an environment. It automatically ends the previous reference segment (if any) and immediately starts a new one. Note that the reference segment started by the last \newrefsegment command will extend to the end of the document. Use \endrefsegment if you want to terminate it earlier.

### 3.5.6 Bibliography Categories

Bibliography categories allow you to split the bibliography into multiple parts dedicated to different topics or different types of references, for example primary and secondary sources. See § 3.10.4 for usage examples.

\DeclareBibliographyCategory{⟨category⟩}

Declares a new ⟨category⟩, to be used in conjunction with \addtocategory and
the category and notcategory filters of \printbibliography. This command is
used in the document preamble.

\addtocategory{⟨category⟩}{⟨key⟩}

Assigns a ⟨key⟩ to a ⟨category⟩, to be used in conjunction with the category and
notcategory filters of \printbibliography. This command may be used in the
preamble and in the document body. The ⟨key⟩ may be a single entry key or a
comma-separated list of keys. The assignment is global.

3.5.7 Bibliography Headings and Environments

\defbibenvironment{⟨name⟩}{⟨begin code⟩}{⟨end code⟩}{⟨item code⟩}

This command defines bibliography environments. The ⟨name⟩ is an identifier
passed to the env option of \printbibliography and \printshorthands when
selecting the environment. The ⟨begin code⟩ is LaTeX code to be executed at the
beginning of the environment; the ⟨end code⟩ is executed at the end of the envi-
ronment; the ⟨item code⟩ is code to be executed at the beginning of each entry in
the bibliography or the list of shorthands. Here is an example of a definition based
on the standard LaTeX list environment:

\defbibenvironment{bibliography}{\list{}\setlength{\leftmargin}{\bibhang}\setlength{\itemindent}{-\leftmargin}\setlength{\itemsep}{\bibitemsep}\setlength{\parskip}{\bibparskip}}\endlist{\item}

As seen in the above example, usage of \defbibenvironment is roughly similar to
\newenvironment except that there is an additional mandatory argument for the
⟨item code⟩.

\defbibheading{⟨name⟩}{⟨title⟩}{⟨code⟩}

This command defines bibliography headings. The ⟨name⟩ is an identifier to be
passed to the heading option of \printbibliography or \printbibheading and
\printshorthands when selecting the heading. The ⟨code⟩ should be LaTeX code
generating a fully-fledged heading, including page headers and an entry in the
table of contents, if desired. If \printbibliography or \printshorthands are
invoked with a title option, the title will be passed to the heading definition as
#1. If not, the default title specified by the optional ⟨title⟩ argument is passed as #1
instead. The ⟨title⟩ argument will typically be \bibname, \refname, or \losname
(see § 4.9.2.1). Here is an example of a simple heading definition:

\defbibheading{bibliography}{\bibname}{
\chapter*{(1)}
\markboth{(1)}{(1)}}
The following headings, which are intended for use with \printbibliography and \printbibheading, are predefined:

\texttt{bibliography}

This is the default heading used by \printbibliography if the heading option is not given. Its default definition depends on the document class. If the class provides a \chapter command, the heading is similar to the bibliography heading of the standard LaTeX book class, i.e., it uses \chapter* to create an unnumbered chapter heading which is not included in the table of contents. If there is no \chapter command, it is similar to the bibliography heading of the standard LaTeX article class, i.e., it uses \section* to create an unnumbered section heading which is not included in the table of contents. The string used in the heading also depends on the document class. With book-like classes the localization string bibliography is used, with other classes it is references (see § 4.9.2). See also §§ 3.11.1 and 3.11.2 for class-specific hints.

\texttt{subbibliography}

Similar to bibliography but one sectioning level lower. This heading definition uses \section* instead of \chapter* with a book-like class and \subsection* instead of \section* otherwise.

\texttt{bibintoc}

Similar to bibliography above but adds an entry to the table of contents.

\texttt{subbibintoc}

Similar to subbibliography above but adds an entry to the table of contents.

\texttt{bibnumbered}

Similar to bibliography above but uses \chapter or \section to create a numbered heading which is also added to the table of contents.

\texttt{subbibnumbered}

Similar to subbibliography above but uses \section or \subsection to create a numbered heading which is also added to the table of contents.

\texttt{none}

A blank heading definition. Use this to suppress the heading.

The following headings intended for use with \printshorthands are predefined:

\texttt{shorthands}

This is the default heading used by \printshorthands if the heading option is not given. It is similar to bibliography above except that it uses the localization string shorthands instead of bibliography or references (see § 4.9.2). See also §§ 3.11.1 and 3.11.2 for class-specific hints.
losintoc
Similar to shorthands above but adds an entry to the table of contents.

losnumbered
Similar to shorthands above but uses `\chapter` or `\section` to create a numbered heading which is also added to the table of contents.

### 3.5.8 Bibliography Notes

\defbibnote\langle name\rangle\langle text\rangle

Defines the bibliography note \langle name\rangle, to be used via the prenote and postnote options of `\printbibliography` and `\printshorthands`. The \langle text\rangle may be any arbitrary piece of text, possibly spanning several paragraphs and containing font declarations. Also see § 3.11.6.

### 3.5.9 Bibliography Filters and Checks

\defbibfilter\langle name\rangle\langle expression\rangle

Defines the custom bibliography filter \langle name\rangle, to be used via the filter option of `\printbibliography`. The \langle expression\rangle is a complex test based on the logical operators and, or, not, the group separator (...) and the following atomic tests:

- **segment=\langle integer\rangle**
  Matches all entries cited in reference segment \langle integer\rangle.

- **type=\langle entrytype\rangle**
  Matches all entries whose entry type is \langle entrytype\rangle.

- **subtype=\langle subtype\rangle**
  Matches all entries whose entrysubtype is \langle subtype\rangle.

- **keyword=\langle keyword\rangle**
  Matches all entries whose keywords field includes \langle keyword\rangle. If the \langle keyword\rangle contains spaces, it needs to be wrapped in braces.

- **category=\langle category\rangle**
  Matches all entries assigned to \langle category\rangle with `\addtocategory`.

Here is an example of a filter expression:

\defbibfilter{example}{%
    ( type=book or type=inbook )
    and keyword=abc
    and not keyword={x y z}
}%

This filter will match all entries whose entry type is either @book or @inbook and whose keywords field includes the keyword 'abc' but not 'x y z'. As seen in the
above example, all elements are separated by whitespace (spaces, tabs, or line endings). There is no spacing around the equal sign. The logical operators are evaluated with the \ifboolexpr command from the etoolbox package. See the etoolbox manual for details about the syntax. The syntax of the \ifthenelse command from the ifthen package, which has been employed in older versions of biblatex, is still supported. This is the same test using ifthen-like syntax:

\defbibfilter{example}{\% \\
\{ \text{\type{book}} \text{\or \type{inbook}} \} \\
\text{\and \keyword{abc}} \\
\text{\and \not \keyword{x y z}} 
\}

Note that custom filters are local to the reference section in which they are used. Use the section filter of \printbibliography to select a different section. This is not possible from within a custom filter.

\defbibcheck{⟨name⟩}{⟨code⟩}

Defines the custom bibliography filter ⟨name⟩, to be used via the check option of \printbibliography. \defbibcheck is similar in concept to \defbibfilter but much more low-level. Rather than a high-level expression, the ⟨code⟩ is LaTeX code, much like the code used in driver definitions, which may perform arbitrary tests to decide whether or not a given entry is to be printed. The bibliographic data of the respective entry is available when the ⟨code⟩ is executed. Issuing the command \skipentry in the ⟨code⟩ will cause the current entry to be skipped. For example, the following filter will only output entries with an abstract field:

\defbibcheck{abstract}{\% \\
\text{\iffieldundefined{abstract}{\skipentry}}} \\
\% ... \\
\printbibliography[check=abstract]

The following check will exclude all entries published before the year 2000:

\defbibcheck{recent}{\% \\
\text{\iffieldint{year}} \\
\{ \text{\ifnumless{\thefield{year}}{2000}} \\
\{ \text{\skipentry} \\
\} \\
\} \\
\{ \text{\skipentry} \}}

See the author guide, in particular §§ 4.6.2 and 4.6.3, for further details.

3.5.10 Dynamic Entry Sets

In addition to the @set entry type, biblatex also supports dynamic entry sets defined on a per-document/per-refsection basis. The following command, which may be used in the document preamble or the document body, defines the set ⟨key⟩:

\defbibentryset{⟨key⟩}{⟨key1,key2,key3,...⟩}

The ⟨key⟩ is the entry key of the set, which is used like any other entry key when re-
ferring to the set. The ⟨key⟩ must be unique and it must not conflict with any other entry key. The second argument is a comma-separated list of the entry keys which make up the set. \defbibentryset implies the equivalent of a \nocite command, i.e., all sets which are declared are also added to the bibliography. When declaring the same set more than once, only the first invocation of \defbibentryset will define the set. Subsequent definitions of the same ⟨key⟩ are ignored and work like \nocite{⟨key⟩}. Dynamic entry sets defined in the document body are local to the enclosing refsection environment, if any. Otherwise, they are assigned to reference section 0. Those defined in the preamble are assigned to reference section 0. Note that dynamic entry sets require Biber. They will not work with any other backend. See § 3.10.5 for further details.

3.6 Citation Commands

All citation commands generally take one mandatory and two optional arguments. The ⟨prenote⟩ is text to be printed at the beginning of the citation. This is usually a notice such as ‘see’ or ‘compare’. The ⟨postnote⟩ is text to be printed at the very end of the citation. This is usually a page number. If only one of these arguments is given, it is taken as a postnote. If you want to specify a prenote but no postnote, you need to leave the second optional argument empty, as in \cite[see]{⟨key⟩}.

The ⟨key⟩ argument to all citation commands is mandatory. This is the entry key or a comma-separated list of keys corresponding to the entry keys in the bib file. In sum, all basic citations commands listed further down have the following syntax:

\command{⟨prenote⟩}{⟨postnote⟩}{⟨keys⟩}{⟨punctuation⟩}

If the autopunct package option from § 3.1.2.1 is enabled, they will scan ahead for any ⟨punctuation⟩ immediately following their last argument. This is useful to avoid spurious punctuation marks after citations. This feature is configured with \DeclareAutoPunctuation, see § 4.7.5 for details.

3.6.1 Standard Commands

The following commands are defined by the citation style. Citation styles may provide any arbitrary number of specialized commands, but these are the standard commands typically provided by general-purpose styles.

\cite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\Cite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

These are the bare citation commands. They print the citation without any additions such as parentheses. The numeric and alphabetic styles still wrap the label in square brackets since the reference may be ambiguous otherwise. \Cite is similar to \cite but capitalizes the name prefix of the first name in the citation if the useprefix option is enabled, provided that there is a name prefix and the citation style prints any name at all.

\parencite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\Parencite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

These commands use a format similar to \cite but enclose the entire citation
in parentheses. The numeric and alphabetic styles use square brackets instead. \Parencite is similar to \parencite but capitalizes the name prefix of the first name in the citation if the useprefix option is enabled, provided that there is a name prefix and the citation style prints any name at all.

\footcite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\footcitetext{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

These command use a format similar to \cite but put the entire citation in a footnote and add a period at the end. In the footnote, they automatically capitalize the name prefix of the first name if the useprefix option is enabled, provided that there is a name prefix and the citation style prints any name at all. \footcitetext differs from \footcite in that it uses \footnotetext instead of \footnote.

3.6.2 Style-specific Commands

The following additional citation commands are only provided by some of the citation styles which ship with this package.

\textcite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\Textcite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

These citation commands are provided by all non-verbose styles which ship with this package. They are intended for use in the flow of text, replacing the subject of a sentence. They print the authors or editors followed by a citation label which is enclosed in parentheses. Depending on the citation style, the label may be a number, the year of publication, an abridged version of the title, or something else. The numeric and alphabetic styles use square brackets instead of parentheses. \Textcite is similar to \textcite but capitalizes the name prefix of the first name in the citation if the useprefix option is enabled, provided that there is a name prefix.

\smartcite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\Smartcite{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

Like \parencite in a footnote and like \footcite in the body.

\cite*[{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}]
\parencite*[{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}]

This command is provided by all author-year and author-title styles. It is similar to the regular \cite command but merely prints the year or the title, respectively.

\supercite{⟨key⟩}

This command, which is only provided by the numeric styles, prints numeric citations as superscripts without brackets. It uses \supercitedelim instead of \multicitedelim as citation delimiter. Note that any ⟨prenote⟩ and ⟨postnote⟩ ar-
3.6.3 Qualified Citation Lists

This package supports a class of special citation commands called ‘multicite’ com-
mands. The point of these commands is that their argument is a list of citations
where each item forms a fully qualified citation with a pre- and/or postnote. This
is particularly useful with parenthetical citations and citations given in footnotes.
It is also possible to assign a pre- and/or postnote to the entire list. The multicite
commands are built on top of backend commands like \parencite and \footcite.
The citation style provides a multicite definition with \DeclareMultiCiteCommand
(see § 4.3.1). The following example illustrates the syntax of multicite commands:
\parencites[35]{key1}[88--120]{key2}[23]{key3}

The format of the arguments is similar to that of the regular citation commands,
except that only one citation command is given. If only one optional argument
is given for an item in the list, it is taken as a postnote. If you want to specify a
prenote but no postnote, you need to leave the second optional argument of the
respective item empty:
\parencites[35]{key1}[chapter 2 in]{key2}[23]{key3}

In addition to that, the entire citation list may also have a pre- and/or postnote.
The syntax of these global notes differs from other optional arguments in that they
are given in parentheses rather than the usual brackets:
\parencites(and chapter 3)[35]{key1}[78]{key2}[23]{key3}
\parencites(Compare)(){35}{key1}[78]{key2}[23]{key3}
\parencites(See)(and the introduction)[35]{key1}[78]{key2}[23]{key3}

Note that the multicite commands keep on scanning for arguments until they en-
counter a token that is not the start of an optional or mandatory argument. If a
left brace or bracket follows a multicite command, you need to mask it by adding
\relax or a control space (a backslash followed by a space) after the last valid
argument. This will cause the scanner to stop.
\parencites[35]{key1}[78]{key2}\relax[...]
\parencites[35]{key1}[78]{key2}\_\_[...]

By default, this package provides the following multicite commands which corre-
spond to regular commands from §§ 3.6.1 and 3.6.2:
\cites⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩...⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩
\Cites⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩...⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩

The multicite version of \cite and \Cite, respectively.
\parencites⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩...⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩
\Parencites⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩...⟨⟨pre⟩⟩⟨⟨post⟩⟩⟨⟨key⟩⟩

The multicite version of \parencite and \Parencite, respectively.
\footcites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}
\footcitetexts{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}

The multicite version of \footcite and \footcitetext, respectively.

\smartcites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}
\Smartcites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}

The multicite version of \smartcite and \Smartcite, respectively.

\textcites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}
\Textcites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}

The multicite version of \textcite and \Textcite, respectively. This command is only provided by non-verbose styles.

\supercites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}
\Supercites{(pre)}{(post)}{(pre)}{(post)}{(key)}\ldots{(pre)}{(post)}{(key)}

The multicite version of \supercite. This command is only provided by the numeric styles.

3.6.4 Style-independent Commands

Sometimes it is desirable to give the citations in the source file in a format that is not tied to a specific citation style and can be modified globally in the preamble. The format of the citations is easily changed by loading a different citation style. However, when using commands such as \parencite or \footcite, the way the citations are integrated with the text is still effectively hard-coded. The idea behind the \autocite command is to provide higher-level citation markup which makes global switching from inline citations to citations given in footnotes (or as superscripts) possible. The \autocite command is built on top of backend commands like \parencite and \footcite. The citation style provides an \autocite definition with \DeclareAutoCiteCommand (see § 4.3.4). This definition may be activated with the autocite package option from § 3.1.2.1. The citation style will usually initialize this package option to a value which is suitable for the style, see § 3.3.1 for details. Note that there are certain limits to high-level citation markup.

For example, inline author-year citation schemes often integrate citations so tightly with the text that it is virtually impossible to automatically convert them to footnotes. The \autocite command is only applicable in cases in which you would normally use \parencite or \footcite (or \supercite, with a numeric style). The citations should be given at the end of a sentence or a partial sentence, immediately preceding the terminal punctuation mark, and they should not be a part of the sentence in a grammatical sense (like \textcite, for example).

\autocite{(prenote)}{(postnote)}{(key)}
\Autocite{(prenote)}{(postnote)}{(key)}

In contrast to other citation commands, the \autocite command does not only scan ahead for punctuation marks following its last argument to avoid double punctuation marks, it actually moves them around if required. For example, with autocite=footnote, a trailing punctuation mark will be moved such that the
footnote mark is printed after the punctuation. \Autocite is similar to \autocite but capitalizes the name prefix of the first name in the citation if the useprefix option is enabled, provided that there is a name prefix and the citation style prints any name at all.

\autocite*{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\Autocite*{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

The starred variants of \autocite do not behave differently from the regular ones. The asterisk is simply passed on to the backend command. For example, if \autocite is configured to use \parencite, then \autocite* will execute \parencite*.

\autocites{⟨pre⟩}{⟨post⟩}{⟨pre⟩}{⟨post⟩}{⟨key⟩}...
\Autocites{⟨pre⟩}{⟨post⟩}{⟨pre⟩}{⟨post⟩}{⟨key⟩}...
\autocites*{⟨pre⟩}{⟨post⟩}{⟨pre⟩}{⟨post⟩}{⟨key⟩}...
\Autocites*{⟨pre⟩}{⟨post⟩}{⟨pre⟩}{⟨post⟩}{⟨key⟩}...

This is the multicite version of \autocite. It also detects and moves punctuation if required. Note that there is no starred variant. \Autocites is similar to \autocites but capitalizes the name prefix of the first name in the citation if the useprefix option is enabled, provided that there is a name prefix and the citation style prints any name at all.

### 3.6.5 Text Commands

The following commands are provided by the core of \biblatex. They are intended for use in the flow of text. Note that all text commands are excluded from citation tracking.

\citeauthor{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\Citeauthor{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

These commands print the authors. Strictly speaking, it prints the \labelname list, which may be the author, the editor, or the translator. \Citeauthor is similar to \citeauthor but capitalizes the name prefix of the first name in the citation if the useprefix option is enabled, provided that there is a name prefix.

\citetitle{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}
\citetitle*{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

This command prints the title. It will use the abridged title in the shorttitle field, if available. Otherwise it falls back to the full title found in the title field. The starred variant always prints the full title.

\citeyear{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

This command prints the year (year field or year component of date).

\citedate{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

This command prints the full date (date or year).

\citeurl{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}

This command prints the url field.
\textbf{3.6.6 Special Commands}

The following special commands are also provided by the core of \texttt{biblatex}.

\textbf{\texttt{\nocite{\langle key\rangle}}}
\texttt{\nocite{*}}

This command is similar to the standard LaTeX \texttt{\nocite{\langle key\rangle}} command. It adds the \texttt{\langle key\rangle} to the bibliography without printing a citation. If the \texttt{\langle key\rangle} is an asterisk, all entries available in the \texttt{.bib} file are added to the bibliography. Like all other citation commands, \texttt{\nocite{\langle key\rangle}} commands in the document body are local to the enclosing \texttt{refsection} environment, if any. In contrast to standard LaTeX, \texttt{\nocite{\langle key\rangle}} may also be used in the document preamble. In this case, the references are assigned to reference section 0.

\textbf{\texttt{\fullcite{\langle prenote\rangle}{\langle postnote\rangle}{\langle key\rangle}}}

This command uses the bibliography driver for the respective entry type to create a full citation similar to the bibliography entry. It is thus related to the bibliography style rather than the citation style.

\textbf{\texttt{\footfullcite{\langle prenote\rangle}{\langle postnote\rangle}{\langle key\rangle}}}

Similar to \texttt{\fullcite{\langle prenote\rangle}{\langle postnote\rangle}{\langle key\rangle}} but puts the entire citation in a footnote and adds a period at the end.

\textbf{\texttt{\volcite{\langle prenote\rangle}{\langle volume\rangle}{\langle page\rangle}{\langle key\rangle}}}
\texttt{\Volcite{\langle prenote\rangle}{\langle volume\rangle}{\langle page\rangle}{\langle key\rangle}}

These commands are similar to \texttt{\cite} and \texttt{\Cite} but intended for references to multi-volume works which are cited by volume and page number. Instead of the \texttt{\langle postnote\rangle}, they take a mandatory \texttt{\langle volume\rangle} and an optional \texttt{\langle page\rangle} argument. Since they merely compose the postnote and pass it to the \texttt{\cite} command provided by the citation style as a \texttt{\langle postnote\rangle} argument, these commands are style independent. The format of the volume portion is controlled by the field formatting directive \texttt{volcitevolume}, the format of the page/text portion is controlled by the field formatting directive \texttt{volcitepages} (§ 4.10.4). The delimiter printed between the volume portion and the page/text portion may be modified by redefining the macro \texttt{volcitedelim} (§ 4.10.1).

\textbf{\texttt{\pvolcite{\langle prenote\rangle}{\langle volume\rangle}{\langle page\rangle}{\langle key\rangle}}}
\texttt{\Pvolcite{\langle prenote\rangle}{\langle volume\rangle}{\langle page\rangle}{\langle key\rangle}}

Similar to \texttt{\volcite} but based on \texttt{\parencite}.
Similar to \volcite but based on \footcite and \footcitetext, respectively.

\svolcite[⟨prenote⟩]{⟨volume⟩}{⟨page⟩}{⟨key⟩}
\Svolcite[⟨prenote⟩]{⟨volume⟩}{⟨page⟩}{⟨key⟩}

Similar to \volcite but based on \smartcite.

\tvolcite[⟨prenote⟩]{⟨volume⟩}{⟨page⟩}{⟨key⟩}
\Tvolcite[⟨prenote⟩]{⟨volume⟩}{⟨page⟩}{⟨key⟩}

Similar to \volcite but based on \textcite.

\avolcite[⟨prenote⟩]{⟨volume⟩}{⟨page⟩}{⟨key⟩}
\Avolcite[⟨prenote⟩]{⟨volume⟩}{⟨page⟩}{⟨key⟩}

Similar to \volcite but based on \autocite.

\notecite[⟨prenote⟩]{⟨postnote⟩}{⟨key⟩}
\Notecite[⟨prenote⟩]{⟨postnote⟩}{⟨key⟩}

These commands print the ⟨prenote⟩ and ⟨postnote⟩ arguments but no citation. Instead, a \nocite command is issued for every ⟨key⟩. This may be useful for authors who incorporate implicit citations in their writing, only giving information not mentioned before in the running text, but who still want to take advantage of the automatic ⟨postnote⟩ formatting and the implicit \nocite function. This is a generic, style-independent citation command. Special citation styles may provide smarter facilities for the same purpose. The capitalized version forces capitalization (note that this is only applicable if the note starts with a command which is sensitive to \biblatex's punctuation tracker).

\pnotecite[⟨prenote⟩]{⟨postnote⟩}{⟨key⟩}
\Pnotecite[⟨prenote⟩]{⟨postnote⟩}{⟨key⟩}

Similar to \notecite but the notes are printed in parentheses.

\fnotecite[⟨prenote⟩]{⟨postnote⟩}{⟨key⟩}

Similar to \notecite but the notes are printed in a footnote.

3.6.7 \textbf{Low-level Commands}

The following commands are also provided by the core of \biblatex. They grant access to all lists and fields at a lower level.

\citename[⟨prenote⟩]{⟨postnote⟩}{⟨key⟩}{⟨format⟩}{⟨name list⟩}

The ⟨format⟩ is a formatting directive defined with \DeclareNameFormat. Formatting directives are discussed in § 4.4.2. If this optional argument is omitted, this command falls back to the format citename. The last argument is the name of a ⟨name list⟩, in the sense explained in § 2.2.
\citelist{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}{⟨format⟩}{⟨literal list⟩}

The ⟨format⟩ is a formatting directive defined with \DeclareListFormat. Formatting directives are discussed in § 4.4.2. If this optional argument is omitted, this command falls back to the format citelist. The last argument is the name of a ⟨literal list⟩, in the sense explained in § 2.2.

\citefield{⟨prenote⟩}{⟨postnote⟩}{⟨key⟩}{⟨format⟩}{⟨field⟩}

The ⟨format⟩ is a formatting directive defined with \DeclareFieldFormat. Formatting directives are discussed in § 4.4.2. If this optional argument is omitted, this command falls back to the format citefield. The last argument is the name of a ⟨field⟩, in the sense explained in § 2.2.

### 3.6.8 Miscellaneous Commands

The commands in this section are little helpers related to citations.

\citereset

This command resets the citation style. This may be useful if the style replaces repeated citations with abbreviations like ibidem, idem, op. cit., etc. and you want to force a full citation at the beginning of a new chapter, section, or some other location. The command executes a style specific initialization hook defined with the \InitializeCitationStyle command from § 4.3.1. It also resets the internal citation trackers of this package. The reset will affect the \ifciteseen, \ifentryseen, \ifciteibid, and \ifciteidem tests discussed in § 4.6.2. When used inside a refsection environment, the reset of the citation tracker is local to the current refsection environment. Also see the citereset package option in § 3.1.2.1.

\citereset*

Similar to \citereset but only executes the style's initialization hook, without resetting the internal citation trackers.

\mancite

Use this command to mark manually inserted citations if you mix automatically generated and manual citations. This is particularly useful if the citation style replaces repeated citations by an abbreviation like ibidem which may get ambiguous or misleading otherwise. Always use \mancite in the same context as the manual citation, e.g., if the citation is given in a footnote, include \mancite in the footnote. The \mancite command executes a style specific reset hook defined with the \OnManualCitation command from § 4.3.1. It also resets the internal ‘ibidem’ and ‘idem’ trackers of this package. The reset will affect the \ifciteibid and \ifciteidem tests discussed in § 4.6.2.

\pno

This command forces a single page prefix in the ⟨postnote⟩ argument to a citation command. See § 3.11.3 for further details and usage instructions. Note that this command is only available locally in citations and the bibliography.

\ppno

Similar to \pno but forces a range prefix. See § 3.11.3 for further details and usage instructions. Note that this command is only available locally in citations and the bibliography.

\nopp

Similar to \pno but suppresses all prefixes. See § 3.11.3 for further details and usage
instructions. Note that this command is only available locally in citations and the bibliography.

\psq In the \textit{⟨postnote⟩} argument to a citation command, this command indicates a range of two pages where only the starting page is given. See § 3.11.3 for further details and usage instructions. The suffix printed is the localization string sequens, see § 4.9.2. The spacing inserted between the suffix and the page number may be modified by redefining the macro \textbackslash sqspace. The default is an unbreakable inter-word space. Note that this command is only available locally in citations and the bibliography.

\psqq Similar to \textbackslash psq but indicates an open-ended page range. See § 3.11.3 for further details and usage instructions. The suffix printed is the localization string sequentes, see § 4.9.2. This command is only available locally in citations and the bibliography.

\RN\{ ⟨integer⟩ \} This command prints an integer as an uppercase Roman numeral. The formatting applied to the numeral may be modified by redefining the macro \textbackslash RNfont.

\Rn\{ ⟨integer⟩ \} Similar to \textbackslash RN but prints a lowercase Roman numeral. The formatting applied to the numeral may be modified by redefining the macro \textbackslash Rnfont.

### 3.6.9 \texttt{natbib} Compatibility Commands

The \texttt{natbib} package option loads a \texttt{natbib} compatibility module. The module defines aliases for the citation commands provided by the \texttt{natbib} package. This includes aliases for the core citation commands \texttt{\citep} and \texttt{\citet} as well as the variants \texttt{\citealp} and \texttt{\citealt}. The starred variants of these commands, which print the full author list, are also supported. The \texttt{\cite} command, which is handled in a particular way by \texttt{natbib}, is not treated in a special way. The text commands (\texttt{\citeyear}, \texttt{\citeauthor}, etc.) are also supported, as are all commands which capitalize the name prefix (\texttt{\Citep}, \texttt{\Citet}, \texttt{\Citeauthor}, etc.). Aliasing with \texttt{\defcitealias}, \texttt{\citepalias}, and \texttt{\citealpalias} is possible as well. Note that the compatibility commands will not emulate the citation format of the \texttt{natbib} package. They merely alias \texttt{natbib}'s commands to functionally equivalent facilities of the \texttt{biblatex} package. The citation format depends on the main citation style. However, the compatibility style will adapt \texttt{nameyeardelim} to match the default style of the \texttt{natbib} package.

### 3.6.10 \texttt{mcite}-like Citation Commands

The \texttt{mcite} package option loads a special citation module which provides \texttt{mcite/mciteplus}-like citation commands. Strictly speaking, what the module provides are wrappers for the commands of the main citation style. For example, the following command:

\texttt{\mcite\{key1,setA,*keyA1,*keyA2,*keyA3,key2,setB,*keyB1,*keyB2,*keyB3\}}

87
Table 5: \textbf{mcite-like commands}

<table>
<thead>
<tr>
<th>Standard Command</th>
<th>\textbf{mcite-like Command}</th>
</tr>
</thead>
<tbody>
<tr>
<td>\cite</td>
<td>\mcite</td>
</tr>
<tr>
<td>\Cite</td>
<td>\Mcite</td>
</tr>
<tr>
<td>\parencite</td>
<td>\mparencite</td>
</tr>
<tr>
<td>\Parencite</td>
<td>\mParencite</td>
</tr>
<tr>
<td>\footcite</td>
<td>\mfootcite</td>
</tr>
<tr>
<td>\footcitetext</td>
<td>\mfootcitetext</td>
</tr>
<tr>
<td>\textcite</td>
<td>\mtextcite</td>
</tr>
<tr>
<td>\Textcite</td>
<td>\mTextcite</td>
</tr>
<tr>
<td>\supercite</td>
<td>\msupercite</td>
</tr>
</tbody>
</table>

is essentially equivalent to this:
\begin{verbatim}
\defbibentryset{setA}{keyA1,keyA2,keyA3}\%
\defbibentryset{setB}{keyB1,keyB2,keyB3}\%
\cite{key1,setA,key2,setB}
\end{verbatim}

The \texttt{\mcite} command will work with any style since the \texttt{\cite} backend command is controlled by the main citation style as usual. The \texttt{mcite} module provides wrappers for the standard commands in §§ 3.6.1 and 3.6.2. See table 6 for an overview. Pre and postnotes as well as starred variants of all commands are also supported. The parameters will be passed to the backend command. For example:
\begin{verbatim}
\mcite*[pre][post]{setA,*keyA1,*keyA2,*keyA3}
\end{verbatim}

will execute:
\begin{verbatim}
\defbibentryset{setA}{keyA1,keyA2,keyA3}\%
\cite*[pre][post]{setA}
\end{verbatim}

Note that the \texttt{mcite} module is not a compatibility module. It provides commands which are very similar but not identical in syntax and function to \texttt{mcite}'s commands. When migrating from \texttt{mcite/mciteplus} to \texttt{biblatex}, legacy files must be updated. With \texttt{mcite}, the first member of the citation group is also the identifier of the group as a whole. Borrowing an example from the \texttt{mcite} manual, this group:
\begin{verbatim}
\cite{glashow,*salam,*weinberg}
\end{verbatim}

consists of three entries and the entry key of the first one also serves as identifier of the entire group. In contrast to that, a \texttt{biblatex} entry set is an entity in its own right. Therefore, it requires a unique entry key which is assigned to the set as it is defined:
\begin{verbatim}
\mcite{set1,*glashow,*salam,*weinberg}
\end{verbatim}

Once defined, an entry set is handled like any regular entry in a \texttt{bib} file. When using one of the numeric styles which ship with \texttt{biblatex} and activating its subentry option, it is even possible to refer to set members. See table 6 for some examples. Restating the original definition of the set is redundant, but permissible. In contrast to \texttt{mciteplus}, however, restating a part of the original definition is invalid. Use the entry key of the set instead.
### Localization Commands

The \texttt{biblatex} package provides translations for key terms such as ‘edition’ or ‘volume’ as well as definitions for language specific features such as the date format and ordinals. These definitions, which are loaded automatically, may be modified or extended in the document preamble or the configuration file with the commands introduced in this section.

\begin{verbatim}
\DefineBibliographyStrings{⟨language⟩}{⟨definitions⟩}
\end{verbatim}

This command is used to define localization strings. The \texttt{⟨language⟩} must be a language name known to the \texttt{babel} package, i.e., one of the identifiers listed in \texttt{table 1} on page 25. The \texttt{⟨definitions⟩} are \texttt{⟨key⟩=⟨value⟩} pairs which assign an expression to an identifier:

\begin{verbatim}
\DefineBibliographyStrings{american}{%
  bibliography = {Bibliography},
  shorthands = {Abbreviations},
  editor = {editor},
  editors = {editors},
}\end{verbatim}

A complete list of all keys supported by default is given is § 4.9.2. Note that all expressions should be capitalized as they usually are when used in the middle of a sentence. The \texttt{biblatex} package will automatically capitalize the first word when required at the beginning of a sentence. Expressions intended for use in headings should be capitalized in a way that is suitable for titling. In contrast to \texttt{\DeclareBibliographyStrings}, \texttt{\DefineBibliographyStrings} overrides both the full and the abbreviated version of the string. See § 4.9.1 for further details.

\begin{verbatim}
\DefineBibliographyExtras{⟨language⟩}{⟨code⟩}
\end{verbatim}

This command is used to adapt language specific features such as the date format and ordinals. The \texttt{⟨language⟩} must be a language name known to the \texttt{babel} package. The \texttt{⟨code⟩}, which may be arbitrary \LaTeX{} code, will usually consist of redefinitions of the formatting commands from § 3.8.2.

\begin{verbatim}
\UndefineBibliographyExtras{⟨language⟩}{⟨code⟩}
\end{verbatim}

This command is used to restore the original definition of any commands modified with \texttt{\DefineBibliographyExtras}. If a redefined command is included in
§ 3.8.2, there is no need to restore its previous definition since these commands are adapted by all language modules anyway.

\DefineHyphenationExceptions{⟨language⟩}{⟨text⟩}

This is a LaTeX frontend to TeX's \hyphenation command which defines hyphenation exceptions. The ⟨language⟩ must be a language name known to the babel package. The ⟨text⟩ is a whitespace-separated list of words. Hyphenation points are marked with a dash:

\DefineHyphenationExceptions{american}{% hyphenation exception}

\NewBibliographyString{⟨key⟩}

This command declares new localization strings, i.e., it initializes a new ⟨key⟩ to be used in the ⟨definitions⟩ of \DefineBibliographyStrings. The ⟨key⟩ argument may also be a comma-separated list of key names. The keys listed in § 4.9.2 are defined by default.

3.8 Formatting Commands

The commands and facilities presented in this section may be used to adapt the format of citations and the bibliography.

3.8.1 Generic Commands and Hooks

The commands in this section may be redefined with \renewcommand in the document preamble. Note that all commands starting with \mk... take one argument. All of these commands are defined in biblatex.def.

\bibsetup Arbitrary code to be executed at the beginning of the bibliography, intended for commands which affect the layout of the bibliography.

\bibfont Arbitrary code setting the font used in the bibliography. This is very similar to \bibsetup but intended for switching fonts.

\citesetup Arbitrary code to be executed at the beginning of each citation command.

\newblockpunct The separator inserted between 'blocks' in the sense explained in § 4.7.1. The default definition is controlled by the package option block (see § 3.1.2.1).

\newunitpunct The separator inserted between 'units' in the sense explained in § 4.7.1. This will usually be a period or a comma plus an interword space. The default definition is a period and a space.

\finentrypunct The punctuation printed at the very end of every bibliography entry, usually a period. The default definition is a period.

\bibnamedelima This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically after the first name element if the element is less than three characters long and before the last element. The default definition is an
interword space penalized by the value of the highnamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

\bibnamedelim  This delimiter is inserted between the elements which make up a name part where \bibnamedelima does not apply. The default definition is an interword space penalized by the value of the lownamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

\bibnamedelimc  This delimiter controls the spacing between name parts. It is inserted between the name prefix and the last name if useprefix=true. The default definition is an interword space penalized by the value of the highnamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

\bibnamedelimd  This delimiter is inserted between all name parts where \bibnamedelimc does not apply. The default definition is an interword space penalized by the value of the lownamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

\bibnamedelimi  This delimiter replaces \bibnamedelima/b after initials. Note that this only applies to initials given as such in the bib file, not to the initials automatically generated by biblatex which use their own set of delimiters.

\bibinitperiod  The punctuation inserted after initials unless \bibinithyphendelim applies. The default definition is a period (\adddot). Please refer to § 3.11.4 for further details.

\bibinitdelim  The spacing inserted between multiple initials unless \bibinithyphendelim applies. The default definition is an unbreakable interword space. Please refer to § 3.11.4 for further details.

\bibinithyphendelim  The punctuation inserted between the initials of hyphenated name parts, replacing \bibinitperiod and \bibinitdelim. The default definition is a period followed by an unbreakable hyphen. Please refer to § 3.11.4 for further details.

\labelnamepunct  The separator printed after the name used for alphabetizing in the bibliography (author or editor, if the author field is undefined). With the default styles,
this separator replaces \newunitpunct at this location. The default definition is \newunitpunct, i.e., it is not handled differently from regular unit punctuation.

\subtitlepunct The separator printed between the fields title and subtitle, booktitle and booksubtitle, as well as maintitle and mainsubtitle. With the default styles, this separator replaces \newunitpunct at this location. The default definition is \newunitpunct, i.e., it is not handled differently from regular unit punctuation.

\intitlepunct The separator between the word “in” and the following title in entry types such as @article, @inbook, @incollection, etc. The default definition is a colon plus an interword space (e.g., “Article, in: Journal” or “Title, in: Book”). Note that this is the separator string, not only the punctuation mark. If you don’t want a colon after “in”, \intitlepunct should still insert a space.

\bibpagespunct The separator printed before the pages field. The default is a comma plus an interword space.

\bibpagerefpunct The separator printed before the pageref field. The default is an interword space.

\multinamedelim The delimiter printed between multiple items in a name list like author or editor if there are more than two names in the list. The default is a comma plus an interword space. See \finalnamedelim for an example.1

\finalnamedelim The delimiter printed instead of \multinamedelim before the final name in a name list. The default is the localized term ‘and’, separated by interword spaces. Here is an example:

\begin{itemize}
  \item Michel Goossens, Frank Mittelbach and Alexander Samarin
  \item Edward Jones and Joe Williams
\end{itemize}

The comma in the first example is the \multinamedelim whereas the string ‘and’ in both examples is the \finalnamedelim. See also \finalandcomma in § 3.8.2.

\revsdnamedelim An extra delimiter printed after the first name in a name list if the first name is reversed. The default is an empty string, i.e., no extra delimiter will be printed. Here is an example showing a name list with a comma as \revsdnamedelim:

\begin{itemize}
  \item Jones, Edward, and Joe Williams
\end{itemize}

In this example, the comma after ‘Edward’ is the \revsdnamedelim whereas the string ‘and’ is the \finalnamedelim, printed in addition to the former.

\andothersdelim The delimiter printed before the localization string ‘and others’ if a name list like author or editor is truncated. The default is an interword space.

\multilistdelim The delimiter printed between multiple items in a literal list like publisher or location if there are more than two items in the list. The default is a comma plus an interword space. See \multinamedelim for further explanation.

\finallistdelim The delimiter printed instead of \multilistdelim before the final item in a literal list.

1 Note that \multinamedelim is not used at all if there are only two names in the list. In this case, the default styles use the \finalnamedelim.
list. The default is the localized term ‘and’, separated by interword spaces. See \finalnamedelim for further explanation.

\andmoredelim The delimiter printed before the localization string ‘and more’ if a literal list like publisher or location is truncated. The default is an interword space.

\multicitedelim The delimiter printed between citations if multiple entry keys are passed to a single citation command. The default is a semicolon plus an interword space.

\supercitedelim Similar to \multicitedelim, but used by the \supercite command only. The default is a comma.

\compcitedelim Similar to \multicitedelim, but used by certain citation styles when ‘compressing’ multiple citations. The default definition is a comma plus an interword space.

\nametitledelim The delimiter printed between the author/editor and the title by author-title and some verbose citation styles. The default definition is a comma plus an interword space.

\nameyeardelim The delimiter printed between the author/editor and the year by author-year citation styles. The default definition is an interword space.

\labelalphaothers A string to be appended to the non-numeric portion of the labelalpha field (i.e., the field holding the citation label used by alphabetic citation styles) if the number of authors/editors exceeds the maxalphanames threshold or the author/editor list was truncated in the bib file with the keyword ‘and others’. This will typically be a single character such as a plus sign or an asterisk. The default is a plus sign. This command may also be redefined to an empty string to disable this feature. In any case, it must be redefined in the preamble.

\sortalphaothers Similar to \labelalphaothers but used in the sorting process. Setting it to a different value is advisable if the latter contains formatting commands, for example:

\renewcommand*{\labelalphaothers}{\textbf{+}}
\renewcommand*{\sortalphaothers}{+}

If \sortalphaothers is not redefined, it defaults to \labelalphaothers.

\prenotedelim The delimiter printed after the ⟨prenote⟩ argument of a citation command. See § 3.6 for details. The default is an interword space.

\postnotedelim The delimiter printed before the ⟨postnote⟩ argument of a citation command. See § 3.6 for details. The default is a comma plus an interword space.

\mkbibnamelast{⟨text⟩}

This command, which takes one argument, is used to format the last name of all authors, editors, translators, etc.

\mkbibnamefirst{⟨text⟩}

Similar to \mkbibnamelast, but intended for the first name.
\mkbibnameprefix{⟨text⟩}

Similar to \mkbibnamelast, but intended for the name prefix.

\mkbibnameaffix{⟨text⟩}

Similar to \mkbibnamelast, but intended for the name affix.

### 3.8.2 Language-specific Commands

The commands in this section are language specific. When redefining them, you need to wrap the new definition in a \DeclareBibliographyExtras command, see § 3.7 for details. Note that all commands starting with \mk... take one or more arguments.

\bibrangedash

The language specific dash to be used for ranges of numbers.

\bibdatedash

The language specific dash to be used for date ranges.

\mkbibdatelong

Takes the names of three field as arguments which correspond to three date components (in the order year/month/day) and uses their values to print the date in the language specific long date format.

\mkbibdateshort

Similar to \mkbibdatelong but using the language specific short date format.

\finalandcomma

Prints the comma to be inserted before the final ‘and’ in a list, if applicable in the respective language. Here is an example:

Michel Goossens, Frank Mittelbach, and Alexander Samarin

\finalandcomma is the comma before the word ‘and’. See also \multinamedelim, \finalnamedelim, and \revsdnamedelim in § 3.8.1.

\mkbibordinal{⟨integer⟩}

This command, which takes an integer as its argument, prints an ordinal number.

\mkbibmascord{⟨integer⟩}

Similar to \mkbibordinal, but prints a masculine ordinal, if applicable in the respective language.

\mkbibfemord{⟨integer⟩}

Similar to \mkbibordinal, but prints a feminine ordinal, if applicable in the respective language.

\mkbibneutord{⟨integer⟩}

Similar to \mkbibordinal, but prints a neuter ordinal, if applicable in the respective language.

\mkbibordedition{⟨integer⟩}

Similar to \mkbibordinal, but intended for use with the term ‘edition’.
\mkbibordseries{⟨integer⟩}

Similar to \mkbibordinal, but intended for use with the term ‘series’.

### 3.8.3 Lengths and Counters

The length registers and counters in this section may be changed in the document preamble with \setlength and \setcounter, respectively.

- \bibhang The hanging indentation of the bibliography, if applicable. This length is initialized to \parindent at load-time.

- \biblabelsep The horizontal space between entries and their corresponding labels in the bibliography. This only applies to bibliography styles which print labels, such as the numeric and alphabetic styles. This length is initialized to twice the value of \labelsep at load-time.

- \bibitemsep The vertical space between the individual entries in the bibliography. This length is initialized to \itemsep at load-time. Note that \bibitemsep, \bibnamesep, and \bibinitsep are cumulative. When they coincide, the largest value will be applied.

- \bibnamesep Vertical space to be inserted between two entries in the bibliography whenever an entry starts with a name which is different from the initial name of the previous entry. The default value is zero. Setting this length to a positive value greater than \bibitemsep will group the bibliography by author/editor name. Note that \bibitemsep, \bibnamesep, and \bibinitsep are cumulative. When they coincide, the largest value will be applied.

- \bibinitsep Vertical space to be inserted between two entries in the bibliography whenever an entry starts with a letter which is different from the initial letter of the previous entry. The default value is zero. Setting this length to a positive value greater than \bibitemsep will group the bibliography alphabetically. Note that \bibitemsep, \bibnamesep, and \bibinitsep are cumulative. When they coincide, the largest value will be applied.

- \bibparsep The vertical space between paragraphs within an entry in the bibliography. The default value is zero.

- abbrvpenalty This counter, which is used by the localization modules, holds the penalty used in short or abbreviated localization strings. For example, a linebreak in expressions such as “et al.” or “ed. by” is unfortunate, but should still be possible to prevent overfull boxes. This counter is initialized to \hyphenpenalty at load-time. The idea is making TeX treat the whole expression as if it were a single, hyphenatable word as far as line-breaking is concerned. If you dislike such linebreaks, use a higher value. If you do not mind them at all, set this counter to zero. If you want to suppress them unconditionally, set it to ‘infinite’ (10 000 or higher).\footnote{The default values assigned to abbrvpenalty, lownamepenalty, and highnamepenalty are deliberately very low to prevent overfull boxes. This implies that you will hardly notice any effect on line-breaking if the text is set justified. If you set these counters to 10 000 to suppress the respective breakpoints, you will notice their effect but you may also be confronted with overfull boxes.}

95
**highnamepenalty** This counter holds a penalty affecting line-breaking in names. Please refer to §§ 3.11.4 and 3.8.1 for explanation. The counter is initialized to \hyphenpenalty at load-time. Use a higher value if you dislike the respective linebreaks. If you do not mind them at all, set this counter to zero. If you prefer the traditional BibTeX behavior (no linebreaks at highnamepenalty breakpoints), set it to ‘infinite’ (10 000 or higher).

**lownamepenalty** Similar to highnamepenalty. Please refer to §§ 3.11.4 and 3.8.1 for explanation. The counter is initialized to half the \hyphenpenalty at load-time. Use a higher value if you dislike the respective linebreaks. If you do not mind them at all, set this counter to zero.

### 3.8.4 All-purpose Commands

The commands in this section are all-purpose text commands which are generally available, not only in citations and the bibliography.

**\bibellipsis** An ellipsis symbol with brackets: '[...]'.

**\noligature** Disables ligatures at this position and adds some space. Use this command to break up standard ligatures like ‘fi’ and ‘fl’. It is similar to the ‘|’ shorthand provided by some language modules of the babel package.

**\hyphenate** A conditional hyphen. In contrast to the standard \- command, this one allows hyphenation in the rest of the word. It is similar to the ‘-’ shorthand provided by some language modules of the babel package.

**\hyphen** An explicit, breakable hyphen intended for compound words. In contrast to a literal ‘-’, this command allows hyphenation in the rest of the word. It is similar to the ‘-’ shorthand provided by some language modules of the babel package.

**\nbhyphen** An explicit, non-breakable hyphen intended for compound words. In contrast to a literal ‘-’, this command does not permit line breaks at the hyphen but still allows hyphenation in the rest of the word. It is similar to the ‘-’ shorthand provided by some language modules of the babel package.

**\nohyphenation** A generic switch which suppresses hyphenation locally. Its scope should normally be confined to a group.

**\textnohyphenation{{⟨text⟩}}**

Similar to \nohyphenation but restricted to the ⟨text⟩ argument.

**\mknumalph{{⟨integer⟩}}**

Takes an integer in the range 1–702 as its argument and converts it to a string as follows: 1=a, ..., 26=z, 27=aa, ..., 702=zz. This is intended for use in formatting directives for the extrayear and extraalpha fields.

Keep in mind that line-breaking in the bibliography is often more difficult than in the body text and that you can not resort to rephrasing a sentence. In some cases it may be preferable to set the entire bibliography \raggedright to prevent suboptimal linebreaks. In this case, even the fairly low default penalties will make a visible difference.
\mkbibacro{⟨text⟩}

Generic command which typesets an acronym using the small caps variant of the current font, if available, and as-is otherwise. The acronym should be given in uppercase letters.

\autocap{⟨character⟩}

Automatically converts the ⟨character⟩ to its uppercase form if biblatex’s punctuation tracker would capitalize a localization string at the current location. This command is robust. It is useful for conditional capitalization of certain strings in an entry. Note that the ⟨character⟩ argument is a single character given in lowercase. For example:

\autocap{s}pecial issue

will yield ‘Special issue’ or ‘special issue’, as appropriate. If the string to be capitalized starts with an inflected character given in Ascii notation, include the accent command in the ⟨character⟩ argument as follows:

\autocap{\'e}dition sp\'eciale

This will yield ‘Édition spéciale’ or ‘édition spéciale’. If the string to be capitalized starts with a command which prints a character, such as \ae or \oe, simply put the command in the ⟨character⟩ argument:

\autocap{\oe}uvres

This will yield ‘Œuvres’ or ‘œuvres’.

3.9 Language-specific Notes

The facilities discussed in this section are specific to certain localization modules.

3.9.1 American

The American localization module uses \uspunctuation from § 4.7.5 to enable ‘American-style’ punctuation. If this feature is enabled, all trailing commas and periods after \mkbibquote will be moved inside the quotes. If you want to disable this feature, use \stdpunctuation as follows:

\DefineBibliographyExtras{american}{%
  \stdpunctuation
}%

By default, the ‘American punctuation’ feature is enabled by the american localization module only. The above code is only required if you want American localization without American punctuation. Since standard punctuation is the package default, it would be redundant with any other language.

It is highly advisable to always specify american, british, australian, etc. rather than english when loading the babel package to avoid any possible confusion. Older versions of the babel package used to treat english as an alias for british; more recent ones treat it as an alias for american. The biblatex package
essentially treats English as an alias for American, except for the above feature which is only enabled if American is requested explicitly.

3.9.2 Spanish

Handling the word ‘and’ is more difficult in Spanish than in the other languages supported by this package because it may be ‘y’ or ‘e’, depending on the initial sound of the following word. Therefore, the Spanish localization module does not use the localization string ‘and’ but a special internal ‘smart and’ command. The behavior of this command is controlled by the smartand counter.

**smartand** This counter controls the behavior of the internal ‘smart and’ command. When set to 1, it prints ‘y’ or ‘e’, depending on the context. When set to 2, it always prints ‘y’. When set to 3, it always prints ‘e’. When set to 0, the ‘smart and’ feature is disabled. This counter is initialized to 1 at load-time and may be changed in the preamble. Note that setting this counter to a positive value implies that the Spanish localization module ignores \finalnamedelim and \finallistdelim.

**\forceE** Use this command in .bib files if biblatex gets the ‘and’ before a certain name wrong. As its name suggests, it will enforce ‘e’. This command must be used in a special way to prevent confusing BibTeX. Here is an example:

```latex
author = {Edward Jones and Eoin Maguire},
author = {Edward Jones and \forceE{E}oin Maguire},
```

Note that the initial letter of the respective name component is given as an argument to \forceE and that the entire construct is wrapped in an additional pair of curly braces.

**\forceY** Similar to \forceE but enforces ‘y’.

3.9.3 Greek

The Greek localization module requires UTF-8 support. It will not work with any other encoding. Generally speaking, the biblatex package is compatible with the inputenc package and with XeLaTeX. The ucs package will not work. Since inputenc's standard utf8 module is missing glyph mappings for Greek, this leaves Greek users with XeLaTeX. Note that you may need to load additional packages which set up Greek fonts. As a rule of thumb, a setup which works for regular Greek documents should also work with biblatex. However, there is one fundamental limitation. As of this writing, biblatex has no support for switching scripts. Greek titles in the bibliography should work fine, provided that you use Biber as a backend, but English and other titles in the bibliography may be rendered in Greek letters. If you need multi-script bibliographies, using XeLaTeX is the only sensible choice.

3.9.4 Russian

Like the Greek localization module, the Russian module also requires UTF-8 support. It will not work with any other encoding.
3.10 Usage Notes

The following sections give a basic overview of the `biblatex` package and discuss some typical usage scenarios.

3.10.1 Overview

Using the `biblatex` package is slightly different from using traditional BibTeX styles and related packages. Before we get to specific usage scenarios, we will therefore have a look at the structure of a typical document first:

```latex
\documentclass{...}
\usepackage[...]{biblatex}
\addbibresource{bibfile.bib}
\begin{document}
\cite{...}
...
\printbibliography
\end{document}
```

With traditional BibTeX, the `\bibliography` command serves two purposes. It marks the location of the bibliography and it also specifies the `.bib` file(s). The file extension is omitted. With `biblatex`, resources are specified in the preamble with `\addbibresource` using the full name with `.bib` suffix. The bibliography is printed using the `\printbibliography` command which may be used multiple times (see § 3.5 for details). The document body may contain any number of citation commands (§ 3.6). Processing this example file requires that a certain procedure be followed. Suppose our example file is called `example.tex` and our bibliographic data is in `bibfile.bib`. The procedure, then, is as follows:

1. Run `latex` on `example.tex`. If the file contains any citations, `biblatex` will request the respective data from BibTeX by writing commands to the auxiliary file `example.aux`.

2. Run `bibtex` on `example.aux`. BibTeX will retrieve the data from `bibfile.bib` and write it to the auxiliary file `example.bbl` in a format which can be processed by `biblatex`.

3. Run `latex` on `example.tex`. `biblatex` will read the data from `example.bbl` and print all citations as well as the bibliography.

Whenever a reference to a work which has not been cited before is added, this procedure must be repeated. This is also the case if the last reference to a work which has been cited before is removed because some citation labels may change in this case. In contrast to traditional BibTeX, there is normally no need to run `latex` twice after running `bibtex` as far as the handling of bibliographic data is concerned.¹ Note that this only applies to the most basic case. Using the `xref` field or the `entryset` field may require an additional LaTeX/BibTeX/ LaTeX cycle.

¹ That is, unless the `defernumbers` package option is enabled. This option requires two LaTeX runs after the data has been exported to the `.bbl` file by BibTeX.
Some other facilities provided by \biblatex may also require an additional \latex run to get certain references and the page tracking right. In this case, the usual warning messages such as “There were undefined references” and “Label(s) may have changed. Rerun to get cross-references right” will be printed. When using Biber as a backend, the workflow is essentially the same.

### 3.10.2 Auxiliary Files

By default, the \biblatex package uses the main aux file only. Even if there are citation commands in a file included via \include, which has its own aux file, you only need to run BibTeX on the main aux file. If you are using refsection environments in a document (see § 3.10.3) \biblatex will create one additional aux file for every refsection environment. In this case, you also need to run \bibtex on each additional aux file. The name of the additional aux files is the base name of the main input file with the string -blx and a running number appended at the end. The \biblatex package issues a warning listing the files which require an additional BibTeX run. With the basic example presented in § 3.10.1, it would issue the following warning:

```
Package biblatex Warning: Please (re)run BibTeX on the file(s):
(biblatex) example.aux
(biblatex) and rerun LaTeX afterwards.
```

If the input file contained three refsection environments, the warning would read as follows:

```
Package biblatex Warning: Please (re)run BibTeX on the file(s):
(biblatex) example1-blx.aux
(biblatex) example2-blx.aux
(biblatex) example3-blx.aux
(biblatex) and rerun LaTeX afterwards.
```

Apart from these aux files, \biblatex uses an additional \bib file with the same suffix to pass certain control parameters to BibTeX. In the example above, this file would be named example-blx.bib. In the event of a file name conflict, you can change the suffix by redefining the macro \blxauxsuffix in the document preamble. When using Biber, \biblatex writes a control file named example.bcf and ignores \blxauxsuffix. There is also no auxiliary \bib file in this case.

Note that \biblatex will not overwrite any files it did not create. All auxiliary files created automatically by this package start with a special signature line. Before overwriting a file (excluding the main aux file, which is managed by LaTeX), \biblatex inspects the first line of the file to make sure that there is no file name conflict. If the file in question is missing the signature line, \biblatex will immediately issue an error message and abort before opening the output stream. In this case you should delete any spurious files accidentally left in the working directory. If the error persists, there may be a file name conflict with a file found in one of the TeX installation trees. Since the installation trees usually do not contain any aux files and the string -blx is fairly exotic in the name of a \bib file, this is rather unlikely but theoretically possible. If you find out that this is indeed the case, you
should redefine \blxauxsuffix permanently in the \biblatex configuration file, \biblatex.cfg.

3.10.3 Multiple Bibliographies

In a collection of articles by different authors, such as a conference proceedings volume for example, it is very common to have one bibliography for each article rather than a global one for the entire book. In the example below, each article would be presented as a separate \chapter with its own bibliography. Note that biblatex creates one additional aux file for every \refsection environment. These files have to be processed by BibTeX as well, see § 3.10.2 for details.

\begin{verbatim}
\documentclass{...}
\usepackage{biblatex}
\addbibresource{...}
\begin{document}
\chapter{...}
\begin{refsection}
...
\printbibliography[heading=subbibliography]
\end{refsection}
\chapter{...}
\begin{refsection}
...
\printbibliography[heading=subbibliography]
\end{refsection}
\end{document}
\end{verbatim}

If \printbibliography is used inside a \refsection environment, it automatically restricts the scope of the list of references to the enclosing \refsection environment. For a cumulative bibliography which is subdivided by chapter but printed at the end of the book, use the section option of \printbibliography to select a reference section, as shown in the next example.

\begin{verbatim}
\documentclass{...}
\usepackage{biblatex}
\defbibheading{subbibliography}{%
  \section*{References for Chapter \ref{refsection:\therefsection}}}
\addbibresource{...}
\begin{document}
\chapter{...}
\begin{refsection}
...
\end{refsection}
\chapter{...}
\begin{refsection}
...
\end{refsection}
\printbibheading \printbibliography[section=1,heading=subbibliography]
\printbibliography[section=2,heading=subbibliography]
\end{verbatim}
Note the definition of the bibliography heading in the above example. This is the definition taking care of the subheadings in the bibliography. The main heading is generated with a plain `\chapter` command in this case. The `biblatex` package automatically sets a label at the beginning of every `refsection` environment, using the standard `\label` command. The identifier used is the string `refsection:` followed by the number of the respective `refsection` environment. The number of the current section is accessible via the `refsection` counter. When using the `section` option of `\printbibliography`, this counter is also set locally. This means that you may use the counter in heading definitions to print subheadings like “References for Chapter 3”, as shown above. You could also use the title of the respective chapter as a subheading by loading the `nameref` package and using `\nameref` instead of `\ref`:

```
\usepackage{nameref}
\defbibheading{subbibliography}{%\section*{\nameref{refsection:\therefsection}}}
```

Since giving one `\printbibliography` command for each part of a subdivided bibliography is tedious, `biblatex` provides a shorthand. The `\bibbysection` command automatically loops over all reference sections. This is equivalent to giving one `\printbibliography` command for every section but has the additional benefit of automatically skipping sections without references. In the example above, the bibliography would then be generated as follows:

```
\printbibheading
\bibbysection[heading=subbibliography]
```

When using a format with one cumulative bibliography subdivided by chapter (or any other document division) it may be more appropriate to use `refsegment` rather than `refsection` environments. The difference is that the `refsection` environment generates labels local to the environment while `refsegment` does not affect the generation of labels, hence they will be unique across the entire document. Note that `refsegment` environments do not require additional aux files. The next example could also be given in § 3.10.4 because, visually, it creates one global bibliography subdivided into multiple segments.
The use of \refsegment is similar to \refsection and there is also a corresponding segment option for \printbibliography. The \biblatex package automatically sets a label at the beginning of every \refsegment environment using the string \refsegment: followed by the number of the respective \refsegment environment as an identifier. There is a matching \refsegment counter which may be used in heading definitions, as shown above. As with reference sections, there is also a shorthand command which automatically loops over all reference segments:

\begin{document}
\printbibheading
\bibbysegment[heading=subbibliography]
\end{document}

This is equivalent to giving one \printbibliography command for every segment.

3.10.4 Subdivided Bibliographies

It is very common to subdivide a bibliography by certain criteria. For example, you may want to list printed and online resources separately or divide a bibliography into primary and secondary sources. The former case is straightforward because you can use the entry type as a criterion for the type and nottype filters of \printbibliography. The next example also demonstrates how to generate matching subheadings for the two parts of the bibliography.

\begin{document}
\documentclass{...}
\usepackage{biblatex}
\addbibresource{...}
\begin{document}
...\end{document}

\printbibheading
\printbibliography[notype=online,heading=subbibliography, title={Printed Sources}]
\printbibliography[type=online,heading=subbibliography, title={Online Sources}]
\end{document}

You may also use more than two subdivisions:

\printbibliography[type=article,...]
\printbibliography[type=book,...]
\printbibliography[notype=article,notype=book,...]

It is even possible to give a chain of different types of filters:

\printbibliography[section=2,type=book,keyword=abc,notkeyword=xyz]
This would print all works cited in reference section 2 whose entry type is `@book` and whose `keywords` field includes the keyword ‘abc’ but not ‘xyz’. When using bibliography filters in conjunction with a numeric style, see § 3.11.5. If you need complex filters with conditional expressions, use the `filter` option in conjunction with a custom filter defined with \texttt{\textbackslash defbibfilter}. See § 3.5.9 for details on custom filters.

\documentclass{...}
\usepackage{biblatex}
\addbibresource{...}
\begin{document}
...
\printbibheading
\printbibliography[keyword=primary,heading=subbibliography,\
\hspace{1cm}title={Primary Sources}]
\printbibliography[keyword=secondary,heading=subbibliography,\
\hspace{1cm}title={Secondary Sources}]
\end{document}

Dividing a bibliography into primary and secondary sources is possible with a keyword filter, as shown in the above example. In this case, with only two subdivisions, it would be sufficient to use one keyword as filter criterion:

\printbibliography[keyword=primary,...]
\printbibliography[notkeyword=primary,...]

Since \texttt{biblatex} has no way of knowing if an item in the bibliography is considered to be primary or secondary literature, we need to supply the bibliography filter with the required data by adding a `keywords` field to each entry in the `bib` file. These keywords may then be used as targets for the `keyword` and `notkeyword` filters, as shown above. It may be a good idea to add such keywords right away while building a `bib` file.

\@Book{key,\
keywords = {primary,some,other,keywords},\
...

An alternative way of subdividing the list of references are bibliography categories. They differ from the keywords-based approach shown in the example above in that they work on the document level and do not require any changes to the `bib` file.

\documentclass{...}
\usepackage{biblatex}
\DeclareBibliographyCategory{primary}
\DeclareBibliographyCategory{secondary}
\addtocategory{primary}{key1,key3,key6}
\addtocategory{secondary}{key2,key4,key5}
\addbibresource{...}
\begin{document}
...
\printbibheading
In this case it would also be sufficient to use one category only:

\printbibliography[category=primary]
\printbibliography[notcategory=primary]

It is still a good idea to declare all categories used in the bibliography explicitly because there is a \bibbycategory command which automatically loops over all categories. This is equivalent to giving one \printbibliography command for every category, in the order in which they were declared.

\documentclass{...}
\usepackage{biblatex}
\DeclareBibliographyCategory{primary}
\DeclareBibliographyCategory{secondary}
\addtocategory{primary}{key1,key3,key6}
\addtocategory{secondary}{key2,key4,key5}
\defbibheading{primary}{\section*{Primary Sources}}
\defbibheading{secondary}{\section*{Secondary Sources}}
\addbibresource{...}
\begin{document}
...
\printbibheading
\bibbycategory
\end{document}

The handling of the headings is different from \bibbysection and \bibbysegment in this case. \bibbycategory uses the name of the current category as a heading name. This is equivalent to passing heading=\langle category \rangle to \printbibliography and implies that you need to provide a matching heading for every category.

### 3.10.5 Entry Sets

An entry set is a group of entries which are cited as a single reference and listed as a single item in the bibliography. The biblatex package supports two types of entry sets. Static entry sets are defined in the \bib file like any other entry. Dynamic entry sets are defined with \defbibentryset (§ 3.5.10) on a per-document/per-refsection basis in the document preamble or the document body. This section deals with the definition of entry sets; style authors should also see § 4.11.1 for further information.

#### 3.10.5.1 Static entry sets

Static entry sets are defined in the \bib file like any other entry. When using Biber as the backend, defining an entry set is as simple as adding an entry of type @set. The entry has an entryset field defining the members of the set as a comma-separated list of entry keys:
Entries may be part of a set in one document/refsection and stand-alone references in another one, depending on the presence of the @set entry. If the @set entry is cited, the set members are grouped automatically. If not, they will work like any regular entry.

When using BibTeX, which has no native support for entry sets, setting up entry sets involves more work. BibTeX requires entryset and crossref fields to be used in a special way. The members of the set are given in the entryset field of the @set entry. The @set entry also requires a crossref field which points to the first key in the entryset field. In addition to that, all members of the set require entryset fields which are reverse pointers to the entry key of the @set head entry:

```latex
@Set{set1,
    entryset = {key1,key2,key3},
}
```

```latex
@Article{key1,
    entryset = {set1},
    author = {...},
    title = {...},
    ...
}
```

```latex
@InCollection{key2,
    entryset = {set1},
    author = {...},
    title = {...},
    ...
}
```

```latex
@Article{key3,
    entryset = {set1},
    author = {...},
    title = {...},
    ...
}
```

Note that citing any set member will automatically load the entire set with BibTeX. If you want to refer to an item as part of a set in one document/refsection and as a stand-alone reference in another one, you need two distinct entries with BibTeX.

### 3.10.5.2 Dynamic entry sets

Dynamic entry sets are set up and work much like static ones. The main difference is that they are defined in the document preamble or on the fly in the document body using the \texttt{\defbibentryset} command from § 3.5.10:

\texttt{\defbibentryset{set1}{key1,key2,key3}}

Dynamic entry sets in the document body are local to the enclosing refsection environment, if any. Otherwise, they are assigned to reference section 0. Those
defined in the preamble are assigned to reference section 0. Note that dynamic entry sets require Biber. They will not work with any other backend.

3.10.6 Data Containers

The @xdata entry type serves as a data container holding one or more fields. These fields may be inherited by other entries using the xdata field. @xdata entries may not be cited or added to the bibliography, they only serve as a data source for other entries. This data inheritance mechanism is useful for fixed field combinations such as publisher/location and for other frequently used data:

```
@XData{hup, 
    publisher  = {Harvard University Press},
    location   = {Cambridge, Mass.},
}
@Book{..., 
    author     = {...},
    title      = {...},
    date       = {...},
    xdata      = {hup},
}
```

Using a comma-separated list of keys in its xdata field, an entry may inherit data from several @xdata entries. Cascading @xdata entries are supported as well, i.e., an @xdata entry may reference one or more other @xdata entries:

```
@XData{macmillan:name, 
    publisher  = {Macmillan},
}
@XData{macmillan:place, 
    location   = {New York and London},
}
@XData{macmillan, 
    xdata      = {macmillan:name,macmillan:place},
}
@Book{..., 
    author     = {...},
    title      = {...},
    date       = {...},
    xdata      = {macmillan},
}
```

See also §§ 2.1.1 and 2.2.3.

3.10.7 Electronic Publishing Information

The `biblatex` package provides three fields for electronic publishing information: `eprint`, `eprinttype`, and `eprintclass`. The `eprint` field is a verbatim field similar to `doi` which holds the identifier of the item. The `eprinttype` field holds the resource name, i.e., the name of the site or electronic archive. The optional `eprintclass` field is intended for additional information specific to the resource indicated by the `eprinttype` field. This could be a section, a path, classification
information, etc. If the eprinttype field is available, the standard styles will use it as a literal label. In the following example, they would print “Resource: identifier” rather than the generic “eprint: identifier”:

\texttt{eprint = \{identifier\},}
\texttt{eprinttype = \{Resource\},}

The standard styles feature dedicated support for a few online archives. For arXiv references, put the identifier in the eprint field and the string \texttt{arxiv} in the eprinttype field:

\texttt{eprint = \{math/0307200v3\},}
\texttt{eprinttype = \{arxiv\},}

For papers which use the new identifier scheme (April 2007 and later) add the primary classification in the eprintclass field:

\texttt{eprint = \{1008.2849v1\},}
\texttt{eprinttype = \{arxiv\},}
\texttt{eprintclass = \{cs.DS\},}

There are two aliases which ease the integration of arXiv entries. \texttt{archiveprefix} is treated as an alias for eprinttype; \texttt{primaryclass} is an alias for eprintclass. If hyperlinks are enabled, the eprint identifier will be transformed into a link to arxiv.org. See the package option \texttt{arxiv} in \S\ 3.1.2.1 for further details.

For \texttt{jstor} references, put the stable \texttt{jstor} number in the eprint field and the string \texttt{jstor} in the eprinttype field:

\texttt{eprint = \{number\},}
\texttt{eprinttype = \{jstor\},}

When using \texttt{jstor}'s export feature to export citations in BibTeX format, \texttt{jstor} uses the url field by default (where the \texttt{\langle number\rangle} is a unique and stable identifier):

\texttt{url = \{http://www.jstor.org/stable/number\},}

While this will work as expected, full urls tend to clutter the bibliography. With the eprint fields, the standard styles will use the more readable “\texttt{jstor: \langle number\rangle}” format which also supports hyperlinks. The \texttt{\langle number\rangle} becomes a clickable link if hyperref support is enabled.

For PubMed references, put the stable PubMed identifier in the eprint field and the string \texttt{pubmed} in the eprinttype field. This means that:

\texttt{url = \{http://www.ncbi.nlm.nih.gov/pubmed/pmid\},}

becomes:

\texttt{eprint = \{pmid\},}
\texttt{eprinttype = \{pubmed\},}

and the standard styles will print “\texttt{PMID: \langle pmid\rangle}” instead of the lengthy \texttt{url}. If hyperref support is enabled, the \texttt{\langle pmid\rangle} will be a clickable link to PubMed.

For handles (\texttt{hdls}), put the handle in the eprint field and the string \texttt{hdl} in the eprinttype field:
eprint = {handle},
eprinttype = {hdl},

For Google Books references, put Google’s identifier in the eprint field and the string googlebooks in the eprinttype field. This means that, for example:
url = {http://books.google.com/books?id=XXu4AkRVBBoC},

would become:

eprint = {XXu4AkRVBBoC},
eprinttype = {googlebooks},

and the standard styles would print “Google Books: XXu4AkRVBBoC” instead of the full url. If hyperref support is enabled, the identifier will be a clickable link to Google Books.\footnote{Note that eprint is a verbatim field. Always give the identifier in its unmodified form. For example, there is no need to replace _ with \_. Also see § 4.11.2 on how to add dedicated support for other eprint resources.}

3.10.8 External Abstracts and Annotations

Styles which print the fields abstract and/or annotation may support an alternative way of adding abstracts or annotations to the bibliography. Instead of including the text in the bib file, it may also be stored in an external LaTeX file. For example, instead of saying

```latex
@Article{key1,
... 
abstract = {This is an abstract of entry 'key1'.}
}
```

in the bib file, you may create a file named bibabstract-key1.tex and put the abstract in this file:

```latex
This is an abstract of entry 'key1'.
\endinput
```

The name of the external file must be the entry key prefixed with bibabstract- or bibannotation-, respectively. You can change these prefixes by redefining \bibabstractprefix and \bibannotationprefix. Note that this feature needs to be enabled explicitly by setting the package option loadfiles from § 3.1.2.1. The option is disabled by default for performance reasons. Also note that any abstract and annotation fields in the bib file take precedence over the external files. Using external files is strongly recommended if you have long abstracts or a lot of annotations since this may increase memory requirements significantly. It is also more convenient to edit the text in a dedicated LaTeX file. Style authors should see § 4.11.3 for further information.

\footnote{Note that the Google Books id seems to be a bit of an ‘internal’ value. As of this writing, there does not seem to be any way to search for an id on Google Books. You may prefer to use the url in this case.}
3.11 Hints and Caveats

This section provides additional usage hints and addresses some common problems and potential misconceptions.

3.11.1 Usage with KOMA-Script Classes

When using \textit{biblatex} in conjunction with one of the \texttt{scrbook}, \texttt{scrreprt}, or \texttt{scrartcl} classes, the headings \texttt{bibliography} and \texttt{shorthands} from § 3.5.7 are responsive to the bibliography-related options of these classes.\footnote{This applies to the traditional syntax of these options (\texttt{bibtotoc} and \texttt{bibtotocnumbered}) as well as to the \texttt{(key)=(value)} syntax introduced in \texttt{koma-Script 3.x}, i.e., to \texttt{bibliography=nottotoc}, \texttt{bibliography=totoc}, and \texttt{bibliography=totocnumbered}. The \texttt{toc=bibliography} and \texttt{toc=bibliographynumbered} options as well as their aliases are detected as well. In any case, the options must be set globally in the optional argument to \texttt{\documentclass}.} You can override the default headings by using the \texttt{heading} option of \texttt{\printbibliography}, \texttt{\printbibheading} and \texttt{\printshorthands}. See §§ 3.5.2, 3.5.3, 3.5.7 for details. All default headings are adapted at load-time such that they blend with the behavior of these classes. If one of the above classes is detected, \texttt{biblatex} will also provide the following additional tests which may be useful in custom heading definitions:

\begin{verbatim}
\ifkomabibtotoc{⟨true⟩}{⟨false⟩}
\end{verbatim}

Expands to \texttt{⟨true⟩} if the class would add the bibliography to the table of contents, and to \texttt{⟨false⟩} otherwise.

\begin{verbatim}
\ifkomabibtotocnumbered{⟨true⟩}{⟨false⟩}
\end{verbatim}

Expands to \texttt{⟨true⟩} if the class would add the bibliography to the table of contents as a numbered section, and to \texttt{⟨false⟩} otherwise. If this test yields \texttt{⟨true⟩}, \texttt{\ifkomabibtotoc} will always yield \texttt{⟨true⟩} as well, but not vice versa.

3.11.2 Usage with the Memoir Class

When using \textit{biblatex} with the \texttt{memoir} class, most class facilities for adapting the bibliography have no effect. Use the corresponding facilities of this package instead (§§ 3.5.2, 3.5.7, 3.5.8). Instead of redefining \texttt{memoir}'s \texttt{bibsection}, use the \texttt{heading} option of \texttt{\printbibliography} and \texttt{\defbibheading} (§§ 3.5.2 and 3.5.7). Instead of \texttt{\prebibhook} and \texttt{\postbibhook}, use the \texttt{prenote} and \texttt{postnote} options of \texttt{\printbibliography} and \texttt{\defbibnote} (§§ 3.5.2 and 3.5.8). All default headings are adapted at load-time such that they blend well with the default layout of this class. The default headings \texttt{bibliography} and \texttt{shorthands} (§ 3.5.7) are also responsive to \texttt{memoir}'s \texttt{\bibintoc} and \texttt{\nobibintoc} switches. The length register \texttt{\bibitemsep} is used by \texttt{biblatex} in a way similar to \texttt{memoir} (§ 3.8.3). This section also introduces some additional length registers which correspond to \texttt{memoir}'s \texttt{\biblistextra}. Lastly, \texttt{\setbiblabel} does not map to a single facility of the \texttt{biblatex} package since the style of all labels in the bibliography is controlled by the bibliography style. See § 4.2.2 in the author section of this manual.
for details. If the memoir class is detected, biblatex will also provide the following additional test which may be useful in custom heading definitions:

\ifmemoirbibintoc\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ or ⟨false⟩, depending on memoir’s \bibintoc and \nobibintoc switches. This is a LaTeX frontend to memoir’s \ifnobibintoc test. Note that the logic of the test is reversed.

3.11.3 Page Numbers in Citations

If the ⟨postnote⟩ argument to a citation command is a page number or page range, biblatex will automatically prefix it with ‘p.’ or ‘pp.’ by default. This works reliably in typical cases, but sometimes manual intervention may be required. In this case, it is important to understand how this argument is handled in detail. First, biblatex checks if the postnote is an Arabic or Roman numeral (case insensitive). If this test succeeds, the postnote is considered as a single page or other number which will be prefixed with ‘p.’ or some other string which depends on the pagination field (see § 2.3.10). If it fails, a second test is performed to find out if the postnote is a range or a list of Arabic or Roman numerals. If this test succeeds, the postnote will be prefixed with ‘pp.’ or some other string in the plural form. If it fails as well, the postnote is printed as is. Note that both tests expand the ⟨postnote⟩. All commands used in this argument must therefore be robust or prefixed with \protect. Here are a few examples of ⟨postnote⟩ arguments which will be correctly recognized as a single number, a range of numbers, or a list of numbers, respectively:

\cite[25]{key}
\cite[vii]{key}
\cite[XIV]{key}
\cite[34--38]{key}
\cite[iv--x]{key}
\cite[185/86]{key}
\cite[XI \& XV]{key}
\cite[3, 5, 7]{key}
\cite[vii--x; 5, 7]{key}

In some other cases, however, the tests may get it wrong and you need to resort to the auxiliary commands \pno, \ppno, and \nopp from § 3.6.8. For example, suppose a work is cited by a special pagination scheme consisting of numbers and letters. In this scheme, the string ‘27a’ would mean ‘page 27, part a’. Since this string does not look like a number or a range to biblatex, you need to force the prefix for a single number manually:

\cite[\pno 27a]{key}

There is also a \ppno command which forces a range prefix as well as a \nopp command which suppresses all prefixes:

\cite[\ppno 27a--28c]{key}
\cite[\nopp 25]{key}
These commands may be used anywhere in the \textit{\textlangle postnote \textrangle} argument. They may also be used multiple times. For example, when citing by volume and page number, you may want to suppress the prefix at the beginning of the postnote and add it in the middle of the string:

\cite{VII, \pno-5}{key}
\cite{VII, \pno-3, \ppno-40--45}{key}
\cite[see][\ppno-37--46, in particular \pno-40]{key}

There are also two auxiliary command for suffixes like ‘the following page(s)’. Instead of inserting such suffixes literally (which would require \textit{\textbackslash ppno} to force a prefix):

\cite[\ppno-27~sq.]{key}
\cite[\ppno-55~sqq.]{key}

use the auxiliary commands \psq and \psqq. Note that there is no space between the number and the command. This space will be inserted automatically and may be modified by redefining the macro \textit{\textbackslash sqspace}.

\cite[27\psq]{key}
\cite[55\psqq]{key}

Since the postnote is printed without any prefix if it includes any character which is not an Arabic or Roman numeral, you may also type the prefix manually:

\cite[p.~5]{key}

It is possible to suppress the prefix on a per-entry basis by setting the pagination field of an entry to 'none', see §\textit{2.3.10} for details. If you do not want any prefixes at all or prefer to type them manually, you can also disable the entire mechanism in the document preamble or the configuration file as follows:

\DeclareFieldFormat{postnote}{#1}

The \textit{\textlangle postnote \textrangle} argument is handled as a field and the formatting of this field is controlled by a field formatting directive which may be freely redefined. The above definition will simply print the postnote as is. See §§\textit{4.3.2} and 4.4.2 in the author guide for further details.

\subsection*{3.11.4 Name Parts and Name Spacing}

The \textit{biblatex} package gives users and style authors very fine-grained control of name spacing and the line-breaking behavior of names, especially when they are using Biber as the backend. The commands discussed in the following are documented in §§\textit{3.8.1} and \textit{4.10.1}. This section is meant to give an overview of how they are put together. A note on terminology: a name \textit{part} is a basic part of the name, for example the first or the last name. Each part of a name may be a single name or it may be composed of multiple names. For example, the name part ‘first name’ may be composed of a first and a middle name. The latter are referred to as name \textit{elements} in this section. Let’s consider a simple name first: “John Edward Doe”. This name is composed of the following parts:
The spacing and the line-breaking behavior of names is controlled by four macros:

- \bibnamedelima: Inserted by the backend after the first element of every name part if that element is less than three characters long and before the last element of every name part.
- \bibnamedelimb: Inserted by the backend between all elements of a name part where \bibnamedelima does not apply.
- \bibnamedelimc: Inserted by a formatting directive between the name prefix and the last name if useprefix=true. If useprefix=false, \bibnamedelimd is used instead.
- \bibnamedelimd: Inserted by a formatting directive between name parts where \bibnamedelimc does not apply.

Initials in the bib file get a special delimiter:

John Edward Doe

Let's consider a more complex name: “Charles-Jean Étienne Gustave Nicolas de La Vallée Poussin”. This name is composed of the following parts:

First Charles-Jean Étienne Gustave Nicolas
Prefix de
Last La Vallée Poussin

The delimiters:

Charles-Jean Étienne Gustave Nicolas de La Vallée Poussin

Note that \bibnamedelima/b/i are inserted by the backend. The backend processes the name parts and takes care of the delimiters between the elements that make up a name part, processing each part individually. In contrast to that, the delimiters between the parts of the complete name (\bibnamedelimc/d) are added by name formatting directives at a later point in the processing chain. The spacing and punctuation of initials is also handled by the backend and may be customized by redefining the following three macros:

- \bibinitperiod: Inserted by the backend after initials.
- \bibinitdelim: Inserted by the backend between multiple initials.
- \bibinithyphenelim: Inserted by the backend between the initials of hyphenated name parts, replacing \bibinitperiod and \bibinitdelim.
This is how they are employed:

- J. Doe
- K. Mustermann

### 3.11.5 Bibliography Filters and Citation Labels

The citation labels generated by this package are assigned to the full list of references before it is split up by any bibliography filters. They are guaranteed to be unique across the entire document (or a `refsection` environment), no matter how many bibliography filters you are using. When using a numeric citation scheme, however, this will most likely lead to discontinuous numbering in split bibliographies. Use the `defernumbers` package option to avoid this problem. If this option is enabled, numeric labels are assigned the first time an entry is printed in any bibliography.

### 3.11.6 Active Characters in Bibliography Headings

Packages using active characters, such as `babel`, `csquotes`, or `underscore`, usually do not make them active until the beginning of the document body to avoid interference with other packages. A typical example of such an active character is the Ascii quote ", which is used by various language modules of the `babel` package. If shorthands such as "< and "a are used in the argument to \defbibheading and the headings are defined in the document preamble, the non-active form of the characters is saved in the heading definition. When the heading is typeset, they do not function as a command but are simply printed literally. The most straightforward solution consists in moving \defbibheading after \begin{document}. Alternatively, you may use `babel`'s \shorthandson and \shorthandsoff commands to temporarily make the shorthands active in the preamble. The above also applies to bibliography notes and the \defbibnote command.

### 3.11.7 Grouping in Reference Sections and Segments

All LaTeX environments enclosed in \begin and \end form a group. This may have undesirable side effects if the environment contains anything that does not expect to be used within a group. This issue is not specific to `refsection` and `refsegment` environments, but it obviously applies to them as well. Since these environments will usually enclose much larger portions of the document than a typical `itemize` or similar environment, they are simply more likely to trigger problems related to grouping. If you observe any malfunctions after adding `refsection` environments to a document (for example, if anything seems to be ‘trapped’ inside the environment), try the following syntax instead:

```
\chapter{...}
\refsection
... 
\endrefsection
```

This will not from a group, but otherwise works as usual. As far as `biblatex` is concerned, it does not matter which syntax you use. The alternative syntax is also sup-
ported by the refsegment environment. Note that the commands \newrefsection
and \newrefsegment do not form a group. See §§ 3.5.4 and 3.5.5 for details.

4 Author Guide

This part of the manual documents the author interface of the biblatex package. The
author guide covers everything you need to know in order to write new citation and
bibliography styles or localization modules. You should read the user guide first before continuing with this part of the manual.

4.1 Overview

Before we get to the commands and facilities provided by biblatex, we will have
a look at some of its fundamental concepts. The biblatex package interacts with
BibTeX in a way that is somewhat different from the traditional way of doing things. Most notably, the bbl file is used differently and there is only one bst file which implements a structured data interface rather than exporting printable data. With LaTeX's standard bibliographic facilities, a document includes any number of citation commands in the document body plus \bibliographystyle and \bibliography, usually towards the end of the document. The location of the former is arbitrary, the latter marks the spot where the list of references is to be printed:

\documentclass{...}
\begin{document}
\cite{...}
...
\bibliographystyle{...}
\bibliography{...}
\end{document}

Processing this files requires that a certain procedure be followed. This procedure
is as follows:

1. Run \texttt{latex}: On the first run, \texttt{\bibstyle} and \texttt{\bibdata} commands are written
to the aux file, along with \texttt{\citation} commands for all citations. At this point,
the references are undefined because LaTeX is waiting for BibTeX to supply the
required data. There is also no bibliography yet.

2. Run \texttt{bibtex}: BibTeX writes a thebibliography environment to the bbl file,
supplying all entries from the bib file which were requested by the \texttt{\citation}
commands in the aux file.

3. Run \texttt{latex}: Starting with the second run, the \texttt{\bibitem} commands in the
thebibliography environment write one \texttt{\bibcite} command for each bib-
liography entry to the aux file. These \texttt{\bibcite} commands define the citation
labels used by \texttt{\cite}. However, the references are still undefined because the
labels are not available until the end of this run.
4. Run `latex`: Starting with the third run, the citation labels are defined as the `aux` file is read in at the end of the preamble. All citations can now be printed.

Note that all bibliographic data is written to the `bbl` file in the final format. The `bbl` file is read in and processed like any printable section of the document. For example, consider the following entry in a `bib` file:

```latex
@Book{companion,
    author  = {Michel Goossens and Frank Mittelbach and Alexander Samarin},
    title   = {The LaTeX Companion},
    publisher = {Addison-Wesley},
    address = {Reading, Mass.},
    year    = {1994},
}
```

With the `plain.bst` style, BibTeX exports this entry to the `bbl` file as follows:

```latex
@Book{companion,
    author  = {Michel Goossens, Frank Mittelbach, and Alexander Samarin},
    title   = {The LaTeX Companion},
    publisher = {Addison-Wesley},
    address = {Reading, Mass.},
    year    = {1994},
}
```

By default, LaTeX generates numeric citation labels, hence \cite writes lines such as the following to the `aux` file:

```latex
\cite{companion}{1}
```

Implementing a different citation style implies that more data has to be transferred via the `aux` file. With the `natbib` package, for example, the `aux` file contains lines like this one:

```latex
\cite{companion}{1}{1994}{Goossens et al.}{Goossens, Mittelbach, and Samarin}
```

The `biblatex` package supports citations in any arbitrary format, hence citation commands need access to all bibliographic data. What this would mean within the scope of the procedure outlined above becomes obvious when looking at the output of the `jurabib` package which also makes all bibliographic data available in citations:

```latex
\cite{companion}{Goossens\jbbfsasep Mittelbach\jbbstasep Samarin}{Goossens, Mittelbach, and Samarin}{0}{book}{1994}{Reading, Mass.\bpubaddr{}Addison-Wesley}
```

In this case, the contents of the entire `thebibliography` environment are effectively transferred via the `aux` file. The data is read from the `bbl` file, written to the `aux` file, read back from the `aux` file and then kept in memory. The bibliography itself is still generated as the `bbl` file is read in. The `biblatex` package would also
be forced to cycle all data through the aux file. This implies processing overhead and is also redundant because the data has to be kept in memory anyway.

The traditional procedure is based on the assumption that the full bibliographic data of an entry is only required in the bibliography and that all citations use short labels. This makes it very effective in terms of memory requirements, but it also implies that it does not scale well. That is why \texttt{biblatex} takes a different approach. First of all, the document structure is slightly different. Instead of using \texttt{\bibliography} in the document body, database files are specified in the preamble with \texttt{\addbibresource}, \texttt{\bibliographystyle} is omitted entirely (all features are controlled by package options), and the bibliography is printed using \texttt{\printbibliography}:

\begin{verbatim}
\documentclass{...}
\usepackage[...]{biblatex}
\addbibresource{...}
\begin{document}
\cite{...}
...
\printbibliography
\end{document}
\end{verbatim}

In order to streamline the whole procedure, \texttt{biblatex} essentially employs the \texttt{bbl} file like an aux file, rendering \texttt{\bibcite} obsolete. We then get the following procedure:

1. Run \texttt{latex}: The first step is similar to the traditional procedure described above: \texttt{\bibstyle} and \texttt{\bibdata} commands are written to the aux file, along with \texttt{\citation} commands for all citations. We then wait for BibTeX to supply the required data. Since \texttt{biblatex} uses a special bst file which implements its data interface on the BibTeX end, the \texttt{\bibstyle} command is always \texttt{\bibstyle{biblatex}}.

2. Run \texttt{bibtex}: BibTeX supplies those entries from the \texttt{bib} file which were requested by the \texttt{\citation} commands in the aux file. However, it does not write a printable bibliography to the \texttt{bbl} file, but rather a structured representation of the bibliographic data. Just like an aux file, this \texttt{bbl} file does not print anything when read in. It merely puts data in memory.

3. Run \texttt{latex}: Starting with the second run, the \texttt{bbl} file is processed right at the beginning of the document body, just like an aux file. From this point on, all bibliographic data is available in memory so that all citations can be printed right away.\footnote{If the \texttt{deffernumbers} package option is enabled \texttt{biblatex} uses an algorithm similar to the traditional procedure to generate numeric labels. In this case, the numbers are assigned as the bibliography is printed and then cycled through the aux file. It will take an additional LaTeX run for them to be picked up in citations.} The citation commands have access to the complete bibliographic data, not only to a predefined label. The bibliography is generated from memory using the same data and may be filtered or split as required.

1
Let's consider the sample entry given above once more:

```latex
@Book{companion,
    author = {Michel Goossens and Frank Mittelbach and Alexander Samarin},
    title = {The LaTeX Companion},
    publisher = {Addison-Wesley},
    address = {Reading, Mass.},
    year = {1994},
}
```

With `biblatex`, this entry is essentially exported in the following format:

```latex
\entry{companion}{book}{}
\name{author}{3}{%
    {{Goossens}{G.}{Michel}{M.}{}{}{}{}}
    {{Mittelbach}{M.}{Frank}{F.}{}{}{}{}}
    {{Samarin}{S.}{Alexander}{A.}{}{}{}{}}%
}
\list{publisher}{1}{%
    {Addison-Wesley}%
}
\list{location}{1}{%
    {Reading, Mass.}%
}
\field{title}{The LaTeX Companion}
\field{year}{1994}
\endentry
```

As seen in this example, the data is presented in a structured format that resembles the structure of a `bib` file to some extent. At this point, no decision concerning the final format of the bibliography entry has been made. The formatting of the bibliography and all citations is controlled by LaTeX macros, which are defined in bibliography and citation style files.

### 4.2 Bibliography Styles

A bibliography style is a set of macros which print the entries in the bibliography. Such styles are defined in files with the suffix `bbx`. The `biblatex` package loads the selected bibliography style file at the end of the package. Note that a small repertory of frequently used macros shared by several of the standard bibliography styles is included in `biblatex.def`. This file is loaded at the end of the package as well, prior to the selected bibliography style.

#### 4.2.1 Bibliography Style Files

Before we go over the individual components of a bibliography style, consider this example of the overall structure of a typical `bbx` file:

```latex
\ProvidesFile{example.bbx}[2006/03/15 v1.0 biblatex bibliography style]
\defbibenvironment{bibliography}{...}{...}
```
The main structure of a bibliography style file consists of the following commands:

\RequireBibliographyStyle\{⟨style⟩\}

This command is optional and intended for specialized bibliography styles built on top of a more generic style. It loads the bibliography style style.bbx.

\InitializeBibliographyStyle\{(code)\}

Specifies arbitrary ⟨code⟩ to be inserted at the beginning of the bibliography, but inside the group formed by the bibliography. This command is optional. It may be useful for definitions which are shared by several bibliography drivers but not used outside the bibliography. Keep in mind that there may be several bibliographies in a document. If the bibliography drivers make any global assignments, they should be reset at the beginning of the next bibliography.

\DeclareBibliographyDriver\{⟨entrytype⟩\}{⟨code⟩}

Defines a bibliography driver. A ‘driver’ is a macro which handles a specific entry type. The ⟨entrytype⟩ corresponds to the entry type used in bib files, specified in lowercase letters (see § 2.1). The type shorthands has a special meaning. The shorthands driver handles all entries in the list of shorthands. The ⟨entrytype⟩ argument may also be an asterisk. In this case, the driver serves as a fallback which is used if no specific driver for the entry type has been defined. The ⟨code⟩ is arbitrary code which typesets all bibliography entries of the respective ⟨entrytype⟩. This command is mandatory. Every bibliography style should provide a driver for each entry type.

\DeclareBibliographyAlias\{⟨alias⟩\}{⟨entrytype⟩}

If a bibliography driver covers more than one entry type, this command may be used to define an alias. This command is optional. The ⟨entrytype⟩ argument may also be an asterisk. In this case, the alias serves as a fallback which is used if no specific driver for the entry type has been defined.

\DeclareBibliographyOption\{⟨key⟩\}{⟨value⟩}{⟨code⟩}

This command defines additional preamble options in ⟨key⟩=⟨value⟩ format. The ⟨key⟩ is the option key. The ⟨code⟩ is arbitrary TeX code to be executed whenever
the option is used. The value passed to the option is passed on to the \textit{(code)} as \#1.
The optional \textit{(value)} is a default value to be used if the bare key is given without any value. This is useful for boolean switches. For example, with a definition like the following:
\begin{verbatim}
\DeclareBibliographyOption{somekey}[true]{...}
\end{verbatim}
giving ‘somekey’ without a value is equivalent to ‘somekey=true’.

\begin{verbatim}
\DeclareEntryOption{(key)}{(value)}{(code)}
\end{verbatim}

Similar to \texttt{\DeclareBibliographyOption} but defines options which are settable on a per-entry basis in the \texttt{options} field from § 2.2.3. The \textit{(code)} is executed whenever \texttt{biblatex} prepares the data of the entry for use by a citation command or a bibliography driver.

### 4.2.2 Bibliography Environments

Apart from defining bibliography drivers, the bibliography style is also responsible for the environments which control the layout of the bibliography and the list of shorthands. These environments are defined with \texttt{\defbibenvironment}. By default, \texttt{\printbibliography} uses the environment \texttt{bibliography}. Here is a definition suitable for a bibliography style which does not print any labels in the bibliography:

\begin{verbatim}
\defbibenvironment{bibliography}
\begin{list}
\end{list}
\endverbatim

This definition employs a \texttt{list} environment with hanging indentation, using the \texttt{\bibhang} length register provided by \texttt{biblatex}. It allows for a certain degree of configurability by using \texttt{\bibitemsep} and \texttt{\bibparsep}, two length registers provided by \texttt{biblatex} for this very purpose (see § 4.10.3). The \texttt{authoryear} and \texttt{authortitle} bibliography styles use a definition similar to this example.

\begin{verbatim}
\defbibenvironment{bibliography}
\begin{list}
\end{list}
\end{verbatim}

120
Some bibliography styles print labels in the bibliography. For example, a bibliography style designed for a numeric citation scheme will print the number of every entry such that the bibliography looks like a numbered list. In the first example, the first argument to `\list` was empty. In this example, we need it to insert the number, which is provided by `biblatex` in the `labelnumber` field. We also employ several length registers and other facilities provided by `biblatex`, see §§ 4.10.4 and 4.10.5 for details. The numeric bibliography style uses the definition given above. The alphabetic style is similar, except that `labelnumber` is replaced by `labelalpha` and `labelnumberwidth` by `labelalphawidth`.

The list of shorthands is handled in a similar way. `\printshorthands` uses the environment `shorthands` by default. A typical example is given below. See §§ 4.10.4 and 4.10.5 for details on the length registers and facilities used in this example.

```latex
\defbibenvironment{shorthands}
{\list
  {{\printfield[shorthandwidth]{shorthand}}
  \setlength{\labelwidth}{\shorthandwidth}\%  
  \setlength{\leftmargin}{\labelwidth}\%  
  \setlength{\labelsep}{\biblabelsep}\%  
  \addtolength{\leftmargin}{\labelsep}\%  
  \setlength{\itemsep}{\bibitemsep}\%  
  \setlength{\parsep}{\bibparsep}\%  
  \renewcommand*{\makelabel}{##1\hss}}}
\endlist
\item}
```

### 4.2.3 Bibliography Drivers

Before we go over the commands which form the data interface of the `biblatex` package, it may be instructive to have a look at the structure of a bibliography driver. Note that the example given below is greatly simplified, but still functional. For the sake of readability, we omit several fields which may be part of a `@book` entry and also simplify the handling of those which are considered. The main point is to give you an idea of how a driver is structured. For information about the mapping of BibTeX’s fields to `biblatex`’s data types, see § 2.2.

```latex
\DeclareBibliographyDriver{book}{%
  \printnames{author}\%
  \newunit\newblock
  \printfield{title}\%
  \newunit\newblock
  \printlist{publisher}\%
  \newunit
  \printlist{location}\%
  \newunit
  \printfield{year}\%
  \finentry}
At this point, there is still one piece missing: the formatting directives used by \texttt{\printnames}, \texttt{\printlist}, and \texttt{\printfield}. To give you an idea of what a formatting directive looks like, here are some fictional ones used by our sample driver. Field formats are straightforward, the value of the field is passed to the formatting directive as an argument which may be formatted as desired. The following directive will simply wrap its argument in an \texttt{\emph} command:

\begin{verbatim}
\DeclareFieldFormat{title}{\emph{#1}}
\end{verbatim}

List formats are slightly more complex. After splitting up the list into individual items, \texttt{biblatex} will execute the formatting directive once for every item in the list. The item is passed to the directive as an argument. The separator to be inserted between the individual items in the list is also handled by the corresponding directive, hence we have to check whether we are in the middle of the list or at the end when inserting it.

\begin{verbatim}
\DeclareListFormat{location}{% #1
  \ifthenelse{\value{listcount}<\value{liststop}}{
    \addcomma\space}
  {}}
\end{verbatim}

Formatting directives for names are similar to those for literal lists, but the individual items in the list are names which are automatically dissected into their components. The list formatting directive is executed once for each name in the list and the components of the name are passed to the formatting directive as separate arguments. For example, \#1 is the last name and \#3 is the first name. Here is a simplified example:

\begin{verbatim}
\DeclareNameFormat{author}{% 
  \ifthenelse{\value{listcount}=1}
    {#1}
  {#1\% \ifblank{#3}{}{#3\space}#1\% \ifthenelse{\value{listcount}<\value{liststop}}{
    \addcomma\space}}
\end{verbatim}

The above directive reverses the name of the first author ("Last, First") and prints the remaining names in their regular sequence ("First Last"). Note that the only component which is guaranteed to be available is the last name, hence we have to check which parts of the name are actually present. If a certain component of a name is not available, the corresponding argument will be blank. As with directives for literal lists, the separator to be inserted between the individual items in the list is also handled by the formatting directive, hence we have to check whether we are in the middle of the list or at the end when inserting it. This is what the second \texttt{\ifthenelse} test does.
4.2.4 Special Fields

The following lists and fields are used by \texttt{biblatex} to pass data to bibliography drivers and citation commands. They are not used in \texttt{bib} files but defined automatically by the package. From the perspective of a bibliography or citation style, they are not different from the fields in a \texttt{bib} file.

4.2.4.1 Generic Fields

\texttt{entrykey} field (string)

The entry key of an item in the \texttt{bib} file. This is the string used by \texttt{biblatex} and BibTeX to identify an entry in the \texttt{bib} file.

\texttt{childentrykey} field (string)

When citing a subentry of an entry set, \texttt{biblatex} provides the data of the parent \texttt{@set} entry to citation commands. This implies that the \texttt{entrykey} field holds the entry key of the parent. The entry key of the child entry being cited is provided in the \texttt{childentrykey} field. This field is only available when citing a subentry of an entry set.

\texttt{entrytype} field (string)

The entry type (\texttt{@book}, \texttt{@inbook}, etc.), given in lowercase letters.

\texttt{childentrytype} field (string)

When citing a subentry of an entry set, \texttt{biblatex} provides the data of the parent \texttt{@set} entry to citation commands. This implies that the \texttt{entrytype} field holds the entry type of the parent. The entry type of the child entry being cited is provided in the \texttt{childentrytype} field. This field is only available when citing a subentry of an entry set.

\texttt{entrysetcount} field (integer)

This field holds an integer indicating the position of a set member in the entry set (starting at 1). This field is only available in the subentries of an entry set.

\texttt{hash} field (string)

This field is special in that it is only available locally in name formatting directives. It holds a hash string which uniquely identifies individual names in a name list. This information is available for all names in all name lists. See also \texttt{namehash} and \texttt{fullhash}.

\texttt{namehash} field (string)

A hash string which uniquely identifies the \texttt{labelname} list. This is useful for recurrence checks. For example, a citation style which replaces recurrent authors or editors with a string like ‘idem’ could save the \texttt{namehash} field with \texttt{\savefield} and use it in a comparison with \texttt{\iffieldequals} later (see §§ 4.6.1 and 4.6.2). The \texttt{namehash} is derived from the truncated \texttt{labelname} list, i.e., it is responsive to \texttt{maxnames} and \texttt{minnames}. See also \texttt{hash} and \texttt{fullhash}.

123
fullhash field (string)

A hash string which uniquely identifies the labelname list. This field differs from namehash in two details: 1) The shortauthor and shorteditor lists are ignored when generating the hash. 2) The hash always refers to the full list, ignoring maxnames and minnames. See also hash and namehash.

pageref list (literal)

If the backref package option is enabled, this list holds the page numbers of the pages on which the respective bibliography entry is cited. If there are refsection environments in the document, the back references are local to the reference sections.

sortinit field (literal)

This field holds the initial letter of the string used during sorting. This is useful when subdividing the bibliography alphabetically.

4.2.4.2 Fields for Use in Citation Labels

labelalpha field (literal)

A label similar to the labels generated by the alpha.bst style of traditional BibTeX. This label consists of initials drawn from the labelname list plus the last two digits of the publication year. If the label field is defined, biblatex will use its value and append the last two digits of the publication year when generating labelalpha. The shorthand field may be used to override the entire label. If defined, labelalpha is the shorthand rather than an automatically generated label. A complete ‘alphabetic’ label consists of the fields labelalpha plus extraalpha. Note that the labelalpha and extraalpha fields need to be requested with the package option labelalpha (§ 3.1.2.3). See also extraalpha as well as \labelalphaothers in § 3.8.1.

eextraalpha field (integer)

The ‘alphabetic’ citation scheme usually requires a letter to be appended to the label if the bibliography contains two or more works by the same author which were all published in the same year. In this case, the extraalpha field holds an integer which may be converted to a letter with \mkenumalph or formatted in some other way. This field is similar to the role of extrayear in the author-year scheme. A complete ‘alphabetic’ label consists of the fields labelalpha plus extraalpha. Note that the labelalpha and extraalpha fields need to be requested with the package option labelalpha, see § 3.1.2.3 for details. See also labelalpha as well as \labelalphaothers in § 3.8.1.

labelname list (name)

The name to be printed in citations. This list is a copy of either the shortauthor, the author, the shorteditor, the editor, or the translator list, which are normally checked for in this order. If no authors and editors are available, this list
is undefined. Note that this list is also responsive to the useauthor, useeditor, and usetranslator options, see § 3.1.3. Citation styles should use this list when printing the name in a citation. This list is provided for convenience only and does not carry any additional meaning. With Biber, this field may be customized. See § 4.5.2 for details.

**labelnumber** field (literal)

The number of the bibliography entry, as required by numeric citation schemes. If the shorthand field is defined, biblatex does not assign a number to the respective entry. In this case labelnumber is the shorthand rather than a number. Numeric styles must use the value of this field instead of a counter. Note that this field needs to be requested with the package option labelnumber, see § 3.1.2.3 for details. Also see the package option defernumbers in § 3.1.2.1.

**prefixnumber** field (literal)

If the prefixnumbers option of \printbibliography has been set in order to prefix all entries in a subbibliography with a fixed string, this string is available in the prefixnumber field of all affected entries. If no prefix has been set, the prefixnumber field of the respective entry is undefined. See the prefixnumbers option of \printbibliography in § 3.5.2 for details. If the shorthand field is defined, biblatex does not assign the prefix to the prefixnumber field of the respective entry. In this case, the prefixnumber field is undefined.

**labeltitle** field (literal)

The title to be printed in citations. If a short title is available, labeltitle is a copy of the shorttitle field, otherwise biblatex falls back to the title field. Citation styles printing short titles may simply make use of this field instead of checking whether a shorttitle field is available every time they print a title. This field is provided for convenience only and does not carry any additional meaning.

**labelyear** field (literal)

The publication year, as specified in the date or the year field, for use in author-year labels. A complete author-year label consists of the fields labelyear plus extrayear. Note that the labelyear and extrayear fields need to be requested with the package option labelyear, see § 3.1.2.3 for details. See also extrayear. With Biber, this field may be customized. See § 4.5.2 for details.

**extrayear** field (integer)

The author-year citation scheme usually requires a letter to be appended to the year if the bibliography contains two or more works by the same author which were all published in the same year. In this case, the extrayear field holds an integer which may be converted to a letter with \mknnumalph or formatted in some other way. This field is undefined if there is only one work by the author in the bibliography or if all works by the author have different publication years. A complete author-year label consists of the fields labelyear plus extrayear. Note that the
4.2.4.3 Date Component Fields

See table 7 for an overview of how the date fields in bib files are related to the date fields provided by the style interface. When testing for a field like \texttt{origdate} in a style, use code like:

\begin{verbatim}
\iffielddefined{origyear}{...}{...}
\end{verbatim}

This will tell you if the corresponding date is defined at all. This test:

\begin{verbatim}
\iffielddefined{origendyear}{...}{...}
\end{verbatim}

will tell you if the corresponding date is defined and a (fully specified) range. This test:

\begin{verbatim}
\iffieldequalstr{origendyear}{}{...}{...}
\end{verbatim}

will tell you if the corresponding date is defined and an open-ended range. Open-ended ranges are indicated by an empty \texttt{endyear} component (as opposed to an undefined \texttt{endyear} component). See § 2.3.8 and table 2 on page 34 for further examples.

\texttt{day} field (integer)

This field holds the day component of the \texttt{date} field. If the date is a range, it holds the day component of the start date.

\texttt{month} field (integer)

This field is the month as given in the database file or it holds the month component of the \texttt{date} field. If the date is a range, it holds the month component of the start date.

\texttt{year} field (integer)

This field is the year as given in the database file or it holds the year component of the \texttt{date} field. If the date is a range, it holds the year component of the start date.

\texttt{endday} field (integer)

If the date specification in the \texttt{date} field is a range, this field holds the day component of the end date.

\texttt{endmonth} field (integer)

If the date specification in the \texttt{date} field is a range, this field holds the month component of the end date.

\texttt{endyear} field (integer)

If the date specification in the \texttt{date} field is a range, this field holds the year compo-
<table>
<thead>
<tr>
<th>bib File</th>
<th>Data Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>Value (Example)</td>
</tr>
<tr>
<td>date</td>
<td>1988</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>date</td>
<td>1997</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>urldate</td>
<td>2009-01-31</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>origdate</td>
<td>2002-01/2002-02</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>eventdate</td>
<td>1995-01-31/1995-02-05</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Date Interface

The table above shows the date interface fields and their values. The endyear component indicates an open-ended date range.

**origday** field (integer)

This field holds the day component of the origdate field. If the date is a range, it holds the day component of the start date.

**origmonth** field (integer)

This field holds the month component of the origdate field. If the date is a range, it holds the month component of the start date.

**origyear** field (integer)

This field holds the year component of the origdate field. If the date is a range, it holds the year component of the start date.
**origendday** field (integer)

If the date specification in the origdate field is a range, this field holds the day component of the end date.

**origendmonth** field (integer)

If the date specification in the origdate field is a range, this field holds the month component of the end date.

**origendyear** field (integer)

If the date specification in the origdate field is a range, this field holds the year component of the end date. A blank (but defined) origendyear component indicates an open ended origdate range.

**eventday** field (integer)

This field holds the day component of the eventdate field. If the date is a range, it holds the day component of the start date.

**eventmonth** field (integer)

This field holds the month component of the eventdate field. If the date is a range, it holds the month component of the start date.

**eventyear** field (integer)

This field holds the year component of the eventdate field. If the date is a range, it holds the year component of the start date.

**eventendday** field (integer)

If the date specification in the eventdate field is a range, this field holds the day component of the end date.

**eventendmonth** field (integer)

If the date specification in the eventdate field is a range, this field holds the month component of the end date.

**eventendyear** field (integer)

If the date specification in the eventdate field is a range, this field holds the year component of the end date. A blank (but defined) eventendyear component indicates an open ended eventdate range.

**urlday** field (integer)

This field holds the day component of the urldate field.

**urlmonth** field (integer)

This field holds the month component of the urldate field.
urlyear field (integer)

This field holds the year component of the urldate field.

urlendday field (integer)

If the date specification in the urldate field is a range, this field holds the day component of the end date.

urlendmonth field (integer)

If the date specification in the urldate field is a range, this field holds the month component of the end date.

urlendyear field (integer)

If the date specification in the urldate field is a range, this field holds the year component of the end date. A blank (but defined) urlendyear component indicates an open ended urldate range.

4.3 Citation Styles

A citation style is a set of commands such as \cite which print different types of citations. Such styles are defined in files with the suffix cbx. The biblatex package loads the selected citation style file at the end of the package. Note that a small repertory of frequently used macros shared by several of the standard citation styles is also included in biblatex.def. This file is loaded at the end of the package as well, prior to the selected citation style. It also contains the definitions of the commands from § 3.6.5.

4.3.1 Citation Style Files

Before we go over the individual commands available in citation style files, consider this example of the overall structure of a typical cbx file:

\ProvidesFile{example.cbx}[2006/03/15 v1.0 biblatex citation style]
\DeclareCiteCommand{\cite}{...}{...}{...}{...}
\DeclareCiteCommand{\parencite}{\mkbibparens}{...}{...}{...}
\DeclareCiteCommand{\footcite}{\mkbibfootnote}{...}{...}{...}
\DeclareCiteCommand{\textcite}{...}{...}{...}{...}
\endinput
\RequireCitationStyle{⟨style⟩}

This command is optional and intended for specialized citation styles built on top of a more generic style. It loads the citation style style.cbx.

\InitializeCitationStyle{⟨code⟩}

Specifies arbitrary ⟨code⟩ required to initialize or reset the citation style. This hook will be executed once at package load-time and every time the \citereset command from § 3.6.8 is used. The \citereset command also resets the in-
ternal citation trackers of this package. The reset will affect the \ifciteseen, \ifentryseen, \ifciteibid, and \ifciteidem tests discussed in § 4.6.2. When used in a \refsection environment, the reset of the citation tracker is local to the current \refsection environment.

\OnManualCitation{⟨code⟩}

Specifies arbitrary ⟨code⟩ required for a partial reset of the citation style. This hook will be executed every time the \mancite command from § 3.6.8 is used. It is particularly useful in citation styles which replace repeated citations by abbreviations like ‘ibidem’ or ‘op. cit.’ which may get ambiguous if automatically generated and manual citations are mixed. The \mancite command also resets the internal ‘ibi-dem’ and ‘idem’ trackers of this package. The reset will affect the \ifciteibid and \ifciteidem tests discussed in § 4.6.2.

\DeclareCiteCommand{⟨command⟩}{⟨wrapper⟩}{⟨precode⟩}{⟨loopcode⟩}{⟨sepcode⟩}{⟨postcode⟩}
\DeclareCiteCommand*{⟨command⟩}{⟨wrapper⟩}{⟨precode⟩}{⟨loopcode⟩}{⟨sepcode⟩}{⟨postcode⟩}

This is the core command used to define all citation commands. It takes one optional and five mandatory arguments. The ⟨command⟩ is the command to be defined, for example \cite. If the optional ⟨wrapper⟩ argument is given, the entire citation will be passed to the ⟨wrapper⟩ as an argument, i.e., the wrapper command must take one mandatory argument.\footnote{1 Typical examples of wrapper commands are \mkbibparens and \mkbibfootnote.
\footnote{2 The bibliographic data available to the ⟨loopcode⟩ is the data of the entry currently being processed. In addition to that, the data of the first entry is available to the ⟨precode⟩ and the data of the last one is available to the ⟨postcode⟩. ‘First’ and ‘last’ refer to the order in which the citations are printed. If the \sortcites package option is active, this is the order of the list after sorting. Note that no bibliographic data is available to the ⟨sepcode⟩.
\footnote{3 Note that the regular variant of \DeclareCiteCommand defines a starred version of the ⟨command⟩ implicitly, unless the starred version has been defined before. This is intended as a fallback. The implicit definition is an alias for the regular variant.}} The ⟨precode⟩ is arbitrary code to be executed at the beginning of the citation. It will typically handle the ⟨prenote⟩ argument which is available in the prenote field. It may also be used to initialize macros required by the ⟨loopcode⟩. The ⟨loopcode⟩ is arbitrary code to be executed for each entry key passed to the ⟨command⟩. This is the core code which prints the citation labels or any other data. The ⟨sepcode⟩ is arbitrary code to be executed after each iteration of the ⟨loopcode⟩. It will only be executed if a list of entry keys is passed to the ⟨command⟩. The ⟨sepcode⟩ will usually insert some kind of separator, such as a comma or a semicolon. The ⟨postcode⟩ is arbitrary code to be executed at the end of the citation. The ⟨postcode⟩ will typically handle the ⟨postnote⟩ argument which is available in the postnote field.\footnote{2} The starred variant of \DeclareCiteCommand defines a starred ⟨command⟩. For example, \DeclareCiteCommand*{cite} would define \cite*.\footnote{3}

\DeclareMultiCiteCommand{⟨command⟩}{⟨wrapper⟩}{⟨cite⟩}{⟨delimiter⟩}

This command defines ‘multicite’ commands (§ 3.6.3). The ⟨command⟩ is the multicite command to be defined, for example \cites. It is automatically made ro-
Multicite commands are built on top of backend commands defined with `\DeclareCiteCommand` and the \cite argument specifies the name of the backend command to be used. Note that the wrapper of the backend command (i.e., the \wrapper argument passed to `\DeclareCiteCommand`) is ignored. Use the optional \wrapper argument to specify an alternative wrapper. The \delimiter is the string to be printed as a separator between the individual citations in the list. This will typically be \multicitedelim. The following examples are real definitions taken from `biblatex.def`:

```latex
\DeclareMultiCiteCommand{\cites}{\cite}{\multicitedelim}
\DeclareMultiCiteCommand{\parencites}{\mkbibparens}{\parencite}{\multicitedelim}
\DeclareMultiCiteCommand{\footcites}{\mkbibfootnote}{\footcite}{\multicitedelim}
```

This command provides definitions for the \autocite and \autocites commands from § 3.6.4. The definitions are enabled with the autocite package option from § 3.1.2.1. The \name is an identifier which serves as the value passed to the package option. The autocite commands are built on top of backend commands like \parencite and \parencites. The arguments \cite and \multicite specify the backend commands to use. The \cite argument refers to \autocite and \multicite refers to \autocites. The \position argument controls the handling of any punctuation marks after the citation. Possible values are 1, r, f, r means that the punctuation is placed to the right of the citation, i.e., it will not be moved around. 1 means that any punctuation after the citation is moved to the left of the citation. f is like r in a footnote and like l otherwise. This argument is optional and defaults to r. See also `\DeclareAutoPunctuation` in § 4.7.5 and the autopunct package option in § 3.1.2.1. The following examples are real definitions taken from `biblatex.def`:

```latex
\DeclareAutoCiteCommand{\plain}{\cite}{\cites}
\DeclareAutoCiteCommand{\inline}{\parencite}{\parencites}
\DeclareAutoCiteCommand{\footnote}{\mkbibfootnote}{\footcite}{\footcites}
\DeclareAutoCiteCommand{\footnote}{\smartcite}{\smartcites}
```

### 4.3.2 Special Fields

The following fields are used by `biblatex` to pass data to citation commands. They are not used in `bib` files but defined automatically by the package. From the perspective of a citation style, they are not different from the fields in a `bib` file. See also § 4.2.4.

**prenote** field (literal)

The \prenote argument passed to a citation command. This field is specific to citations and not available in the bibliography. If the \prenote argument is missing or empty, this field is undefined.
The \langle postnote \rangle argument passed to a citation command. This field is specific to citations and not available in the bibliography. If the \langle postnote \rangle argument is missing or empty, this field is undefined.

4.4 Data Interface

The data interface are the facilities used to format and print all bibliographic data. These facilities are available in both bibliography and citation styles.

4.4.1 Data Commands

This section introduces the main data interface of the \texttt{biblatex} package. These are the commands doing most of the work, i.e., they actually print the data provided in lists and fields.

\texttt{\printfield}\{⟨format⟩\}{⟨field⟩}

This command prints a \langle field \rangle using the formatting directive \langle format \rangle, as defined with \texttt{\DeclareFieldFormat}. If a type-specific \langle format \rangle has been declared, the type-specific formatting directive takes precedence over the generic one. If the \langle field \rangle is undefined, nothing is printed. If the \langle format \rangle is omitted, \printfield tries using the name of the field as a format name. For example, if the title field is to be printed and the \langle format \rangle is not specified, it will try to use the field format title.\footnote{In other words, \printfield{title} is equivalent to \printfield[title]{title}.} In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort. Note that \printfield provides the name of the field currently being processed in \texttt{\currentfield} for use in field formatting directives.

\texttt{\printlist}\{⟨format⟩\}{⟨start⟩−⟨stop⟩}{⟨literal list⟩}

This command loops over all items in a \langle literal list \rangle, starting at item number \langle start \rangle and stopping at item number \langle stop \rangle, including \langle start \rangle and \langle stop \rangle (all lists are numbered starting at 1). Each item is printed using the formatting directive \langle format \rangle, as defined with \texttt{\DeclareListFormat}. If a type-specific \langle format \rangle has been declared, the type-specific formatting directive takes precedence over the generic one. If the \langle literal list \rangle is undefined, nothing is printed. If the \langle format \rangle is omitted, \printlist tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort. The \langle start \rangle argument defaults to 1; \langle stop \rangle defaults to the total number of items in the list. If the total number is greater than \langle maxitems \rangle, \langle stop \rangle defaults to \langle minitems \rangle (see § 3.1.2.1). See \texttt{\printnames} for further details. Note that \printlist provides the name of the literal list currently being processed in \texttt{\currentlist} for use in list formatting directives.
\printnames\[⟨\text{format}\rangle\]\{⟨\text{start}⟩–⟨\text{stop}⟩\}\{⟨\text{name list}\rangle\}

This command loops over all items in a ⟨\text{name list}⟩, starting at item number ⟨\text{start}⟩ and stopping at item number ⟨\text{stop}⟩, including ⟨\text{start}⟩ and ⟨\text{stop}⟩ (all lists are numbered starting at 1). Each item is printed using the formatting directive ⟨\text{format}⟩, as defined with \DeclareNameFormat. If a type-specific ⟨\text{format}⟩ has been declared, the type-specific formatting directive takes precedence over the generic one. If the ⟨\text{name list}⟩ is undefined, nothing is printed. If the ⟨\text{format}⟩ is omitted, \printnames tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort. The ⟨\text{start}⟩ argument defaults to 1; ⟨\text{stop}⟩ defaults to the total number of items in the list. If the total number is greater than ⟨\text{maxnames}⟩, ⟨\text{stop}⟩ defaults to ⟨\text{minnames}⟩ (see § 3.1.2.1). If you want to select a range but use the default list format, the first optional argument must still be given, but is left empty:

\printnames\[\]\[1-3\]\{\}

One of ⟨\text{start}⟩ and ⟨\text{stop}⟩ may be omitted, hence the following arguments are all valid:

\printnames\[\]\[-1\]\{\}
\printnames\[\]\[2-\]\{\}
\printnames\[\]\[1-3\]\{\}

If you want to override ⟨\text{maxnames}⟩ and ⟨\text{minnames}⟩ and force printing of the entire list, you may refer to the listtotal counter in the second optional argument:

\printnames\[\]\[-\value{listtotal}\]\{\}

Whenever \printnames and \printlist process a list, information concerning the current state is accessible by way of four counters: the listtotal counter holds the total number of items in the current list, listcount holds the number of the item currently being processed, liststart is the ⟨\text{start}⟩ argument passed to \printnames or \printlist, liststop is the ⟨\text{stop}⟩ argument. These counters are intended for use in list formatting directives. listtotal may also be used in the second optional argument to \printnames and \printlist. Note that these counters are local to list formatting directives and do not hold meaningful values when used anywhere else. For every list, there is also a counter by the same name which holds the total number of items in the corresponding list. For example, the author counter holds the total number of items in the author list. These counters are similar to listtotal except that they may also be used independently of list formatting directives. There are also maxnames and minnames as well as maxitems and minitems counters which hold the values of the corresponding package options. See § 4.10.5 for a complete list of such internal counters. Note that \printnames provides the name of the name list currently being processed in \currentname for use in name formatting directives.

\printtext\{⟨\text{format}⟩\}\{⟨\text{text}⟩\}

This command prints ⟨\text{text}⟩, which may be printable text or arbitrary code gen-
erating printable text. It clears the punctuation buffer before inserting \text and informs \biblatex that printable text has been inserted. This ensures that all preceding and following \newblock and \newunit commands have the desired effect. \printfield and \printnames as well as \bibstring and its companion commands (see § 4.8) do that automatically. Using this command is required if a bibliography styles inserts literal text (including the commands from §§ 4.7.3 and 4.7.4) to ensure that block and unit punctuation works as advertised in § 4.7.1. The optional \text argument specifies a field formatting directive to be used to format \text. This may also be useful when several fields are to be printed as one chunk, for example, by enclosing the entire chunk in parentheses or quotation marks. If a type-specific \text has been declared, the type-specific formatting directive takes precedence over the generic one. If the \text is omitted, the \text is printed as is. See also § 4.11.7 for some practical hints.

\printfield{\text}{\file}

This command is similar to \printtext except that the second argument is a file name rather than literal text. The \file argument must be the name of a valid \LaTeX\ file found in \TeX\'s search path. \printfield will use \input to load this \file. If there is no such file, \printfield does nothing. The optional \text argument specifies a field formatting directive to be applied to the \file. If a type-specific \text has been declared, the type-specific formatting directive takes precedence over the generic one. If the \text is omitted, the \file is printed as is. Note that this feature needs to be enabled explicitly by setting the package option loadfiles from § 3.1.2.1. By default, \printfield will not input any files.

\printdate

This command prints the date of the entry, as specified in the fields date or month/year. The date format is controlled by the package option date from § 3.1.2.1. Additional formatting (fonts etc.) may be applied by adjusting the field format date (§ 4.10.4). Note that this command interfaces with the punctuation tracker. There is no need to wrap it in a \printtext command.

\printdateextra

Similar to \printdate but incorporates the extrayear field in the date specification. This is useful for bibliography styles designed for author-year citations.

\printurldate

Similar to \printdate but prints the urldate of the entry. The date format is controlled by the package option urldate from § 3.1.2.1. Additional formatting may be applied by adjusting the field format urldate (§ 4.10.4).

\printorigdate

Similar to \printdate but prints the origdate of the entry. The date format is controlled by the package option origdate from § 3.1.2.1. Additional formatting may be applied by adjusting the field format origdate (§ 4.10.4).

\printeventdate

Similar to \printdate but prints the eventdate of the entry. The date format is controlled by the package option eventdate from § 3.1.2.1. Additional formatting may be applied by adjusting the field format eventdate (§ 4.10.4).

\indexfield{\text}{\field}

This command is similar to \printfield except that the \field is not printed
but added to the index using the formatting directive ⟨format⟩, as defined with \DeclareIndexFieldFormat. If a type-specific ⟨format⟩ has been declared, it takes precedence over the generic one. If the ⟨field⟩ is undefined, this command does nothing. If the ⟨format⟩ is omitted, \indexfield tries using the name of the field as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort.

\indexlist{⟨format⟩}{(start)–(stop)}{(literal list)}

This command is similar to \printlist except that the items in the list are not printed but added to the index using the formatting directive ⟨format⟩, as defined with \DeclareIndexListFormat. If a type-specific ⟨format⟩ has been declared, the type-specific formatting directive takes precedence over the generic one. If the ⟨literal list⟩ is undefined, this command does nothing. If the ⟨format⟩ is omitted, \indexlist tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort.

\indexnames{⟨format⟩}{(start)–(stop)}{(name list)}

This command is similar to \printnames except that the items in the list are not printed but added to the index using the formatting directive ⟨format⟩, as defined with \DeclareIndexNameFormat. If a type-specific ⟨format⟩ has been declared, the type-specific formatting directive takes precedence over the generic one. If the ⟨name list⟩ is undefined, this command does nothing. If the ⟨format⟩ is omitted, \indexnames tries using the name of the list as a format name. In this case, any type-specific formatting directive will also take precedence over the generic one. If all of these formats are undefined, it falls back to default as a last resort.

\entrydata{⟨key⟩}{⟨code⟩}
\entrydata*{⟨key⟩}{⟨code⟩}

Data commands like \printfield normally use the data of the entry currently being processed. You may use \entrydata to switch contexts locally. The ⟨key⟩ is the entry key of the entry to use locally. The ⟨code⟩ is arbitrary code to be executed in this context. This code will be executed in a group. See § 4.11.6 for an example. Note that this command will automatically switch languages if the babel package option is enabled. The starred version \entrydata* will clone all fields of the enclosing entry, using field, counter, and other resource names prefixed with the string 'saved'. This is useful when comparing two data sets. For example, inside the ⟨code⟩ argument, the author field holds the author of entry ⟨key⟩ and the author of the enclosing entry is available as savedauthor. The author counter holds the number of names in the author field of ⟨key⟩; the savedauthor counter refers to the author count of the enclosing entry.

\entryset{⟨precode⟩}{⟨postcode⟩}

This command is intended for use in bibliography drivers handling @set entries. It will loop over all members of the set, as indicated by the entryset field, and
execute the appropriate driver for the respective set member. This is similar to executing the \usedriver command from § 4.6.4 for each set member. The \usedriver is arbitrary code to be executed prior to processing each item in the set. The \usedriver is arbitrary code to be executed immediately after processing each item. Both arguments are mandatory in terms of the syntax but may be left empty. See § 4.11.1 for usage examples.

### 4.4.2 Formatting Directives

This section introduces the commands used to define the formatting directives required by the data commands from § 4.4.1. Note that all standard formats are defined in \biblatex.def.

\DeclareFieldFormat[⟨entrytype, . . .⟩]{⟨format⟩}{⟨code⟩}
\DeclareFieldFormat*[⟨format⟩]{⟨code⟩}

Defines the field format ⟨format⟩. This formatting directive is arbitrary ⟨code⟩ to be executed by \printfield. The value of the field will be passed to the ⟨code⟩ as its first and only argument. The name of the field currently being processed is available to the ⟨code⟩ as \currentfield. If an ⟨entrytype⟩ is specified, the format is specific to that type. The ⟨entrytype⟩ argument may be a comma-separated list of values. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

\DeclareListFormat[⟨entrytype, . . .⟩]{⟨format⟩}{⟨code⟩}
\DeclareListFormat*[⟨format⟩]{⟨code⟩}

Defines the literal list format ⟨format⟩. This formatting directive is arbitrary ⟨code⟩ to be executed for every item in a list processed by \printlist. The current item will be passed to the ⟨code⟩ as its first and only argument. The name of the literal list currently being processed is available to the ⟨code⟩ as \currentlist. If an ⟨entrytype⟩ is specified, the format is specific to that type. The ⟨entrytype⟩ argument may be a comma-separated list of values. Note that the formatting directive also handles the punctuation to be inserted between the individual items in the list. You need to check whether you are in the middle of or at the end of the list, i.e., whether listcount is smaller than or equal to liststop. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

\DeclareNameFormat[⟨entrytype, . . .⟩]{⟨format⟩}{⟨code⟩}
\DeclareNameFormat*[⟨format⟩]{⟨code⟩}

Defines the name list format ⟨format⟩. This formatting directive is arbitrary ⟨code⟩ to be executed for every name in a list processed by \printnames. The name of the literal list currently being processed is available to the ⟨code⟩ as \currentlist. If an ⟨entrytype⟩ is specified, the format is specific to that type. The ⟨entrytype⟩ argument may be a comma-separated list of values. The individual parts of a name will be passed to the ⟨code⟩ as separate arguments. These arguments are as follows:

#1 The last names. If a name consists of a single part only (for example, ‘Aristotle’), this part will be treated as the last name.
#2 The last names, given as initials.
#3 The first names. This argument also includes all middle names.
#4 The first names, given as initials.
#5 The name prefixes, for example von, van, of, da, de, del, della, etc. Note that
name prefixes are referred to as the ‘von part’ of the name in the BibTeX
documentation.
#6 The name prefixes, given as initials.
#7 The name affixes, for example ‘junior’, ‘senior’, ‘der Jüngere’, ‘der Ältere’, etc.
Note that name affixes are referred to as the ‘junior part’ of the name in the
BibTeX documentation.
#8 The name affixes, given as initials.

If a certain part of a name is not available, the corresponding argument will be
empty, hence you may use \ifblank tests to check for the individual parts of
a name. The name of the name list currently being processed is available to the
\langle code \rangle as \currentname. Note that the formatting directive also handles the
punctuation to be inserted between separate names and between the individual parts
of a name. You need to check whether you are in the middle of or at the end of the
list, i.e., whether listcount is smaller than or equal to liststop. See also §3.11.4.
The starred variant of this command is similar to the regular version, except that
all type-specific formats are cleared.

\DeclareIndexFieldFormat{\langle entrytype, \ldots \rangle}{\langle format \rangle}{\langle code \rangle}
\DeclareIndexFieldFormat*{\langle format \rangle}{\langle code \rangle}

Defines the field format \langle format \rangle. This formatting directive is arbitrary \langle code \rangle to
be executed by \indexfield. The value of the field will be passed to the \langle code \rangle
as its first and only argument. The name of the field currently being processed is
available to the \langle code \rangle as \currentfield. If an \langle entrytype \rangle is specified, the format
is specific to that type. The \langle entrytype \rangle argument may be a comma-separated list
of values. This command is similar to \DeclareFieldFormat except that the data
handled by the \langle code \rangle is not intended to be printed but written to the index. Note
that \indexfield will execute the \langle code \rangle as is, i.e., the \langle code \rangle must include \index
or a similar command. The starred variant of this command is similar to the regular
version, except that all type-specific formats are cleared.

\DeclareIndexListFormat{\langle entrytype, \ldots \rangle}{\langle format \rangle}{\langle code \rangle}
\DeclareIndexListFormat*{\langle format \rangle}{\langle code \rangle}

Defines the literal list format \langle format \rangle. This formatting directive is arbitrary \langle code \rangle to
be executed for every item in a list processed by \indexlist. The current item
will be passed to the \langle code \rangle as its only argument. The name of the literal list cur-
rently being processed is available to the \langle code \rangle as \currentlist. If an \langle entrytype \rangle
is specified, the format is specific to that type. The \langle entrytype \rangle argument may be a
comma-separated list of values. This command is similar to \DeclareListFormat except that the data
handled by the \langle code \rangle is not intended to be printed but written to the index. Note
that \indexlist will execute the \langle code \rangle as is, i.e., the \langle code \rangle
must include \index or a similar command. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

\DeclareIndexNameFormat{⟨entrytype, ...)⟩}{⟨format⟩}{⟨code⟩}
\DeclareIndexNameFormat*{⟨format⟩}{⟨code⟩}

Defines the name list format ⟨format⟩. This formatting directive is arbitrary ⟨code⟩ to be executed for every name in a list processed by \indexnames. The name of the name list currently being processed is available to the ⟨code⟩ as \currentname. If an ⟨entrytype⟩ is specified, the format is specific to that type. The ⟨entrytype⟩ argument may be a comma-separated list of values. The parts of the name will be passed to the ⟨code⟩ as separate arguments. This command is very similar to \DeclareNameFormat except that the data handled by the ⟨code⟩ is not intended to be printed but written to the index. Note that \indexnames will execute the ⟨code⟩ as is, i.e., the ⟨code⟩ must include \index or a similar command. The starred variant of this command is similar to the regular version, except that all type-specific formats are cleared.

\DeclareFieldAlias{⟨entry type⟩}{⟨alias⟩}{⟨format entry type⟩}{⟨format⟩}

Declares ⟨alias⟩ to be an alias for the field format ⟨format⟩. If an ⟨entrytype⟩ is specified, the alias is specific to that type. The ⟨format entry type⟩ is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

\DeclareListAlias{⟨entry type⟩}{⟨alias⟩}{⟨format entry type⟩}{⟨format⟩}

Declares ⟨alias⟩ to be an alias for the literal list format ⟨format⟩. If an ⟨entrytype⟩ is specified, the alias is specific to that type. The ⟨format entry type⟩ is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

\DeclareNameAlias{⟨entry type⟩}{⟨alias⟩}{⟨format entry type⟩}{⟨format⟩}

Declares ⟨alias⟩ to be an alias for the name list format ⟨format⟩. If an ⟨entrytype⟩ is specified, the alias is specific to that type. The ⟨format entry type⟩ is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

\DeclareIndexFieldAlias{⟨entry type⟩}{⟨alias⟩}{⟨format entry type⟩}{⟨format⟩}

Declares ⟨alias⟩ to be an alias for the field format ⟨format⟩. If an ⟨entrytype⟩ is specified, the alias is specific to that type. The ⟨format entry type⟩ is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

\DeclareIndexListAlias{⟨entry type⟩}{⟨alias⟩}{⟨format entry type⟩}{⟨format⟩}

Declares ⟨alias⟩ to be an alias for the literal list format ⟨format⟩. If an ⟨entrytype⟩ is specified, the alias is specific to that type. The ⟨format entry type⟩ is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.
\DeclareIndexNameAlias{⟨entry type⟩}{⟨alias⟩}{⟨format entry type⟩}{⟨format⟩}
Declares ⟨alias⟩ to be an alias for the name list format ⟨format⟩. If an ⟨entry type⟩ is specified, the alias is specific to that type. The ⟨format entry type⟩ is the entry type of the backend format. This is only required when declaring an alias for a type-specific formatting directive.

4.5 Customization

4.5.1 Sorting

In addition to the predefined sorting schemes discussed in § 3.4, it is possible to define new ones or modify the default definitions. The sorting process may be customized further by excluding certain fields from sorting on a per-type basis and by automatically populating the presort field on a per-type basis. Note that custom sorting schemes require Biber. They will not work with any other backend.

\DeclareSortingScheme{⟨name⟩}{⟨specification⟩} Biber only
Defines the sorting scheme ⟨name⟩. The ⟨name⟩ is the identifier passed to the sorting option (§ 3.1.2.1) when selecting the sorting scheme. The ⟨specification⟩ is an undelimited list of \sort directives which specify the elements to be considered in the sorting process. Spaces, tabs, and line endings may be used freely to visually arrange the ⟨specification⟩. Blank lines are not permissible. This command may only be used in the preamble.

\sort{⟨elements⟩}
Specifies the elements considered in the sorting process. The ⟨elements⟩ are an undelimited list of \name, \list, \field, \literal, and \citeorder commands which are evaluated in the order in which they are given. If an element is defined, it is added to the sort key and the sorting routine skips to the next \sort directive. If it is undefined, the next element is evaluated. Since literal strings are always defined, any \literal commands should be the sole or the last element in a \sort directive. The \sort command supports the following optional arguments:

direction=ascending, descending default: ascending
The sort direction, which may be either ascending or descending. The default is ascending order.

final=true, false default: false
This option marks a \sort directive as the final one in the ⟨specification⟩. If one of the ⟨elements⟩ is available, the remainder of the ⟨specification⟩ will be ignored. The short form final is equivalent to final=true.

sortcase=true, false
Whether or not to sort case-sensitively. The default setting depends on the global sortcase option.
sortupper=true, false

Whether or not to sort in ‘uppercase before lowercase’ (true) or ‘lowercase before uppercase’ order (false). The default setting depends on the global sortupper option.

\name{⟨name list⟩}

The \name element adds a ⟨name list⟩ to the sorting specification. If the ⟨name list⟩ is undefined, the element is skipped.

\list{⟨literal list⟩}

The \list element adds a ⟨literal list⟩ to the sorting specification. If the ⟨literal list⟩ is undefined, the element is skipped.

\field{⟨key=value, . . .⟩}{⟨field⟩}

The \field element adds a ⟨field⟩ to the sorting specification. If the ⟨field⟩ is undefined, the element is skipped. The \field command supports the following optional arguments:

padside=left, right default: left

Pads a field on the left or right side using padchar so that its width is padwidth. If no padding option is set, no padding is done at all. If any padding option is specified, then padding is performed and the missing options are assigned built-in default values. If padding and substring matching are both specified, the substring match is performed first. Padding is particularly useful with numeric fields. For example, the command

\field[padside=left,padwidth=2,padchar=0]{volume}

will pad the volume field with leading zeros to a width of two characters. This way, volumes are sorted by numeric value (01/02/11/12) rather than in alphabetic order (1/11/12/2).

padwidth=⟨integer⟩ default: 4

The target width in characters.

padchar=⟨character⟩ default: 0

The character to be used when padding the field.

strside=left, right default: left

Performs a substring match on the left or right side of the field. The number of characters to match is specified by the corresponding strwidth option. If no substring option is set, no substring matching is performed at all. If any substring option is specified, then substring matching is performed and the missing options are assigned built-in default values. If padding and substring matching are both specified, the substring match is performed first.
\texttt{strwidth}=(integer) \hspace{1cm} \texttt{default: 4}

The number of characters to match.

\texttt{\textbackslash literal\{⟨string⟩\}}

The \texttt{\textbackslash literal} element adds a literal \langle string⟩ to the sorting specification. This is useful as a fallback if some fields are not available.

\texttt{\textbackslash citeorder}

The \texttt{\textbackslash citeorder} element has a special meaning. It indicates that the entries should be kept in the order in which they were cited. It is usually the only element in the \langle specification⟩:

\begin{verbatim}
\DeclareSortingScheme{none}{
  \sort{\citeorder}
}
\end{verbatim}

Here are some examples. In the first example, we define a simple name/title/year scheme. The name element may be either the author, the editor, or the translator. Given this specification, the sorting routine will use the first element which is available and continue with the title. Note that the options useauthor, useeditor, and usetranslator are considered automatically in the sorting process:

\begin{verbatim}
\DeclareSortingScheme{sample}{
  \sort{
    \name{author}
    \name{editor}
    \name{translator}
  }
  \sort{
    \field{title}
  }
  \sort{
    \field{year}
  }
}
\end{verbatim}

In the next example, we define the same scheme in a more elaborate way, considering special fields such as presort, sortkey, sortname, etc. Since the sortkey field specifies the master sort key, it needs to override all other elements except for presort. This is indicated by the \texttt{final} option. If the sortkey field is available, processing will stop at this point. If not, the sorting routine continues with the next \texttt{\textbackslash sort} directive. This setup corresponds to the default definition of the nty scheme:

\begin{verbatim}
\DeclareSortingScheme{nty}{
  \sort{
    \field{presort}
  }
  \sort[final]{
    \field{sortkey}
  }
}\end{verbatim}
4.5.2 Special Fields

Some of the automatically generated fields from § 4.2.4.2 may be customized. Note that this requires Biber.

\DeclareLabelname{⟨entrytype, ...⟩}{⟨specification⟩}

Biber only

Defines the fields to consider when generating the labelname field (see § 4.2.4.2). The ⟨specification⟩ is a comma-separated list of fields. The fields are checked in the order listed and the first field which is available will be used as labelname. This is the default definition:

\DeclareLabelname{shortauthor,author,shorteditor,editor,translator}

The labelname field may be customized globally or on a per-type basis. If the optional ⟨entrytype⟩ argument is given, the specification applies to the respective
entry type. If not, it is applied globally. The \textit{entrytype} argument may be a comma-separated list of values. This command may only be used in the preamble.

\DeclareLabelyear{\langle entrytype, \ldots \rangle}{\langle specification \rangle}

Defines the date components to consider when generating the \textit{labelyear} field (see § 4.2.4.2). The \textit{specification} is a comma-separated list of date components. The items are checked in the order listed and the first item which is available will be used as \textit{labelyear}. Note that the items are date components, not date fields. This is the default definition:

\DeclareLabelyear{year,eventyear,origyear,urlyear}

The \textit{labelyear} field may be customized globally or on a per-type basis. If the optional \textit{entrytype} argument is given, the specification applies to the respective entry type. If not, it is applied globally. The \textit{entrytype} argument may be a comma-separated list of values. This command may only be used in the preamble. See also § 4.2.4.3.

4.5.3 Data Inheritance (crossref)

Biber features a highly customizable cross-referencing mechanism with flexible data inheritance rules. This sections deals with the configuration interface. See appendix A for the default configuration. Note that customized data inheritance requires Biber. It will not work with any other backend. A note on terminology: the \textit{child} or \textit{target} is the entry with the \textit{crossref} field, the \textit{parent} or \textit{source} is the entry the \textit{crossref} field points to. The child inherits data from the parent.

\DefaultInheritance{\langle exceptions \rangle}{\langle options \rangle}

Configures the default inheritance behavior. This command may only be used in the preamble. The default behavior may be customized be setting the following \textit{options}:

\texttt{all=true, false}

default: \texttt{true}

Whether or not to inherit all fields from the parent by default. \texttt{all=true} means that the child entry inherits all fields from the parent, unless a more specific inheritance rule has been set up with \texttt{\DeclareDataInheritance}. If an inheritance rule is defined for a field, data inheritance is controlled by that rule. \texttt{all=false} means that no data is inherited from the parent by default. Each field to be inherited requires an explicit inheritance rule set up with \texttt{\DeclareDataInheritance}. The package default is \texttt{all=true}.

\texttt{override=true, false}

default: \texttt{false}

Whether or not to overwrite target fields with source fields if both are defined. This applies both to automatic inheritance and to explicit inheritance rules. The package default is \texttt{override=false}, i.e., existing fields of the child entry are not overwritten.

The optional \textit{exceptions} are an undelimited list of \texttt{\except} directives. Spaces,
tabs, and line endings may be used freely to visually arrange the ⟨exceptions⟩. Blank lines are not permissible.

\except{⟨source⟩}{⟨target⟩}{⟨options⟩}

Sets the ⟨options⟩ for a specific ⟨source⟩ and ⟨target⟩ combination. The ⟨source⟩ and ⟨target⟩ arguments specify the parent and the child entry type. The asterisk matches all types and is permissible in either argument.

\DeclareDataInheritance{⟨source, . . .⟩}{⟨target, . . .⟩}{⟨rules⟩}

Declares inheritance rules. The ⟨source⟩ and ⟨target⟩ arguments specify the parent and the child entry type. Either argument may be a single entry type, a comma-separated list of types, or an asterisk. The asterisk matches all entry types. The ⟨rules⟩ are an undelimited list of \inherit and/or \noinherit directives. Spaces, tabs, and line endings may be used freely to visually arrange the ⟨rules⟩. Blank lines are not permissible. This command may only be used in the preamble.

\inherit{⟨option⟩}{⟨source⟩}{⟨target⟩}

Defines an inheritance rule by mapping a ⟨source⟩ field to a ⟨target⟩ field. The ⟨option⟩ is the override option explained above. When set locally, it takes precedence over any global options set with \DefaultInheritance.

\noinherit{⟨source⟩}

Unconditionally prevents inheritance of the ⟨source⟩ field.

\ResetDataInheritance Biber only

Clears all inheritance rules defined with \DeclareDataInheritance. This command may only be used in the preamble.

Here are some practical examples:

\DefaultInheritance{all=true,override=false}

This example shows how to configure the default inheritance behavior. The above settings are the package defaults.

\DefaultInheritance[
  \except{*}{online}{all=false}
][all=true,override=false]

This example is similar to the one above but adds one exception: entries of type @online will, by default, not inherit any data from any parent.

\DeclareDataInheritance{collection}{incollection}{
  \inherit{title}{booktitle}
  \inherit{subtitle}{booksubtitle}
  \inherit{titleaddon}{booktitleaddon}
}

So far we have looked at setting up the defaults. For example, all=true means that the publisher field of a source entry is copied to the publisher field of the target entry. In some cases, however, asymmetric mappings are required. They are defined with \DeclareDataInheritance. The above example sets up three typical
rules for @incollection entries referencing a @collection. We map the title and related fields of the source to the corresponding booktitle fields of the target.

\DeclareDataInheritance{mvbook,book}{inbook,bookinbook}{
  \inherit{author}{author}
  \inherit{author}{bookauthor}
}

This rule is an example of one-to-many mapping: it maps the author field of the source to both the author and the bookauthor fields of the target in order to allow for compact inbook/bookinbook entries. The source may be either a @mvbook or a @book entry, the target either an @inbook or a @bookinbook entry.

\DeclareDataInheritance{*}{inbook,incollection}{
  \noinherit{introduction}
}

This rule prevents inheritance of the introduction field. It applies to all targets of type @inbook or @incollection, regardless of the source entry type.

\DeclareDataInheritance{*}{*}{
  \noinherit{abstract}
}

This rule, which applies to all entries, regardless of the source and target entry types, prevents inheritance of the abstract field.

\DefaultInheritance{all=true,override=false}
\ResetDataInheritance

This example demonstrates how to emulate BibTeX's cross-referencing mechanism. It enables inheritance by default, disables overwriting, and clears all other inheritance rules and mappings.

4.6 Auxiliary Commands

The facilities in this section are intended for analyzing and saving bibliographic data rather than formatting and printing it.

4.6.1 Data Commands

The commands in this section grant low-level access to the unformatted bibliographic data. They are not intended for typesetting but rather for things like saving data to a temporary macro so that it may be used in a comparison later.

\thefield{⟨field⟩}

Expands to the unformatted ⟨field⟩. If the ⟨field⟩ is undefined, this command expands to an empty string.

\strfield{⟨field⟩}

Similar to \thefield, except that the field is automatically sanitized such that its value may safely be used in the formation of a control sequence name.
\theclist{⟨literal list⟩}

Expands to the unformatted ⟨literal list⟩. If the list is undefined, this command expands to an empty string. Note that this command will dump the ⟨literal list⟩ in the internal format used by this package. This format is not suitable for printing.

\thename{⟨name list⟩}

Expands to the unformatted ⟨name list⟩. If the list is undefined, this command expands to an empty string. Note that this command will dump the ⟨name list⟩ in the internal format used by this package. This format is not suitable for printing.

\savefield{⟨field⟩}{⟨macro⟩}
\savefield*{⟨field⟩}{⟨macro⟩}

Copies an unformatted ⟨field⟩ to a ⟨macro⟩. The regular variant of this command defines the ⟨macro⟩ globally, the starred one works locally.

\savelist{⟨literal list⟩}{⟨macro⟩}
\savelist*{⟨literal list⟩}{⟨macro⟩}

Copies an unformatted ⟨literal list⟩ to a ⟨macro⟩. The regular variant of this command defines the ⟨macro⟩ globally, the starred one works locally.

\savename{⟨name list⟩}{⟨macro⟩}
\savename*{⟨name list⟩}{⟨macro⟩}

Copies an unformatted ⟨name list⟩ to a ⟨macro⟩. The regular variant of this command defines the ⟨macro⟩ globally, the starred one works locally.

\savefieldcs{⟨field⟩}{⟨csname⟩}
\savefieldcs*{⟨field⟩}{⟨csname⟩}

Similar to \savefield, but takes the control sequence name ⟨csname⟩ (without a leading backslash) as an argument, rather than a macro name.

\savelistcs{⟨literal list⟩}{⟨csname⟩}
\savelistcs*{⟨literal list⟩}{⟨csname⟩}

Similar to \savelist, but takes the control sequence name ⟨csname⟩ (without a leading backslash) as an argument, rather than a macro name.

\savenamecs{⟨name list⟩}{⟨csname⟩}
\savenamecs*{⟨name list⟩}{⟨csname⟩}

Similar to \savename, but takes the control sequence name ⟨csname⟩ (without a leading backslash) as an argument, rather than a macro name.

\restorefield{⟨field⟩}{⟨macro⟩}

Restores a ⟨field⟩ from a ⟨macro⟩ defined with \savefield before. The field is restored within a local scope.
\restorelist\{⟨literal list⟩\}\{⟨macro⟩\}

Restores a ⟨literal list⟩ from a ⟨macro⟩ defined with \savelist before. The list is
restored within a local scope.

\restorename\{⟨name list⟩\}\{⟨macro⟩\}

Restores a ⟨name list⟩ from a ⟨macro⟩ defined with \savename before. The list is
restored within a local scope.

\clearfield\{⟨field⟩\}

Clears the ⟨field⟩ within a local scope. A field cleared this way is treated as unde-
defined by subsequent data commands.

\clearlist\{⟨literal list⟩\}

Clears the ⟨literal list⟩ within a local scope. A list cleared this way is treated as
undefined by subsequent data commands.

\clearname\{⟨name list⟩\}

Clears the ⟨name list⟩ within a local scope. A list cleared this way is treated as
undefined by subsequent data commands.

4.6.2 Stand-alone Tests

The commands in this section are various kinds of stand-alone tests for use in
bibliography and citation styles.

\iffieldundef\{⟨field⟩\}\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ if the ⟨field⟩ is undefined, and to ⟨false⟩ otherwise.

\iflistundef\{⟨literal list⟩\}\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ if the ⟨literal list⟩ is undefined, and to ⟨false⟩ otherwise.

\ifnameundef\{⟨name list⟩\}\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ if the ⟨name list⟩ is undefined, and to ⟨false⟩ otherwise.

\iffieldequal\{⟨field 1⟩\}\{⟨field 2⟩\}\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ if the values of ⟨field 1⟩ and ⟨field 2⟩ are equal, and to ⟨false⟩
otherwise.

\iflistequal\{⟨literal list 1⟩\}\{⟨literal list 2⟩\}\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ if the values of ⟨literal list 1⟩ and ⟨literal list 2⟩ are equal, and to
⟨false⟩ otherwise.

\ifnamesequal\{⟨name list 1⟩\}\{⟨name list 2⟩\}\{⟨true⟩\}\{⟨false⟩\}

Expands to ⟨true⟩ if the values of ⟨name list 1⟩ and ⟨name list 2⟩ are equal, and to
⟨false⟩ otherwise.
\iffieldequals{\langle field \rangle}{\langle macro \rangle}{\langle true \rangle}{\langle false \rangle}

Expands to \langle true \rangle if the value of the \langle field \rangle is equal to the definition of \langle macro \rangle, and to \langle false \rangle otherwise.

\iflistequals{\langle literal list \rangle}{\langle macro \rangle}{\langle true \rangle}{\langle false \rangle}

Expands to \langle true \rangle if the value of the \langle literal list \rangle is equal to the definition of \langle macro \rangle, and to \langle false \rangle otherwise.

\ifnameequals{\langle name list \rangle}{\langle macro \rangle}{\langle true \rangle}{\langle false \rangle}

Expands to \langle true \rangle if the value of the \langle name list \rangle is equal to the definition of \langle macro \rangle, and to \langle false \rangle otherwise.

\iffieldequalcs{\langle field \rangle}{\langle csname \rangle}{\langle true \rangle}{\langle false \rangle}

Similar to \iffieldequals but takes the control sequence name \langle csname \rangle (without a leading backslash) as an argument, rather than a macro name.

\iflistequalcs{\langle literal list \rangle}{\langle csname \rangle}{\langle true \rangle}{\langle false \rangle}

Similar to \iflistequals but takes the control sequence name \langle csname \rangle (without a leading backslash) as an argument, rather than a macro name.

\ifnameequalcs{\langle name list \rangle}{\langle csname \rangle}{\langle true \rangle}{\langle false \rangle}

Similar to \ifnameequals but takes the control sequence name \langle csname \rangle (without a leading backslash) as an argument, rather than a macro name.

\iffieldequalstr{\langle field \rangle}{\langle string \rangle}{\langle true \rangle}{\langle false \rangle}

Executes \langle true \rangle if the value of the \langle field \rangle is equal to \langle string \rangle, and \langle false \rangle otherwise. This command is robust.

\iffiel dexref{\langle field \rangle}{\langle true \rangle}{\langle false \rangle}

If the crossref/xref field of an entry is defined, this command checks if the \langle field \rangle is related to the cross-referenced parent entry. It executes \langle true \rangle if the \langle field \rangle of the child entry is equal to the corresponding \langle field \rangle of the parent entry, and \langle false \rangle otherwise. If the crossref/xref field is undefined, it always executes \langle false \rangle. This command is robust. See the description of the crossref and xref fields in § 2.2.3 as well as § 2.4.1 for further information concerning cross-referencing.

\iflist xref{\langle literal list \rangle}{\langle true \rangle}{\langle false \rangle}

Similar to \iffiel dexref but checks if a \langle literal list \rangle is related to the cross-referenced parent entry. See the description of the crossref and xref fields in § 2.2.3 as well as § 2.4.1 for further information concerning cross-referencing.

\ifnamexref{\langle name list \rangle}{\langle true \rangle}{\langle false \rangle}

Similar to \iffiel dexref but checks if a \langle name list \rangle is related to the cross-refer-
enced parent entry. See the description of the crossref and xref fields in § 2.2.3 as well as § 2.4.1 for further information concerning cross-referencing.

\ifcurrentfield{⟨field⟩}{⟨true⟩}{⟨false⟩}

Executes ⟨true⟩ if the current field is ⟨field⟩, and ⟨false⟩ otherwise. This command is robust. It is intended for use in field formatting directives and always executes ⟨false⟩ when used in any other context.

\ifcurrentlist{⟨literal list⟩}{⟨true⟩}{⟨false⟩}

Executes ⟨true⟩ if the current list is ⟨literal list⟩, and ⟨false⟩ otherwise. This command is robust. It is intended for use in list formatting directives and always executes ⟨false⟩ when used in any other context.

\ifcurrentname{⟨name list⟩}{⟨true⟩}{⟨false⟩}

Executes ⟨true⟩ if the current list is ⟨name list⟩, and ⟨false⟩ otherwise. This command is robust. It is intended for use in list formatting directives and always executes ⟨false⟩ when used in any other context.

\ifuseprefix{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the useprefix option is enabled (either globally or for the current entry), and ⟨false⟩ otherwise. See § 3.1.3 for details on this option.

\ifuseauthor{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the useauthor option is enabled (either globally or for the current entry), and ⟨false⟩ otherwise. See § 3.1.3 for details on this option.

\ifuseeditor{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the useeditor option is enabled (either globally or for the current entry), and ⟨false⟩ otherwise. See § 3.1.3 for details on this option.

\ifusetranslator{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the usetranslator option is enabled (either globally or for the current entry), and ⟨false⟩ otherwise. See § 3.1.3 for details on this option.

\ifsingletitle{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if there is only one work by the author/editor in the bibliography, and to ⟨false⟩ otherwise. Note that this feature needs to be enabled explicitly with the package option singletitle.

\ifandothers{⟨list⟩}{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the ⟨list⟩ is defined and has been truncated in the bib file with the keyword ‘and others’, and to ⟨false⟩ otherwise. The ⟨list⟩ may be a literal list or a name list.

\ifmorenames{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the current name list has been or will be truncated, and to...
(false) otherwise. This command is intended for use in formatting directives for name lists. It will always expand to (false) when used elsewhere. This command performs the equivalent of an \ifandothers test for the current list. If this test is negative, it also checks if the listtotal counter is larger than liststop. This command may be used in a formatting directive to decide if a note such as “and others” or “et al.” is to be printed at the end of the list. Note that you still need to check whether you are in the middle or at the end of the list, i.e., whether listcount is smaller than or equal to liststop, see § 4.4.1 for details.

\ifmoreitems{(true)}{(false)}

This command is similar to \ifmorenames but checks the current literal list. It is intended for use in formatting directives for literal lists. It will always expand to (false) when used elsewhere.

\iffirstinits{(true)}{(false)}

Expands to (true) or (false), depending on the state of the firstinits package option (see § 3.1.2.3). This command is intended for use in formatting directives for name lists.

\ifentrytype{(type)}{(true)}{(false)}

Executes (true) if the entry type of the entry currently being processed is (type), and (false) otherwise.

\ifkeyword{(keyword)}{(true)}{(false)}

Executes (true) if the (keyword) is found in the keywords field of the entry currently being processed, and (false) otherwise.

\ifentrykeyword{(entrykey)}{(keyword)}{(true)}{(false)}

A variant of \ifkeyword which takes an entry key as its first argument. This is useful for testing an entry other than the one currently processed.

\ifcategory{(category)}{(true)}{(false)}

Executes (true) if the entry currently being processed has been assigned to a (category) with \addtocategory, and (false) otherwise.

\ifentrycategory{(entrykey)}{(category)}{(true)}{(false)}

A variant of \ifcategory which takes an entry key as its first argument. This is useful for testing an entry other than the one currently processed.

\ifciteseen{(true)}{(false)}

Executes (true) if the entry currently being processed has been cited before, and (false) otherwise. This command is robust and intended for use in citation styles. If there are any refsection environments in the document, the citation tracking is local to these environments. Note that the citation tracker needs to be enabled explicitly with the package option citetracker. The behavior of this test depends on the mode the citation tracker is operating in, see § 3.1.2.3 for details. If the citation
tracker is disabled, the test always yields <false>. Also see the \citetrackertrue and \citetrackerfalse switches in § 4.6.4.

\ifentryseen\langle entrykey \rangle \{ \langle true \rangle \} \{ \langle false \rangle \}

A variant of \ifciteseen which takes an entry key as its first argument. Since the \langle entrykey \rangle is expanded prior to performing the test, it is possible to test for entry keys in a field such as xref:
\ifentryseen\langle thefield[xref]\rangle \{ \langle true \rangle \} \{ \langle false \rangle \}

Apart from the additional argument, \ifentryseen behaves like \ifciteseen.

\ifciteibid{(true)}{(false)}

Expands to \langle true \rangle if the entry currently being processed is the same as the last one, and to \langle false \rangle otherwise. This command is intended for use in citation styles. If there are any refsection environments in the document, the tracking is local to these environments. Note that the ‘ibidem’ tracker needs to be enabled explicitly with the package option ibidtracker. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields \langle false \rangle. Also see the \citetrackertrue and \citetrackerfalse switches in § 4.6.4.

\ifciteidem{(true)}{(false)}

Expands to \langle true \rangle if the primary name (i.e., the author or editor) in the entry currently being processed is the same as the last one, and to \langle false \rangle otherwise. This command is intended for use in citation styles. If there are any refsection environments in the document, the tracking is local to these environments. Note that the ‘idem’ tracker needs to be enabled explicitly with the package option idemtracker. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields \langle false \rangle. Also see \citetrackertrue and \citetrackerfalse in § 4.6.4.

\ifopcit{(true)}{(false)}

This command is similar to \ifciteibid except that it expands to \langle true \rangle if the entry currently being processed is the same as the last one by this author or editor. Note that the ‘opcit’ tracker needs to be enabled explicitly with the package option opcittracker. The behavior of this test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields \langle false \rangle. Also see \citetrackertrue and \citetrackerfalse switches in § 4.6.4.

\ifloccit{(true)}{(false)}

This command is similar to \ifopcit except that it also compares the \langle postnote \rangle arguments and expands to \langle true \rangle only if they match and are numerical (in the sense of \ifnumerals from § 4.6.2), i.e., \ifloccit will yield true if the citation refers to the same page cited before. Note that the ‘loccit’ tracker needs to be enabled explicitly with the package option loccittracker. The behavior of this
test depends on the mode the tracker is operating in, see § 3.1.2.3 for details. If the tracker is disabled, the test always yields \langle false \rangle. Also see the \texttt{\textbackslash citetrackertrue} and \texttt{\textbackslash citetrackerfalse} switches in § 4.6.4.

\texttt{\textbackslash iffirsonpage\{\langle\text{true}\rangle\}\{\langle\text{false}\rangle\}}

The behavior of this command is responsive to the package option \texttt{pagetracker}. If the option is set to page, it expands to \langle true \rangle if the current item is the first one on the page, and to \langle false \rangle otherwise. If the option is set to spread, it expands to \langle true \rangle if the current item is the first one on the double-page spread, and to \langle false \rangle otherwise. If the page tracker is disabled, this test always yields \langle false \rangle. Depending on the context, the 'item' may be a citation or an entry in the bibliography or the list of shorthands. Note that this test distinguishes between body text and footnotes. For example, if used in the first footnote on a page, it will expand to \langle true \rangle even if there is a citation in the body text prior to the footnote. Also see the \texttt{\textbackslash pagetrackertrue} and \texttt{\textbackslash pagetrackerfalse} switches in § 4.6.4.

\texttt{\textbackslash ifsamepage\{\langle\text{instance}\ 1\rangle\}\{\langle\text{instance}\ 2\rangle\}\{\langle\text{true}\rangle\}\{\langle\text{false}\rangle\}}

This command expands to \langle true \rangle if two instances of a reference are located on the same page or double-page spread, and to \langle false \rangle otherwise. An instance of a reference may be a citation or an entry in the bibliography or the list of shorthands. These instances are identified by the value of the \texttt{instcount} counter, see § 4.10.5. The behavior of this command is responsive to the package option \texttt{pagetracker}. If this option is set to spread, \texttt{\textbackslash ifsamepage} is in fact an 'if same spread' test. If the page tracker is disabled, this test always yields \langle false \rangle. The arguments \langle instance\ 1 \rangle and \langle instance\ 2 \rangle are treated as integer expressions in the sense of e-TeX's \texttt{\textbackslash numexpr}. This implies that it is possible to make calculations within these arguments, for example:

\begin{verbatim}
\texttt{\textbackslash ifsamepage\{\textbackslash value\{\texttt{instcount}\}\}\{\textbackslash value\{\texttt{instcount}\}-1\}\{\langle\text{true}\rangle\}\{\langle\text{false}\rangle\}}
\end{verbatim}

Note that \texttt{\textbackslash value} is not prefixed by \texttt{\textbackslash the} and that the subtraction is included in the second argument in the above example. If \langle instance\ 1 \rangle or \langle instance\ 2 \rangle is an invalid number (for example, a negative one), the test yields \langle false \rangle. Also note that this test does not distinguish between body text and footnotes. Also see the \texttt{\textbackslash pagetrackertrue} and \texttt{\textbackslash pagetrackerfalse} switches in § 4.6.4.

\texttt{\textbackslash ifinteger\{\langle\text{string}\rangle\}\{\langle\text{true}\rangle\}\{\langle\text{false}\rangle\}}

Executes \langle true \rangle if the \langle string \rangle is a positive integer, and \langle false \rangle otherwise. This command is robust.

\texttt{\textbackslash ifnumeral\{\langle\text{string}\rangle\}\{\langle\text{true}\rangle\}\{\langle\text{false}\rangle\}}

Executes \langle true \rangle if the \langle string \rangle is an Arabic or Roman numeral, and \langle false \rangle otherwise. This command is robust. See also \texttt{\textbackslash DeclareNumChars} and \texttt{\textbackslash NumCheckSetup} in § 4.6.4.

\texttt{\textbackslash ifnumerals\{\langle\text{string}\rangle\}\{\langle\text{true}\rangle\}\{\langle\text{false}\rangle\}}

Executes \langle true \rangle if the \langle string \rangle is a range or a list of Arabic or Roman numer-
als, and \textit{false} otherwise. This command is robust. In contrast to \texttt{ifnumeral}, it will also execute \textit{true} with arguments like “52–58”, “14/15”, “1, 3, 5”, and so on. See also \texttt{DeclareNumChars}, \texttt{DeclareRangeChars}, \texttt{DeclareRangeCommands}, and \texttt{NumCheckSetup} in § 4.6.4.

\texttt{ifpages}\{\langle\text{string}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifnumerals}, but also considers \texttt{DeclarePageCommands} from § 4.6.4.

\texttt{iffieldint}\{\langle\text{field}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifinteger}, but uses the value of a \langle\text{field}\rangle rather than a literal string in the test. If the \texttt{\langle\text{field}\rangle} is undefined, it executes \texttt{false}.

\texttt{iffieldnum}\{\langle\text{field}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifnumeral}, but uses the value of a \langle\text{field}\rangle rather than a literal string in the test. If the \texttt{\langle\text{field}\rangle} is undefined, it executes \texttt{false}.

\texttt{iffieldnums}\{\langle\text{field}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifnumerals}, but uses the value of a \langle\text{field}\rangle rather than a literal string in the test. If the \texttt{\langle\text{field}\rangle} is undefined, it executes \texttt{false}.

\texttt{iffieldpages}\{\langle\text{field}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifpages}, but uses the value of a \langle\text{field}\rangle rather than a literal string in the test. If the \texttt{\langle\text{field}\rangle} is undefined, it executes \texttt{false}.

\texttt{ifbibstring}\{\langle\text{string}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Expands to \texttt{true} if the \langle\text{string}\rangle is a known localization key, and to \texttt{false} otherwise. The localization keys defined by default are listed in § 4.9.2. New ones may be defined with \texttt{NewBibliographyString}.

\texttt{ifbibxstring}\{\langle\text{string}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifbibstring}, but the \langle\text{string}\rangle is expanded.

\texttt{iffieldbibstring}\{\langle\text{field}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Similar to \texttt{ifbibstring}, but uses the value of a \langle\text{field}\rangle rather than a literal string in the test. If the \texttt{\langle\text{field}\rangle} is undefined, it expands to \texttt{false}.

\texttt{ifdriver}\{\langle\text{entrytype}\rangle\}\{\texttt{true}\}\{\texttt{false}\}

Expands to \texttt{true} if a driver for the \langle\text{entrytype}\rangle is available, and to \texttt{false} otherwise.

\texttt{ifcapital}\{\texttt{true}\}\{\texttt{false}\}

Executes \texttt{true} if \texttt{biblatex}'s punctuation tracker would capitalize a localization string at the current location, and \texttt{false} otherwise. This command is robust. It may be useful for conditional capitalization of certain parts of a name in a formatting directive.
\ifcitation{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ when located in a citation, and to ⟨false⟩ otherwise. Note that this command is responsive to the outermost context in which it is used. For example, if a citation command defined with \DeclareCiteCommand executes a driver defined with \DeclareBibliographyDriver, any \ifcitation tests in the driver code will yield ⟨true⟩. See § 4.11.6 for a practical example.

\ifbibliography{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ when located in a bibliography, and to ⟨false⟩ otherwise. Note that this command is responsive to the outermost context in which it is used. For example, if a driver defined with \DeclareBibliographyDriver executes a citation command defined with \DeclareCiteCommand, any \ifbibliography tests in the citation code will yield ⟨true⟩. See § 4.11.6 for a practical example.

\ifnatbimode{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ or ⟨false⟩ depending on the natbib option from § 3.1.1.

\ifciteindex{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ or ⟨false⟩ depending on the indexing option from § 3.1.2.1.

\ifbibindex{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ or ⟨false⟩ depending on the indexing option from § 3.1.2.1.

\iftfootnote{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ when located in a footnote, and to ⟨false⟩ otherwise. Note that footnotes in minipage environments are considered to be part of the body text. This command will only expand to ⟨true⟩ in footnotes a the bottom of the page and in endnotes as provided by the endnotes package.

citecounter

This counter indicates how many times the entry currently being processed is cited in the current reference section. Note that this feature needs to be enabled explicitly with the package option citecounter. If the option is set to context, citations in the body text and in footnotes are counted separately. In this case, citecounter will hold the value of the context it is used in.

uniquename

This counter refers to the labelname list. It is set on a per-name basis. Its value is 0 if the last name is unique, 1 if adding the other parts of the name (first name, prefix, suffix) as initials will make it unique, and 2 if the full name is required to disambiguate the name. This information is required by author-year and author-title citation schemes which add additional parts of the name when citing different authors with the same last name. For example, if there is one ‘John Doe’ and one ‘Edward Doe’ in the list of references, this counter will be set to 1. If there is one ‘John Doe’ and one ‘Jane Doe’, the value of the counter will be 2. If the option is set to init/allinit/mininit, the counter will be limited to 1. This is useful for citations styles which use initials to disambiguate names but never print the full name in citations. If adding the initials is not sufficient to disambiguate the
name, uniquename will also be set to 0 for that name. This feature needs to be enabled explicitly with the package option uniquename. Note that the uniquename counter is local to \printnames and that it is only set for the labelname list and to the name list labelname has been derived from (typically author or editor). Its value is zero in any other context, i.e., it must be evaluated in the name formatting directives handling name lists. See § 4.11.4 for further details and practical examples.

**uniquelist**

This counter refers to the labelname list. It is set on a per-field basis. Its value indicates the number of names required to disambiguate the name list if automatic maxnames/minnames truncation would lead to ambiguous citations. For example, if there is one work by ‘Doe/Smith/Johnson’ and another one by ‘Doe/Edwards/Williams’, setting maxnames=1 would lead to ‘Doe et al.’ in both cases. In this case, uniquelist would be set to 2 on the labelname lists of both entries because at least the first two names are required to disambiguate them. Note that the uniquelist counter is local to \printnames and that it is only set for the labelname list and to the name list labelname has been derived from (typically author or editor). Its value is zero in any other context. If available, the uniquelist value will be used automatically by \printnames when processing the name list, i.e., it will automatically override maxnames/minnames. This feature needs to be enabled explicitly with the package option uniquelist. See § 4.11.4 for further details and practical examples.

**parenlevel**

The current nesting level of parentheses and/or brackets. This information is only available if the parentracker from § 3.1.2.3 is enabled.

### 4.6.3 Tests with \ifboolexpr and \ifthenelse

The tests introduced in § 4.6.2 may also be used with the \ifboolexpr command provided by the etoolbox package and the \ifthenelse command provided by the ifthen package. The syntax of the tests is slightly different in this case: the ⟨true⟩ and ⟨false⟩ arguments are omitted from the test itself and passed to the \ifboolexpr or \ifthenelse command instead. Note that the use of these commands implies some processing overhead. If you do not need any boolean operators, it is more efficient to use the stand-alone tests from § 4.6.2.

\ifboolexpr{⟨expression⟩}{⟨true⟩}{⟨false⟩}

etoolbox command which allows for complex tests with boolean operators and grouping:

\ifboolexpr{ 
  test {\ifnameundef{editor}}
  and
  not test {\iflistundef{location}}
}{
  ...}
{...}
\ifthenelse{⟨tests⟩}{⟨true⟩}{⟨false⟩}

ifthen command which allows for complex tests with boolean operators and grouping:
\ifthenelse{ ⟨\ifnameundef{editor} \and \not \iflistundef{location} \) \or \iffieldundef{year} ⟩ }
{...}
{...}

The additional tests provided by \biblatex are only available when \ifboolexpr or \ifthenelse are used in citation commands and in the bibliography.

4.6.4 Miscellaneous Commands

The section introduced miscellaneous commands and little helpers for use in bibliography and citation styles.

\newbibmacro{⟨name⟩}{⟨arguments⟩}{⟨optional⟩}{⟨definition⟩}
\newbibmacro*{⟨name⟩}{⟨arguments⟩}{⟨optional⟩}{⟨definition⟩}

Defines a macro to be executed via \usebibmacro later. The syntax of this command is very similar to \newcommand except that ⟨name⟩ may contain characters such as numbers and punctuation marks and does not start with a backslash. The optional argument ⟨arguments⟩ is an integer specifying the number of arguments taken by the macro. If ⟨optional⟩ is given, it specifies a default value for the first argument of the macro, which automatically becomes an optional argument. In contrast to \newcommand, \newbibmacro issues a warning message if the macro is already defined, and automatically falls back to \renewbibmacro. As with \newcommand, the regular variant of this command uses the \long prefix in the definition while the starred one does not. If a macro has been declared to be long, it may take arguments containing \par tokens. \newbibmacro and \renewbibmacro are provided for convenience. Style authors are free to use \newcommand or \def instead. However, note that most shared definitions found in \biblatex\def are defined with \newbibmacro, hence they must be used and modified accordingly.

\renewbibmacro{⟨name⟩}{⟨arguments⟩}{⟨optional⟩}{⟨definition⟩}
\renewbibmacro*{⟨name⟩}{⟨arguments⟩}{⟨optional⟩}{⟨definition⟩}

Similar to \newbibmacro but redefines ⟨name⟩. In contrast to \renewcommand, \renewbibmacro issues a warning message if the macro is undefined, and automatically falls back to \newbibmacro.
\providebibmacro{⟨name⟩}⟨(arguments)⟩⟨(optional)⟩⟨(definition)⟩
\providebibmacro*[⟨name⟩]⟨(arguments)⟩⟨(optional)⟩⟨(definition)⟩

Similar to \newbibmacro but only defines ⟨name⟩ if it is undefined. This command is similar in concept to \providecommand.

\usebibmacro{⟨name⟩}

Executes the macro ⟨name⟩, as defined with \newbibmacro. If the macro takes any arguments, they are simply appended after ⟨name⟩. \usebibmacro is robust.

\savecommand{⟨command⟩}
\restorecommand{⟨command⟩}

These commands save and restore any ⟨command⟩, which must be a command name starting with a backslash. Both commands work within a local scope. They are mainly provided for use in localization files.

\savebibmacro{⟨name⟩}
\restorebibmacro{⟨name⟩}

These commands save and restore the macro ⟨name⟩, where ⟨name⟩ is the identifier of a macro defined with \newbibmacro. Both commands work within a local scope. They are mainly provided for use in localization files.

\savefieldformat{⟨entry type⟩}{⟨format⟩}
\restorefieldformat{⟨entry type⟩}{⟨format⟩}

These commands save and restore the formatting directive ⟨format⟩, as defined with \DeclareFieldFormat. Both commands work within a local scope. They are mainly provided for use in localization files.

\savelistformat{⟨entry type⟩}{⟨format⟩}
\restorelistformat{⟨entry type⟩}{⟨format⟩}

These commands save and restore the formatting directive ⟨format⟩, as defined with \DeclareListFormat. Both commands work within a local scope. They are mainly provided for use in localization files.

\savenameformat{⟨entry type⟩}{⟨format⟩}
\restorenameformat{⟨entry type⟩}{⟨format⟩}

These commands save and restore the formatting directive ⟨format⟩, as defined with \DeclareNameFormat. Both commands work within a local scope. They are mainly provided for use in localization files.

\usedriver{⟨code⟩}{⟨entrytype⟩}

Executes the bibliography driver for an ⟨entrytype⟩. Calling this command in the ⟨loopcode⟩ of a citation command defined with \DeclareCiteCommand is a simple way to print full citations similar to a bibliography entry. Commands such as \newblock, which are not applicable in a citation, are disabled automatically. Additional initialization commands may be passed as the ⟨code⟩ argument. This
argument is executed inside the group in which \usedriver runs the respective driver. Note that it is mandatory in terms of the syntax but may be left empty. Also note that this command will automatically switch languages if the babel package option is enabled.

\bibhypertarget{⟨name⟩}{⟨text⟩}

A wrapper for hyperref’s \hypertarget command. The ⟨name⟩ is the name of the anchor, the ⟨text⟩ is arbitrary printable text or code which serves as an anchor. If there are any refsection environments in the document, the ⟨name⟩ is local to the current environment. If the hyperref package option is disabled or the hyperref package has not been loaded, this command will simply pass on its ⟨text⟩ argument. See also the formatting directive \bibhypertarget in § 4.10.4.

\bibhyperlink{⟨name⟩}{⟨text⟩}

A wrapper for hyperref’s \hyperlink command. The ⟨name⟩ is the name of an anchor defined with \bibhypertarget, the ⟨text⟩ is arbitrary printable text or code to be transformed into a link. If there are any refsection environments in the document, the ⟨name⟩ is local to the current environment. If the hyperref package option is disabled or the hyperref package has not been loaded, this command will simply pass on its ⟨text⟩ argument. See also the formatting directive \bibhyperlink in § 4.10.4.

\bibhyperref{⟨entrykey⟩}{⟨text⟩}

Transforms ⟨text⟩ into an internal link pointing to ⟨entrykey⟩ in the bibliography. If ⟨entrykey⟩ is omitted, this command uses the key of the entry currently being processed. This command is employed to transform citations into clickable links pointing to the corresponding entry in the bibliography. The link target is marked automatically by biblatex. If there are multiple bibliographies in a document, the target will be the first occurrence of ⟨entrykey⟩ in one of the bibliographies. If there are refsection environments, the links are local to the environment. See also the formatting directive \bibhyperref in § 4.10.4.

\ifhyperref{⟨true⟩}{⟨false⟩}

Expands to ⟨true⟩ if the hyperref package option is enabled (which implies that the hyperref package has been loaded), and to ⟨false⟩ otherwise.

\docsvfield{⟨field⟩}

Similar to the \docsvlist command from the etoolbox package, except that it takes a field name as its argument. The value of this field is parsed as a comma-separated list. If the ⟨field⟩ is undefined, this command expands to an empty string.

\forcsvfield{⟨handler⟩}{⟨field⟩}

Similar to the \forcsvlist command from the etoolbox package, except that it takes a field name as its argument. The value of this field is parsed as a comma-separated list. If the ⟨field⟩ is undefined, this command expands to an empty string.
\MakeCapital{⟨text⟩}

Similar to \MakeUppercase but only converts the first printable character in ⟨text⟩ to uppercase. Note that the restrictions that apply to \MakeUppercase also apply to this command. Namely, all commands in ⟨text⟩ must either be robust or prefixed with \protect since the ⟨text⟩ is expanded during capitalization. Apart from Ascii characters and the standard accent commands, this command also handles the active characters of the inputenc package as well as the shorthands of the babel package. If the ⟨text⟩ starts with a control sequence, nothing is capitalized. This command is robust.

\MakeSentenceCase{⟨text⟩}
\MakeSentenceCase{*}{⟨text⟩}

Converts its ⟨text⟩ argument to sentence case, i.e., the first word is capitalized and the remainder of the string is converted to lowercase. This command is robust. The starred variant differs from the regular version in that it considers the language of the entry, as specified in the hyphenation field. It only converts the ⟨text⟩ to sentence case if the hyphenation field is undefined or if it holds a language declared with \DeclareCaseLangs (see below).\footnote{By default, converting to sentence case is enabled for the following language identifiers: american, british, canadian, english, australian, newzealand as well as the aliases USenglish and UKenglish. Use \DeclareCaseLangs to extend or change this list.} Otherwise, the ⟨text⟩ is not altered in any way. It is recommended to use \MakeSentenceCase* rather than the regular variant in formatting directives. Both variants support the traditional BibTeX convention for bib files that anything wrapped in a pair of curly braces is not modified when changing the case. For example:

\MakeSentenceCase{an Introduction to LaTeX}
\MakeSentenceCase{an Introduction to \LaTeX}

would yield:

An introduction to latex
An introduction to La\TeX

In bib files designed with traditional BibTeX in mind, it has been fairly common to only wrap single letters in braces to prevent case-changing:

title = {An Introduction to \LaTeX}

The problem with this convention is that the braces will suppress the kerning on both sides of the enclosed letter. It is preferable to wrap the entire word in braces as shown in the first example.

\mkpageprefix{⟨pagination⟩}{⟨postpro⟩}{⟨text⟩}

This command is intended for use in field formatting directives which format the page numbers in the ⟨postnote⟩ argument of citation commands and the pages field of bibliography entries. It will parse its ⟨text⟩ argument and prefix it with ‘p.’ or ‘pp.’ by default. The optional ⟨pagination⟩ argument holds the name of a field in-
indicating the pagination type. This may be either pagination or bookpagination, with pagination being the default. The spacing between the prefix and the \text may be modified by redefining \ppspace. The default is an unbreakable interword space. See §§ 2.3.10 and 3.11.3 for further details. See also \DeclareNumChars, \DeclareRangeChars, \DeclareRangeCommands, and \NumCheckSetup. The optional \text argument specifies a macro to be used for post-processing the \text. If only one optional argument is given, it is taken as \text. Here are two typical examples:

\DeclareFieldFormat{postnote}{\mkpageprefix[pagination]{#1}}
\DeclareFieldFormat{pages}{\mkpageprefix[bookpagination]{#1}}

The optional argument pagination in the first example is omissible.

\mkpagetotal[\text]

This command is similar to \mkpageprefix except that it is intended for the pagetotal field of bibliography entries, i.e., it will print “123 pages” rather than “page 123”. The optional \text argument defaults to bookpagination. The spacing inserted between the pagination suffix and the \text may be modified by redefining the macro \ppspace. The optional \text argument specifies a macro to be used for post-processing the \text. If only one optional argument is given, it is taken as \text. Here is a typical example:

\DeclareFieldFormat{pagetotal}{\mkpagetotal[bookpagination]{#1}}

The optional argument bookpagination is omissible in this case.

\mkcomprange[\text]
\mkcomprange*[\text]

This command, which is intended for use in field formatting directives, will parse its \text argument for page ranges and compress them. For example, “125–129” may be formatted as “125–9”. You may configure the behavior of \mkcomprange by adjusting the LaTeX counters mincomprange, maxcomprange, and mincompwidth,
as illustrated in table 8. The default settings are 10, 100000, and 1, respectively. This means that the command tries to compress as much as possible by default. Use \setcounter to adjust the parameters. The scanner recognizes \bibrangedash and hyphens as range dashes. It will normalize the dash by replacing any number of consecutive hyphens with \bibrangedash. Lists of ranges delimited with commas and/or semicolons are also supported. If you want to hide a character from the list/range scanner for some reason, wrap the character or the entire string in curly braces. The optional \postpro argument specifies a macro to be used for post-processing the \text. This is important if you want to combine \mkcomprange with other formatting macros which also need to parse their \text argument, such as \mkpageprefix. Simply nesting these commands will not work as expected. Use the \postpro argument to set up the processing chain as follows:

\DeclareFieldFormat{postnote}{\mkcomprange[\mkpageprefix[\pagination]]\{#1\}}

Note that \mkcomprange is executed first, using \mkpageprefix as post-processor. Also note that the \postpro argument is wrapped in an additional pair of braces. This is only required in this particular case to prevent LaTeX’s optional argument scanner from getting confused by the nested brackets. The starred version of this command differs from the regular one in the way the \postpro argument is applied to a list of values. For example:

\mkcomprange\{5, 123-129, 423-439\}
\mkcomprange*\{5, 123-129, 423-439\}

will output:

pp. 5, 123-9, 423-39
p. 5, pp. 123-9, pp. 423-39

\mkfirstpage\{\mkpageprefix\}\{\text\}
\mkfirstpage*\{\mkpageprefix\}\{\text\}

This command, which is intended for use in field formatting directives, will parse its \text argument for page ranges and print the start page of the range only. The scanner recognizes \bibrangedash and hyphens as range dashes. Lists of ranges delimited with commas and/or semicolons are also supported. If you want to hide a character from the list/range scanner for some reason, wrap the character or the entire string in curly braces. The optional \postpro argument specifies a macro to be used for post-processing the \text. See \mkcomprange on how to use this argument. The starred version of this command differs from the regular one in the way the \postpro argument is applied to a list of values. For example:

\mkfirstpage\{\mkpageprefix\}\{5, 123-129, 423-439\}
\mkfirstpage*\{\mkpageprefix\}\{5, 123-129, 423-439\}

will output:

pp. 5, 123, 423
p. 5, p. 123, p. 423
\DeclareNumChars{⟨characters⟩}
\DeclareNumChars*{⟨characters⟩}

This command configures the \ifnumeral, \ifnumerals, and \ifpages tests from § 4.6.2. The setup will also affect \iffielldnum, \iffielldnums, \iffielldpages as well as \mkpageprefix and \mkpagetotal. The ⟨characters⟩ argument is an unlimited list of characters which are to be considered as being part of a number. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default setting is:

\DeclareNumChars{.}

This means that a (section or other) number like ‘3.4.5’ will be considered as a number. Note that Arabic and Roman numerals are detected by default, there is no need to declare them explicitly.

\DeclareRangeChars{⟨characters⟩}
\DeclareRangeChars*{⟨characters⟩}

This command configures the \ifnumerals and \ifpages tests from § 4.6.2. The setup will also affect \iffielldnums and \iffielldpages as well as \mkpageprefix and \mkpagetotal. The ⟨characters⟩ argument is an unlimited list of characters which are to be considered as range indicators. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default setting is:

\DeclareRangeChars{~,;-+/

This means that strings like ‘3–5’, ‘35+’, ‘8/9’ and so on will be considered as a range by \ifnumerals and \ifpages. See also §§ 2.3.10 and 3.11.3 for further details.

\DeclareRangeCommands{⟨commands⟩}
\DeclareRangeCommands*{⟨commands⟩}

This command is similar to \DeclareRangeChars, except that the ⟨commands⟩ argument is an unlimited list of commands which are to be considered as range indicators. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default list is rather long and should cover all common cases; here is a shorter example:

\DeclareRangeCommands{\&\bibrangedash\textendash\textemdash\psq\psqq}

See also §§ 2.3.10 and 3.11.3 for further details.

\DeclarePageCommands{⟨commands⟩}
\DeclarePageCommands*{⟨commands⟩}

This command is similar to \DeclareRangeCommands, except that it only affects the \ifpages and \iffielldpages tests but not \ifnumerals and \iffielldnums. The default setting is:

\DeclarePageCommands{\pno\ppno}
\NumCheckSetup{⟨code⟩}

Use this command to temporarily redefine any commands which interfere with the tests performed by \ifnumeral, \ifnumerals, and \ifpages from § 4.6.2. The setup will also affect \iffieldnum, \iffieldnums, \iffieldpages as well as \mkpageprefix and \mkpagetotal. The ⟨code⟩ will be executed in a group by these commands. Since the above mentioned commands will expand the string to be analyzed, it is possible to remove commands to be ignored by the tests by making them expand to an empty string. See also §§ 2.3.10 and 3.11.3 for further details.

\DeclareCaseLangs{⟨languages⟩}
\DeclareCaseLangs*{⟨languages⟩}

Defines the list of languages which are considered by the \MakeSentenceCase* command as it converts a string to sentence case. The ⟨languages⟩ argument is a comma-separated list of babel languages identifiers. The regular version of this command replaces the current setting, the starred version appends its argument to the current list. The default setting is:

\DeclareCaseLangs{%
    american,british,canadian,english,australian,newzealand,
    USenglish,UKenglish}

See the babel manual and table 1 for a list of languages identifiers.

\BibliographyWarning{⟨message⟩}

This command is similar to \PackageWarning but prints the entry key of the entry currently being processed in addition to the input line number. It may be used in the bibliography as well as in citation commands. If the ⟨message⟩ is fairly long, use \MessageBreak to include line breaks. Note that the standard \PackageWarning command does not provide a meaningful clue when used in the bibliography since the input line number is the line on which the \printbibliography command was given.

\RequireBiber[⟨severity⟩]

This command is intended for use in cbx/bbx files and in the @preamble of bib files. It checks the selected backend and warns if it is not Biber. The optional ⟨severity⟩ argument is an integer specifying the severity. The value 1 triggers an informational message stating that Biber is recommended; 2 triggers a warning stating that Biber is required and the style/bib file may not work properly; 3 triggers an error stating that Biber is strictly required and the style/bib file will not work at all with any other backend. If \RequireBiber is used multiple times, the highest ⟨severity⟩ takes precedence. cbx/bbx files on the one hand and the @preamble snippets of all bib files on the other are tracked seperately. If the optional ⟨severity⟩ argument is omitted, the default severity is 2 (warning).

\pagetrackertrue
\pagetrackerfalse

These commands activate or deactivate the citation tracker locally (this will affect the \iffirstonpage and \ifsamepage test from § 4.6.2). They are intended for
use in the definition of citation commands or anywhere in the document body. If a citation command is to be excluded from page tracking, use \pagetrackerfalse in the (precode) argument of \DeclareCiteCommand. See § 4.3.1 for details. Note that these commands have no effect if page tracking has been disabled globally.

\citetrackertrue
\citetrackerfalse

These commands activate or deactivate all citation trackers locally (this will affect the \ifciteseen, \ifentryseen, \ifciteibid, and \ifcitedem tests from § 4.6.2). They are intended for use in the definition of citation commands or anywhere in the document body. If a citation command is to be excluded from tracking, use \citetrackerfalse in the (precode) argument of \DeclareCiteCommand. See § 4.3.1 for details. Note that these commands have no effect if tracking has been disabled globally.

\backtrackertrue
\backtrackerfalse

These commands activate or deactivate the backref tracker locally. They are intended for use in the definition of citation commands or anywhere in the document body. If a citation command is to be excluded from backtracking, use \backtrackerfalse in the (precode) argument of \DeclareCiteCommand. Note that these commands have no effect if the backref option has been not been set globally.

4.7 Punctuation and Spacing

The \biblatex package provides elaborate facilities designed to manage and track punctuation and spacing in the bibliography and in citations. These facilities work on two levels. The high-level commands discussed in § 4.7.1 deal with punctuation and whitespace inserted by the bibliography style between the individual segments of a bibliography entry. The commands in §§ 4.7.2, 4.7.3, 4.7.4 work at a lower level. They use TeX’s space factor and modified space factor codes to track punctuation in a robust and efficient way. This way it is possible to detect trailing punctuation marks within fields, not only those explicitly inserted between fields. The same technique is also used for automatic capitalization of localization strings, see \DeclareCapitalPunctuation in § 4.7.5 as well as § 4.8 for details. Note that these facilities are only made available locally in citations and bibliographies. They will not affect any other part of a document.

4.7.1 Block and Unit Punctuation

The major segments of a bibliography entry are ‘blocks’ and ‘units’. A block is the larger segment of the two, a unit is shorter or at most equal in length. For example, the values of fields such as \texttt{title} or \texttt{note} usually form a unit which is separated from subsequent data by a period or a comma. A block may comprise several fields which are treated as separate units, for example publisher, location, and year. The segmentation of an entry into blocks and units is at the discretion of the bibliography style. An entry is segmented by inserting \texttt{\newblock} and \texttt{\newunit} commands at suitable places and \texttt{\finentry} at the very end (see § 4.2.3 for an example). See also § 4.11.7 for some practical hints.

\newblock

Records the end of a block. This command does not print anything, it merely marks the end of the block. The block delimiter \texttt{\newblockpunct} will be inserted by a sub-
sequent \printtext, \printfield, \printlist, \printnames, or \bibstring command. You may use \newblock at suitable places without having to worry about spurious blocks. A new block will only be started by the next \printfield (or similar) command if this command prints anything. See § 4.11.7 for further details.

\newunit Records the end of a unit and puts the default delimiter \newunitpunct in the punctuation buffer. This command does not print anything, it merely marks the end of the unit. The punctuation buffer will be inserted by the next \printtext, \printfield, \printlist, \printnames, or \bibstring command. You may use \newunit after commands like \printfield without having to worry about spurious punctuation and whitespace. The buffer will only be inserted by the next \printfield or similar command if both fields are non-empty. This also applies to \printtext, \printlist, \printnames, and \bibstring. See § 4.11.7 for further details.

\finentry Inserts \finentrypunct. This command should be used at the very end of every bibliography entry.

\setunit{⟨punctuation⟩}
\setunit*{⟨punctuation⟩}

The \setunit command is similar to \newunit except that it uses ⟨punctuation⟩ instead of \newunitpunct. The starred variant differs from the regular version in that it checks if the last \printtext, \printfield, \printlist, \printnames, or \bibstring command did actually print anything. If not, it does nothing.

\setpunctfont{⟨command⟩}

This command, which is intended for use in field formatting directives, provides an alternative way of dealing with unit punctuation after a field printed in a different font (for example, a title printed in italics). The standard LaTeX way of dealing with this is adding a small amount of space, the so-called italic correction. This command allows adapting the punctuation to the font of the preceding field. The ⟨command⟩ should be a text font command which takes one argument, such as \emph or \textbf. This command will only affect punctuation marks inserted by one of the commands from § 4.7.3. The font adaption is applied to the next punctuation mark only and will be reset automatically thereafter. If you want to reset it manually before it takes effect, issue \resetpunctfont. If the punctfont package option is disabled, this command does nothing. Note that the \mkbibemph and \mkbibbold wrappers from § 4.10.4 incorporate this feature by default.

\resetpunctfont

This command resets the unit punctuation font defined with \setpunctfont before it takes effect. If the punctfont package option is disabled, this command does nothing.

4.7.2 Punctuation Tests

The following commands may be used to test for preceding punctuation marks at any point in citations and the bibliography.
\ifpunct{⟨true⟩}{⟨false⟩}

Executes ⟨true⟩ if preceded by any punctuation mark except for an abbreviation dot, and ⟨false⟩ otherwise.

\ifterm{⟨true⟩}{⟨false⟩}

Executes ⟨true⟩ if preceded by a terminal punctuation mark, and ⟨false⟩ otherwise. A terminal punctuation mark is any punctuation mark which has been registered for automatic capitalization, either with \DeclareCapitalPunctuation or by default, see § 4.7.5 for details. By default, this applies to periods, exclamation marks, and question marks.

\ifpunctmark{⟨character⟩}{⟨true⟩}{⟨false⟩}

Executes ⟨true⟩ if preceded by the punctuation mark ⟨character⟩, and ⟨false⟩ otherwise. The ⟨character⟩ may be a comma, a semicolon, a colon, a period, an exclamation mark, a question mark, or an asterisk. Note that a period denotes an end-of-sentence period. Use the asterisk to test for the dot after an abbreviation. If this command is used in a formatting directive for name lists, i.e., in the argument to \DeclareNameFormat, the ⟨character⟩ may also be an apostrophe.

4.7.3 Adding Punctuation

The following commands are designed to prevent double punctuation marks. Bibliography and citation styles should always use these commands instead of literal punctuation marks. All \add... commands in this section automatically remove preceding whitespace with \unspace (see § 4.7.4). Note that the behavior of all \add... commands discussed below is the package default, which is restored whenever \biblatex switches languages. This behavior may be adjusted with \DeclarePunctuationPairs from § 4.7.5.

\adddot

Adds a period unless it is preceded by any punctuation mark. The purpose of this command is inserting the dot after an abbreviation. Any dot inserted this way is recognized as such by the other punctuation commands. This command may also be used to turn a previously inserted literal period into an abbreviation dot.

\addcomma

Adds a comma unless it is preceded by another comma, a semicolon, a colon, or a period.

\addsemicolon

Adds a semicolon unless it is preceded by a comma, another semicolon, a colon, or a period.

\addcolon

Adds a colon unless it is preceded by a comma, a semicolon, another colon, or a period.

\addperiod

Adds a period unless it is preceded by an abbreviation dot or any other punctuation mark. This command may also be used to turn a previously inserted literal period into an abbreviation dot.

\addexclam

Adds an exclamation mark unless it is preceded by any punctuation mark except for an abbreviation dot.
\texttt{\texttt{\textbackslash addquestion}} adds a question mark unless it is preceded by any punctuation mark except for an abbreviation dot.

\texttt{\texttt{\textbackslash isdot}} turns a previously inserted literal period into an abbreviation dot. In contrast to \texttt{\textbackslash adddot}, nothing is inserted if this command is not preceded by a period.

\texttt{\texttt{\textbackslash nopunct}} adds an internal marker which will cause the next punctuation command to print nothing.

\textbf{4.7.4 Adding Whitespace}

The following commands are designed to prevent spurious whitespace. Bibliography and citation styles should always use these commands instead of literal whitespace. In contrast to the commands in §§ 4.7.2 and 4.7.3, they are not restricted to citations and the bibliography but available globally.

\texttt{\texttt{\textbackslash unspace}} removes preceding whitespace, i.e., removes all skips and penalties from the end of the current horizontal list. This command is implicitly executed by all of the following commands.

\texttt{\texttt{\textbackslash addspace}} adds a breakable interword space.

\texttt{\texttt{\textbackslash addnbspace}} adds a non-breakable interword space.

\texttt{\texttt{\textbackslash addthinspace}} adds a breakable thin space.

\texttt{\texttt{\textbackslash addnbthinspace}} adds a non-breakable thin space. This is similar to \texttt{\textbackslash ,} and \texttt{\textbackslash thinspace}.

\texttt{\texttt{\textbackslash addlowpenspace}} adds a space penalized by the value of the \texttt{\texttt{lownamepenalty}} counter, see §§ 3.8.3 and 4.10.3 for details.

\texttt{\texttt{\textbackslash addhighpenspace}} adds a space penalized by the value of the \texttt{\texttt{highnamepenalty}} counter, see §§ 3.8.3 and 4.10.3 for details.

\texttt{\texttt{\textbackslash addlpthinspace}} similar to \texttt{\texttt{\textbackslash addlowpenspace}} but adds a breakable thin space.

\texttt{\texttt{\textbackslash addhpthinspace}} similar to \texttt{\texttt{\textbackslash addhighpenspace}} but adds a breakable thin space.

\texttt{\texttt{\textbackslash addabbrvspace}} adds a space penalized by the value of the \texttt{\texttt{abbrvpenalty}} counter, see §§ 3.8.3 and 4.10.3 for details.

\texttt{\texttt{\textbackslash addabthinspace}} similar to \texttt{\texttt{\textbackslash addabbrvspace}} but using a thin space.

\texttt{\texttt{\textbackslash adddotspace}} executes \texttt{\texttt{\textbackslash adddot}} and adds a space penalized by the value of the \texttt{\texttt{abbrvpenalty}} counter, see §§ 3.8.3 and 4.10.3 for details.

\texttt{\texttt{\textbackslash addslash}} adds a breakable slash. This command differs from the \texttt{\textbackslash slash} command in the \LaTeX{} kernel in that a linebreak after the slash is not penalized at all.

Note that the commands in this section implicitly execute \texttt{\texttt{\textbackslash unspace}} to remove spurious whitespace, hence they may be used to override each other. For example, you may use \texttt{\texttt{\textbackslash addnbspace}} to transform a previously inserted interword space into a non-breakable one and \texttt{\texttt{\textbackslash addspace}} to turn a non-breakable space into a breakable one.
4.7.5 Configuring Punctuation and Capitalization

The following commands configure various features related to punctuation and automatic capitalization.

\DeclareAutoPunctuation{⟨characters⟩}

This command defines the punctuation marks to be considered by the citation commands as they scan ahead for punctuation. Note that ⟨characters⟩ is an unlimited list of characters. Valid ⟨characters⟩ are period, comma, semicolon, colon, exclamation and question mark. The default setting is:

\DeclareAutoPunctuation{.,;:!?}

This definition is restored automatically whenever the autopunct package option is set to true. Executing \DeclareAutoPunctuation{} is equivalent to setting autopunct=false, i.e., it disables this feature.

\DeclareCapitalPunctuation{⟨characters⟩}

When \biblatex inserts localization strings, i.e., key terms such as ‘edition’ or ‘volume’, it automatically capitalizes them after terminal punctuation marks. This command defines the punctuation marks which will cause localization strings to be capitalized if one of them precedes a string. Note that ⟨characters⟩ is an unlimited list of characters. Valid ⟨characters⟩ are period, comma, semicolon, colon, exclamation and question mark. The package default is:

\DeclareCapitalPunctuation{.!?}

Using \DeclareCapitalPunctuation with an empty argument is equivalent to disabling automatic capitalization. Since this feature is language specific, this command must be used in the argument to \DefineBibliographyExtras (when used in the preamble) or \DeclareBibliographyExtras (when used in a localization module). See §§ 3.7 and 4.9 for details. By default, strings are capitalized after periods, exclamation marks, and question marks. All strings are generally capitalized at the beginning of a paragraph (in fact whenever TeX is in vertical mode).

\DeclarePunctuationPairs{⟨identifier⟩}{⟨characters⟩}

Use this command to declare valid pairs of punctuation marks. This will affect the punctuation commands discussed in § 4.7.3. For example, the description of \addcomma states that this command adds a comma unless it is preceded by another comma, a semicolon, a colon, or a period. In other words, commas after abbreviation dots, exclamation marks, and question marks are permitted. These valid pairs are declared as follows:

\DeclarePunctuationPairs{comma}{*!?}

The ⟨identifier⟩ selects the command to be configured. The identifiers correspond to the names of the punctuation commands from § 4.7.3 without the \add prefix, i.e., valid ⟨identifier⟩ strings are dot, comma, semicolon, colon, period, exclam, question. The ⟨characters⟩ argument is an unlimited list of punctuation marks.
Valid \textit{(characters)} are comma, semicolon, colon, period, exclamation mark, question mark, and asterisk. A period in the \textit{(characters)} argument denotes an end-of-sentence period, an asterisk the dot after an abbreviation. This is the default setup, which is automatically restored whenever bibliography switches languages and corresponds to the behavior described in § 4.7.3:

\begin{verbatim}
\DeclarePunctuationPairs{dot}{}
\DeclarePunctuationPairs{comma}{*!?}
\DeclarePunctuationPairs{semicolon}{*!?}
\DeclarePunctuationPairs{colon}{*!?}
\DeclarePunctuationPairs{period}{}
\DeclarePunctuationPairs{exclam}{*}
\DeclarePunctuationPairs{question}{*}
\end{verbatim}

Since this feature is language specific, \texttt{\DeclarePunctuationPairs} must be used in the argument to \texttt{\DefineBibliographyExtras} (when used in the preamble) or \texttt{\DeclareBibliographyExtras} (when used in a localization module). See §§ 3.7 and 4.9 for details. Note that some localization modules may use a setup which is different from the package default.\footnote{As of this writing, the \texttt{american} module uses different settings for 'American-style' punctuation.}

\texttt{\DeclareQuotePunctuation\{ \textit{(characters)} \}}

This command controls 'American-style' punctuation. The \texttt{\mkbibquote} wrapper from § 4.10.4 can interact with the punctuation facilities discussed in §§ 4.7.1, 4.7.3, 4.7.4. Punctuation marks after \texttt{\mkbibquote} will be moved inside the quotes if they have been registered with \texttt{\DeclareQuotePunctuation}. Note that \textit{(characters)} is an undelimited list of characters. Valid \textit{(characters)} are period, comma, semicolon, colon, exclamation and question mark. Here is an example:

\begin{verbatim}
\DeclareQuotePunctuation{.,}
\end{verbatim}

Executing \texttt{\DeclareQuotePunctuation\{\}} is equivalent to disabling this feature. This is the package default. Since this feature is language specific, this command must be used in the argument to \texttt{\DefineBibliographyExtras} (when used in the preamble) or \texttt{\DeclareBibliographyExtras} (when used in a localization module). See §§ 3.7 and 4.9 for details. See also § 3.9.1.

\texttt{\uspunctuation} A shorthand using the lower-level commands \texttt{\DeclareQuotePunctuation} and \texttt{\DeclarePunctuationPairs} to activate 'American-style' punctuation. See § 3.9.1 for details. This shorthand is provided for convenience only. The effective settings are applied by the lower-level commands.

\texttt{\stdpunctuation} Undoes the settings applied by \texttt{\uspunctuation}, restoring standard punctuation. As standard punctuation is the default setting, you only need this command to override a previously executed \texttt{\uspunctuation} command. See § 3.9.1 for details.

4.7.6 Correcting Punctuation Tracking

The facilities for punctuation tracking and automatic capitalization are very reliable under normal circumstances, but there are always marginal cases which may
require manual intervention. Typical cases are localization strings printed as the
first word in a footnote (which is usually treated as the beginning of a paragraph as
far as capitalization is concerned, but TeX is not in vertical mode at this point) or
punctuation after periods which are not really end-of-sentence periods (for exam-
ple, after an ellipsis like “[...]” a command such as \addperiod would do nothing
since parentheses and brackets are transparent to the punctuation tracker). In such
cases, use the following commands in bibliography and citation styles to mark the
beginning or middle of a sentence if and where required:

\bibsentence This command marks the beginning of a sentence. A localization string immedi-
ately after this command will be capitalized and the punctuation tracker is reset,
i.e., this command hides all preceding punctuation marks from the punctuation
tracker and enforces capitalization.

\midsentence This command marks the middle of a sentence. A localization string immediately
after this command will not be capitalized and the punctuation tracker is reset,
i.e., this command hides all preceding punctuation marks from the punctuation
tracker and suppresses capitalization.

\midsentence* The starred variant of \midsentence differs from the regular one in that a preced-
ing abbreviation dot is not hidden from the the punctuation tracker, i.e., any code
after \midsentence* will see a preceding abbreviation dot. All other punctuation
marks are hidden from the punctuation tracker and capitalization is suppressed.

4.8 Localization Strings

Localization strings are key terms such as ‘edition’ or ‘volume’ which are automati-
cally translated by biblatex’s localization modules. See § 4.9 for an overview and
§ 4.9.2 for a list of all strings supported by default. The commands in this section
are used to print the localized term.

\bibstring\{⟨wrapper⟩\}\{⟨key⟩\}

Prints the localization string ⟨key⟩, where ⟨key⟩ is an identifier in lowercase letters
(see § 4.9.2). The string will be capitalized as required, see § 4.7.5 for details.
Depending on the abbreviate package option from § 3.1.2.1, \bibstring prints
the short or the long version of the string. If localization strings are nested, i.e.,
if \bibstring is used in another string, it will behave like \bibxstring. If the
⟨wrapper⟩ argument is given, the string is passed to the ⟨wrapper⟩ for formatting.
This is intended for font commands such as \emph.

\biblstring\{⟨wrapper⟩\}\{⟨key⟩\}

Similar to \bibstring but always prints the long string, ignoring the abbreviate
option.

\bibsstring\{⟨wrapper⟩\}\{⟨key⟩\}

Similar to \bibstring but always prints the short string, ignoring the abbreviate
option.
\bibcpstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibstring but the term is always capitalized.

\bibcplstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \biblstring but the term is always capitalized.

\bibcpsstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibsstring but the term is always capitalized.

\bibucstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibstring but the whole term is uppercased.

\bibuclstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \biblstring but the whole term is uppercased.

\bibucsstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibsstring but the whole term is uppercased.

\bibucstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibstring but the whole term is lowercased.

\bibuclstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \biblstring but the whole term is lowercased.

\bibucsstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibsstring but the whole term is lowercased.

\bibxstring\{\langle key\rangle\}

A simplified but expandable version of \bibstring. Note that this variant does not capitalize automatically, nor does it hook into the punctuation tracker. It is intended for special cases in which strings are nested or an expanded localization string is required in a test.

\bibxstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibxstring but always uses the long string, ignoring the abbreviate option.

\bibxsstring\{\langle wrapper\rangle\}\{\langle key\rangle\}

Similar to \bibxstring but always uses the short string, ignoring the abbreviate option.

4.9 Localization Modules

A localization module provides translations for key terms such as ‘edition’ or ‘volume’ as well as definitions for language specific features such as the date format and ordinals. These definitions are provided in files with the suffix 1bx. The base
name of the file must be a language name known to the babel package. The 1bx files may also be used to map babel's language names to the backend modules of the biblatex package. All localization modules are loaded on demand in the document body. Note that the contents of the file are processed in a group and that the category code of the character @ is temporarily set to 'letter'.

### 4.9.1 Localization Commands

The user-level versions of the localization commands were already introduced in § 3.7. When used in 1bx files, however, the syntax of localization commands is different from the user syntax in the preamble and the configuration file. When used in localization files, there is no need to specify the ⟨language⟩ because the mapping of strings to a language is already provided by the name of the 1bx file.

\begin{verbatim}
\DeclareBibliographyStrings{⟨definitions⟩}
\end{verbatim}

This command is only available in 1bx files. It is used to define localization strings. The ⟨definitions⟩ consist of ⟨key⟩=⟨value⟩ pairs which assign an expression to an identifier. A complete list of all keys supported by default is given is § 4.9.2. Note that the syntax of the value is different in 1bx files. The value assigned to a key consists of two expressions, each of which is wrapped in an additional pair of brackets. This is best shown by example:

\begin{verbatim}
\DeclareBibliographyStrings{%
  bibliography = {{Bibliography}{Bibliography}},
  shorthands = {{List of Abbreviations}{Abbreviations}},
  editor = {{editor}{ed.}},
  editors = {{editors}{eds.}},
}
\end{verbatim}

The first value is the long, written out expression, the second one is an abbreviated or short form. Both strings must always be given even though they may be identical if an expression is always (or never) abbreviated. Depending on the setting of the abbreviate package option (see § 3.1.2.1), biblatex selects one expression when loading the 1bx file. There is also a special key named inherit which copies the strings from a different language. This is intended for languages which only differ in a few expressions, such as German and Austrian or American and British English. For example, here are the complete definitions for Austrian:

\begin{verbatim}
\DeclareBibliographyStrings{%
  inherit = {german},
  january = {{J"anner}{J"an.}},
}
\end{verbatim}

The above examples are slightly simplified. Real localization files should use the punctuation and formatting commands discussed in §§ 4.7.3 and 3.8 instead of literal punctuation. Here is an excerpt from a real localization file:

\begin{verbatim}
bibliography = {{Bibliography}{Bibliography}},
shorthands = {{List of Abbreviations}{Abbreviations}},
editor = {{editor}{ed\adddot}},
editors = {{editors}{eds\adddot}},
\end{verbatim}
byeditor = {{edited by}\addspace by}},
mathesis = {{Master's thesis}\addspace \textsc{MA} thesis}},

Note the handling of abbreviation dots, the spacing in abbreviated expressions, and the capitalization in the example above. All expressions should be capitalized as they usually are when used in the middle of a sentence. The \textsc{biblatex} package will automatically capitalize the first word when required at the beginning of a sentence, see \texttt{\DeclareCapitalPunctuation} in § 4.7.5 for details. Expressions intended for use in headings are special. They should be capitalized in a way that is suitable for titling and should not be abbreviated (but they may have a short form).

\texttt{\textbackslash InheritBibliographyStrings}\{\langle language\rangle\} \texttt{\textbackslash DeclareBibliographyExtras}\{\langle code\rangle\}

This command is only available in \texttt{1bx} files. It copies the localization strings for \langle language\rangle to the current language, as specified by the name of the \texttt{1bx} file.

\texttt{\textbackslash UndeclareBibliographyExtras}\{\langle code\rangle\}

This command is only available in \texttt{1bx} files. It is used to restore any formatting commands modified with \texttt{\DeclareBibliographyExtras}. If a redefined command is included in § 4.10.2, there is no need to restore its previous definition since these commands are localized by all language modules anyway.

\texttt{\textbackslash InheritBibliographyExtras}\{\langle language\rangle\}

This command is only available in \texttt{1bx} files. It copies the bibliography extras for \langle language\rangle to the current language, as specified by the name of the \texttt{1bx} file.

\texttt{\textbackslash DeclareHyphenationExceptions}\{\langle text\rangle\}

This command corresponds to \texttt{\DeclareHyphenationExceptions} from § 3.7. The difference is that it is only available in \texttt{1bx} files and that the \langle language\rangle argument is omitted. The hyphenation exceptions will affect the language of the \texttt{1bx} file currently being processed.

\texttt{\textbackslash DeclareRedundantLanguages}\{\langle language, language, ...\rangle\}\{\langle babel, babel, ...\rangle\}

This command provides the language mappings required by the \texttt{clearlang} option from § 3.1.2.1. The \langle language\rangle is the string given in the language field (without the optional \texttt{lang} prefix); \langle babel\rangle is babel\textquotesingle s language identifier, as given in the optional argument of \texttt{\usepackage} when loading babel. This command may be used in \texttt{1bx} files or in the document preamble. Here are some examples:

\texttt{\textbackslash DeclareRedundantLanguages}\{french\}\{french\}
\texttt{\textbackslash DeclareRedundantLanguages}\{german\}\{german, \textsc{n}german, \textsc{a}ustrian, \textsc{n}austrian\}
\DeclareRedundantLanguages{english,american}{english,american,british,canadian,austalian,newzealand,USenglish,UKenglish}

Note that this feature needs to be enabled globally with the clearlang option from § 3.1.2.1. If it is disabled, all mappings will be ignored. If the \langle babel\rangle parameter is blank, \biblatex will clear the mappings for the corresponding \langle language\rangle, i.e., the feature will be disabled for this \langle language\rangle only.

\DeclareLanguageMapping{\langle language\rangle}{\langle file\rangle}

This command maps a babel language identifier to an lbx file. The \langle language\rangle must be a language name known to the babel package, i.e., one of the identifiers listed in table 1. The \langle file\rangle argument is the name of an alternative lbx file without the .lbx suffix. Declaring the same mapping more than once is possible. Subsequent declarations will simply overwrite any previous ones. This command may only be used in the preamble. See § 4.11.8 for further details.

\NewBibliographyString{\langle key\rangle}

This command, which may be used in the preamble (including cbx and bbx files) as well as in lbx files, declares new localization strings, i.e., it initializes a new \langle key\rangle to be used in the \langle definitions\rangle of \DefineBibliographyStrings. The \langle key\rangle argument may also be a comma-separated list of key names. The keys listed in § 4.9.2 are defined by default.

4.9.2 Localization Keys

The localization keys in this section are defined by default and covered by the localization files which come with \biblatex. Note that these strings are only available in citations, the bibliography, and the list of shorthands. All expressions should be capitalized as they usually are when used in the middle of a sentence. \biblatex will capitalize them automatically at the beginning of a sentence. The only exceptions to these rules are the three strings intended for use in headings.

4.9.2.1 Headings

The following strings are special because they are intended for use in headings and made available globally via macros. For this reason, they should be capitalized for use in headings and they must not include any local commands which are part of \biblatex’s author interface.

\begin{itemize}
  \item bibliography
  \item references
  \item shorthands
\end{itemize}

The term ‘bibliography’, also available as \bibname.
The term ‘references’, also available as \refname.
The term ‘list of shorthands’ or ‘list of abbreviations’, also available as \losname.

4.9.2.2 Roles, Expressed as Functions

The following keys refer to roles which are expressed as a function (‘editor’, ‘translator’) rather than as an action (‘edited by’, ‘translated by’).

\begin{itemize}
  \item editor
\end{itemize}

The term ‘editor’, referring to the main editor. This is the most generic editorial role.
The plural form of editor. The term ‘compiler’, referring to an editor whose task is to compile a work. The plural form of compiler. The term ‘founder’, referring to a founding editor. The plural form of founder. An expression like ‘continuator’, ‘continuation’, or ‘continued’, referring to a past editor who continued the work of the founding editor but was subsequently replaced by the current editor. The plural form of continuator. The term ‘redactor’, referring to a secondary editor. The plural form of redactor. The term ‘reviser’, referring to a secondary editor. The plural form of reviser. A term like ‘collaborator’, ‘collaboration’, ‘cooperator’, or ‘cooperation’, referring to a secondary editor. The plural form of collaborators. The term ‘translator’. The plural form of translators. The term ‘commentator’, referring to the author of a commentary to a work. The plural form of commentators. The term ‘annotator’, referring to the author of annotations to a work. The plural form of annotators.

### 4.9.2.3 Concatenated Editor Roles, Expressed as Functions

The following keys are similar in function to editor, translator, etc. They are used to indicate additional roles of the editor, e.g., ‘editor and translator’, ‘editor and foreword’.

- **editortr** Used if editor/translator are identical.
- **editorstr** The plural form of editortr.
- **editorco** Used if editor/commentator are identical.
- **editorsto** The plural form of editorco.
- **editoran** Used if editor/annotator are identical.
- **editorson** The plural form of editoran.
- **editorin** Used if editor/introduction are identical.
- **editorsin** The plural form of editorin.
- **editorfo** Used if editor/foreword are identical.
- **editorsfo** The plural form of editorfo.
- **editoraf** Used if editor/aftword are identical.
- **editorsaf** The plural form of editoraf.

Keys for editor/translator/⟨role⟩ combinations:

- **editortrco** Used if editor/translator/commentator are identical.
- **editorstrco** The plural form of editortrco.
- **editortrtran** Used if editor/translator/annotator are identical.
- **editorstrtran** The plural form of editorstrtran.
The following keys are similar in function to editor. They are used to indicate additional roles of the editor, e.g., 'editor and commentator', 'editor and introduction'.

Keys for editor/translator/⟨role⟩ combinations:

- editortrco Used if editor/translator/⟨role⟩ are identical.
- translatorsco The plural form of editortrco.

Keys for editor/annotator/⟨role⟩ combinations:

- editorannt Used if editor/annotator/⟨role⟩ are identical.
- editorsannt The plural form of editorannt.

Keys for editor/translator/commentator/⟨role⟩ combinations:

- editortrcoin Used if editor/translator/commentator/⟨role⟩ are identical.
- editorstrcoin The plural form of editortrcoin.

Keys for editor/annotator/commentator/⟨role⟩ combinations:

- editortranin Used if editor/annotator/commentator/⟨role⟩ are identical.
- editorstranin The plural form of editortranin.

4.9.2.4 Concatenated Translator Roles, Expressed as Functions

The following keys are similar in function to translator. They are used to indicate additional roles of the translator, e.g., 'translator and commentator', 'translator and introduction'.

- translatorco Used if translator/commentator are identical.
- translatorsco The plural form of translatorco.
translatoran Used if translator/annotator are identical.
translatorsan The plural form of translatoran.
translatorin Used if translator/introduction are identical.
translatorsin The plural form of translatorin.
translatorfo Used if translator/foreword are identical.
translatorsfo The plural form of translatorfo.
translatoraf Used if translator/aftword are identical.
translatorsaf The plural form of translatoraf.

Keys for translator/commentator/⟨role⟩ combinations:
translatorcoin Used if translator/commentator/introduction are identical.
translatorscoin The plural form of translatorcoin.
translatorcofo Used if translator/commentator/foreword are identical.
translatorscofo The plural form of translatorcofo.
translatorcoaf Used if translator/commentator/aftword are identical.
translatorscoaf The plural form of translatorcoaf.

Keys for translator/annotator/⟨role⟩ combinations:
translatoranin Used if translator/annotator/introduction are identical.
translatorsanin The plural form of translatoranin.
translatoranfo Used if translator/annotator/foreword are identical.
translatorsanfo The plural form of translatoranfo.
translatoranaf Used if translator/annotator/aftword are identical.
translatorsanaf The plural form of translatoranaf.

4.9.2.5 Roles, Expressed as Actions

The following keys refer to roles which are expressed as an action (‘edited by’, ‘translated by’) rather than as a function (‘editor’, ‘translator’).

byauthor The expression ‘[created] by ⟨name⟩’.
byeditor The expression ‘edited by ⟨name⟩’.
bycompiler The expression ‘compiled by ⟨name⟩’.
byfounder The expression ‘founded by ⟨name⟩’.
bycontinuator The expression ‘continued by ⟨name⟩’.
byredactor The expression ‘redacted by ⟨name⟩’.
byreviser The expression ‘revised by ⟨name⟩’.
bycollaborator An expression like ‘in collaboration with ⟨name⟩’ or ‘in cooperation with ⟨name⟩’.
bytranslator The expression ‘translated by ⟨name⟩’ or ‘translated from ⟨language⟩ by ⟨name⟩’.
bycommentator The expression ‘commented by ⟨name⟩’.
byannotator The expression ‘annotated by ⟨name⟩’.

4.9.2.6 Concatenated Editor Roles, Expressed as Actions

The following keys are similar in function to byeditor, bytranslator, etc. They are used to indicate additional roles of the editor, e.g., ‘edited and translated by’, ‘edited and furnished with an introduction by’, ‘edited, with a foreword, by’.

byeditortr Used if editor/translator are identical.
4.9.2.7 Concatenated Translator Roles, Expressed as Actions

The following keys are similar in function to bytranslator. They are used to indicate additional roles of the translator, e.g., 'translated and commented by', 'translated and furnished with an introduction by', 'translated, with a foreword, by'.
4.9.2.8 Roles, Expressed as Objects

Roles which are related to supplementary material may also be expressed as objects ('with a commentary by') rather than as functions ('commentator') or as actions ('commented by').

withcommentator The expression 'with a commentary by ⟨name⟩'.
withannotator The expression 'with annotations by ⟨name⟩'.
withintroduction The expression 'with an introduction by ⟨name⟩'.
withforeword The expression 'with a foreword by ⟨name⟩'.
withafterword The expression 'with an afterword by ⟨name⟩'.

4.9.2.9 Supplementary Material

commentary The term 'commentary'.
annotations The term 'annotations'.
introduction The term 'introduction'.
foreword The term 'foreword'.
afterword The term 'afterword'.

4.9.2.10 Publication Details

volume The term 'volume', referring to a book.
volumes The plural form of volume.
journal The term 'volume', referring to a journal.
journals The term 'series', referring to a journal.
part The term 'part', referring to a part of a book or a periodical.
issue The term 'issue', referring to a periodical.
newseries The expression 'new series', referring to a journal.
oldseries The expression 'old series', referring to a journal.
edition The term 'edition'.
in The term 'in', referring to the title of a work published as part of another one, e. g., '⟨title of article⟩ in ⟨title of journal⟩'.
inseries The term 'in', as used in expressions like 'volume ⟨number⟩ in ⟨name of series⟩'.
ofseries The term 'of', as used in expressions like 'volume ⟨number⟩ of ⟨name of series⟩'.
outnumber The term 'number', referring to an issue of a journal.
chapter The term 'chapter', referring to a chapter in a book.
version The term 'version', referring to a revision number.
reprint The term 'reprint'.

179
reprintof The expression ‘reprint of ⟨title⟩’.
reprintas The expression ‘reprinted as ⟨title⟩’.

4.9.2.11 Publication State

inpreparation The expression ‘in preparation’ (the manuscript is being prepared for publication).
submitted The expression ‘submitted’ (the manuscript has been submitted to a journal or conference).
forthcoming The expression ‘forthcoming’ (the manuscript has been accepted by a press or journal).
inpress The expression ‘in press’ (the manuscript is fully copyedited and out of the author’s hands; it is in the final stages of the production process).

4.9.2.12 Pagination

page The term ‘page’.
pages The plural form of page.
column The term ‘column’, referring to a column on a page.
columns The plural form of column.
section The term ‘section’, referring to a document division (usually abbreviated as §).
sections The plural form of section (usually abbreviated as §§).
paragraph The term ‘paragraph’ (i.e., a block of text, not to be confused with section).
paragraphs The plural form of paragraph.
verse The term ‘verse’ as used when referring to a work which is cited by verse numbers.
verses The plural form of verse.
line The term ‘line’ as used when referring to a work which is cited by line numbers.
lines The plural form of line.

4.9.2.13 Types

The following keys are typically used in the type field of @thesis, @report, @misc, and other entries:

mathesis An expression equivalent to the term ‘Master’s thesis’.
techreport The term ‘technical report’.
resreport The term ‘research report’.
software The term ‘computer software’.
datacd The term ‘data CD’ or ‘CD-ROM’.
audiocd The term ‘audio CD’.

4.9.2.14 Miscellaneous

and The term ‘and’, as used in a list of authors or editors, for example.
andothers The expression ‘and others’ or ‘et alii’, used to mark the truncation of a name list.
andmore Like andothers but used to mark the truncation of a literal list.
4.9.2.15 Labels

The following strings are intended for use as labels, e.g., ‘Address: ⟨url⟩’ or ‘Abstract: ⟨abstract⟩’.

- **url**: The term ‘address’ in the sense of an internet address.
- **urlseen**: An expression like ‘accessed on ⟨date⟩’, ‘retrieved on ⟨date⟩’, ‘visited on ⟨date⟩’, referring to the access date of an online resource.
- **file**: The term ‘file’.
- **library**: The term ‘library’.
- **abstract**: The term ‘abstract’.
- **annotation**: The term ‘annotations’.

4.9.2.16 Citations

Traditional scholarly expressions used in citations:

- **idem**: The term equivalent to the Latin ‘idem’ (‘the same [person]’).
- **idemsf**: The feminine singular form of idem.
- **idemsm**: The masculine singular form of idem.
- **idemsn**: The neuter singular form of idem.
- **idempf**: The feminine plural form of idem.
- **idempm**: The masculine plural form of idem.
- **idempn**: The neuter plural form of idem.
- **idempm**: The plural form of idem suitable for a mixed gender list of names.
- **ibidem**: The term equivalent to the Latin ‘ibidem’ (‘in the same place’).
- **opcit**: The term equivalent to the Latin term ‘opere citato’ (‘[in] the work [already] cited’).
- **loccit**: The term equivalent to the Latin term ‘loco citato’ (‘[at] the place [already] cited’).
- **confer**: The term equivalent to the Latin ‘confer’ (‘compare’).
- **sequens**: The term equivalent to the Latin ‘sequens’ (‘[and] the following [page]’), as used to indicate a range of two pages when only the starting page is provided (e.g., ‘25 sq.’ or ‘25 f.’ instead of ‘25–26’).
- **sequentess**: The term equivalent to the Latin ‘sequentess’ (‘[and] the following [pages]’), as used to indicate an open-ended range of pages when only the starting page is provided (e.g., ‘25 sqq.’ or ‘25 ff.’).
- **passim**: The term equivalent to the Latin ‘passim’ (‘throughout’, ‘here and there’, ‘scatteredly’).

Other expressions frequently used in citations:

- **see**: The term ‘see’.
- **seealso**: The expression ‘see also’.
- **seenote**: An expression like ‘see note ⟨footnote⟩’ or ‘as in ⟨footnote⟩’, used to refer to a previous footnote in a citation.
- **backrefpage**: An expression like ‘see page ⟨page⟩’ or ‘cited on page ⟨page⟩’, used to introduce back references in the bibliography.
The plural form of \texttt{backrefpage}, e.g., ‘see pages \langle pages \rangle’ or ‘cited on pages \langle pages \rangle’.

\texttt{quotedin} An expression like ‘quoted in \langle citation \rangle’, used when quoting a passage which was already a quotation in the cited work.

\texttt{citedas} An expression like ‘henceforth cited as \langle shorthand \rangle’, used to introduce a shorthand in a citation.

\texttt{thiscite} The expression used in some verbose citation styles to differentiate between the page range of the cited item (typically an article in a journal, collection, or conference proceedings) and the page number the citation refers to. For example: “Author, Title, in: Book, pp. 45–61, \texttt{thiscite} p. 52.”

\texttt{4.9.2.17 Month Names}

\texttt{january} The name ‘January’.
\texttt{february} The name ‘February’.
\texttt{march} The name ‘March’.
\texttt{april} The name ‘April’.
\texttt{may} The name ‘May’.
\texttt{june} The name ‘June’.
\texttt{july} The name ‘July’.
\texttt{august} The name ‘August’.
\texttt{september} The name ‘September’.
\texttt{october} The name ‘October’.
\texttt{november} The name ‘November’.
\texttt{december} The name ‘December’.

\texttt{4.9.2.18 Language Names}

\texttt{langamerican} The language ‘American’ or ‘American English’.
\texttt{langbrazilian} The language ‘Brazilian’ or ‘Brazilian Portuguese’.
\texttt{langcroatian} The language ‘Croatian’.
\texttt{langdanish} The language ‘Danish’.
\texttt{langdutch} The language ‘Dutch’.
\texttt{langenglish} The language ‘English’.
\texttt{langfinnish} The language ‘Finnish’.
\texttt{langfrench} The language ‘French’.
\texttt{langgerman} The language ‘German’.
\texttt{langgreek} The language ‘Greek’.
\texttt{langitalian} The language ‘Italian’.
\texttt{langlatin} The language ‘Latin’.
\texttt{langnorwegian} The language ‘Norwegian’.
\texttt{langportuguese} The language ‘Portuguese’.
\texttt{langrussian} The language ‘Russian’.
\texttt{langspanish} The language ‘Spanish’.
\texttt{langswedish} The language ‘Swedish’.

The following strings are intended for use in phrases like ‘translated from [the] English by \langle translator \rangle’:

182
Country names are localized by using the string country plus the iso-3166 country code as the key. The short version of the translation should be the iso-3166 country code. Note that only a small number of country names is defined by default, mainly to illustrate this scheme. These keys are used in the location list of @patent entries but they may be useful for other purposes as well.

- **countryde**: The name ‘Germany’, abbreviated as DE.
- **countryeu**: The name ‘European Union’, abbreviated as EU.
- **countryp**: Similar to countryeu but abbreviated as EP. This is intended for patent entries.
- **countryfr**: The name ‘France’, abbreviated as FR.
- **countryuk**: The name ‘United Kingdom’, abbreviated (according to iso-3166) as GB.
- **countryus**: The name ‘United States of America’, abbreviated as US.

Strings related to patents are localized by using the term patent plus the iso-3166 country code as the key. Note that only a small number of patent keys is defined by default, mainly to illustrate this scheme. These keys are used in the type field of @patent entries.

- **patent**: The generic term ‘patent’.
- **patentde**: The expression ‘German patent’.
- **patenteu**: The expression ‘European patent’.
- **patentfr**: The expression ‘French patent’.
- **patentuk**: The expression ‘British patent’.
- **patentus**: The expression ‘U.S. patent’.

Patent requests are handled in a similar way, using the string patreq as the base name of the key:
The generic term ‘patent request’.

The expression ‘German patent request’.

The expression ‘European patent request’.

The expression ‘French patent request’.

The expression ‘British patent request’.

The expression ‘U.S. patent request’.

### 4.10 Formatting Commands

This section corresponds to § 3.8 in the user part of this manual. Bibliography and citation styles should incorporate the commands and facilities discussed in this section in order to provide a certain degree of high-level configurability. Users should not be forced to write new styles if all they want to do is modify the spacing in the bibliography or the punctuation used in citations.

#### 4.10.1 User-definable Commands and Hooks

This section corresponds to § 3.8.1 in the user part of the manual. The commands and hooks discussed here are meant to be redefined by users, but bibliography and citation styles may provide a default definition which is different from the package default. These commands are defined in biblatex.def. Note that all commands starting with \mk... take one mandatory argument.

- \bibnamedelima: This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically by the backend after the first name element if the element is less than three characters long and before the last element. The default definition is \addhighpenspace, i.e., a space penalized by the value of the highnamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

- \bibnamedelimb: This delimiter controls the spacing between the elements which make up a name part. It is inserted automatically by the backend between all name elements where \bibnamedelima does not apply. The default definition is \addlowpenspace, i.e., a space penalized by the value of the lownamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

- \bibnamedelimc: This delimiter controls the spacing between name parts. The default name formats use it between the name prefix and the last name if useprefix=true. The default definition is \addhighpenspace, i.e., a space penalized by the value of the highnamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

- \bibnamedelimd: This delimiter controls the spacing between name parts. The default name formats use it between all name parts where \bibnamedelimc does not apply. The default definition is \addlowpenspace, i.e., a space penalized by the value of the lownamepenalty counter (§ 3.8.3). Please refer to § 3.11.4 for further details.

- \bibnamedelimi: This delimiter replaces \bibnamedelima/b after initials. Note that this only applies to initials given as such in the bib file, not to the initials automatically generated by biblatex which use their own set of delimiters.

- \bibinitperiod: The punctuation inserted automatically by the backend after all initials unless
\binithyphendelim applies. The default definition is a period (\adddot). Please refer to § 3.11.4 for further details.

\bibinitdelim The spacing inserted automatically by the backend between multiple initials unless \binithyphendelim applies. The default definition is an unbreakable interword space. Please refer to § 3.11.4 for further details.

\binithyphendelim The punctuation inserted automatically by the backend between the initials of hyphenated name parts, replacing \bibinitperiod and \bibinitdelim. The default definition is a period followed by an unbreakable hyphen. Please refer to § 3.11.4 for further details.

\bibindexnamedelima Replaces \bibnamedelima in the index.
\bibindexnamedelimb Replaces \bibnamedelimb in the index.
\bibindexnamedelimc Replaces \bibnamedelimc in the index.
\bibindexnamedelimd Replaces \bibnamedelimd in the index.
\bibindexnamedelimi Replaces \bibnamedelimi in the index.
\bibindexinitperiod Replaces \bibinitperiod in the index.
\bibindexinitdelim Replaces \bibinitdelim in the index.
\bibindexinithyphendelim Replaces \binithyphendelim in the index.

\bibnamedash The dash to be used as a replacement for recurrent authors or editors in the bibliography. The default is an ‘em’ or an ‘en’ dash, depending on the indentation of the list of references.

\labelnamepunct The separator to be printed after the name used for alphabetizing in the bibliography (author or editor, if the author field is undefined). Use this separator instead of \newunitpunct at this location. The default is \newunitpunct, i.e., it is not handled differently from regular unit punctuation but permits convenient reconfiguration.

\subtitlepunct The separator to be printed between the fields title and subtitle, booktitle and booksubtitle, as well as maintitle and mainsubtitle. Use this separator instead of \newunitpunct at this location. The default is \newunitpunct, i.e., it is not handled differently from regular unit punctuation but permits convenient reconfiguration.

\intitlepunct The separator to be printed between the word “in” and the following title in entry types such as @article, @inbook, @incollection, etc. Use this separator instead of \newunitpunct at this location. The default definition is a colon plus an interword space.

\bibpagespunct The separator to be printed before the pages field. Use this separator instead of \newunitpunct at this location. The default is a comma plus an interword space.

\bibpagerefpunct The separator to be printed before the pageref field. Use this separator instead of \newunitpunct at this location. The default is an interword space.
\multinamedelim The delimiter to be printed between multiple items in a name list like author or editor if there are more than two names in the list. If there are only two names in the list, use the \finalnamedelim instead. This command should be incorporated in all formatting directives for name lists.

\finalnamedelim Use this command instead of \multinamedelim before the final name in a name list.

\revsdnamedelim The extra delimiter to be printed after the first name in a name list (in addition to \finalnamedelim) if the first name is reversed. This command should be incorporated in all formatting directives for name lists.

\andothersdelim The delimiter to be printed before the localization string 'and others' if a name list like author or editor is truncated. This command should be incorporated in all formatting directives for name lists.

\multilistdelim The delimiter to be printed between multiple items in a literal list like publisher or location if there are more than two names in the list. If there are only two items in the list, use the \finallistdelim instead. This command should be incorporated in all formatting directives for literal lists.

\finallistdelim Use this command instead of \multilistdelim before the final item in a literal list.

\andmoredelim The delimiter to be printed before the localization string 'and more' if a literal list like publisher or location is truncated. This command should be incorporated in all formatting directives for literal lists.

\multicitedelim The delimiter printed between citations if multiple entry keys are passed to a single citation command. This command should be incorporated in the definition of all citation commands, for example in the \langle sepcode \rangle argument passed to \DeclareCiteCommand. See § 4.3.1 for details.

\supercitedelim Similar to \multinamedelim, but intended for the \supercite command only.

\compcitedelim Similar to \multicitedelim, but intended for citation styles which 'compress' multiple citations, i.e., print the author only once if subsequent citations share the same author etc.

\nametitledelim The delimiter to be printed between the author/editor and the title. This command should be incorporated in the definition of all citation commands of author-title and some verbose citation styles.

\nameyeardelim The delimiter to be printed between the author/editor and the year. This command should be incorporated in the definition of all citation commands of author-year citation styles.

\volcitedelim The delimiter to be printed between the volume portion and the page/text portion of \volcite and related commands (§ 3.6.6).

\prenotedelim The delimiter to be printed after the \langle prenote \rangle argument of a citation command.

\postnotedelim The delimiter to be printed after the \langle postnote \rangle argument of a citation command.
\mkbibnamelast{⟨text⟩}

Formatting hook for the last name, to be used in all formatting directives for name lists.

\mkbibnamefirst{⟨text⟩}

Similar to \mkbibnamelast, but intended for the first name.

\mkbibnameprefix{⟨text⟩}

Similar to \mkbibnamelast, but intended for the name prefix.

\mkbibnameaffix{⟨text⟩}

Similar to \mkbibnamelast, but intended for the name affix.

### 4.10.2 Language-specific Commands

This section corresponds to § 3.8.2 in the user part of the manual. The commands discussed here are usually handled by the localization modules, but may also be redefined by users on a per-language basis. Note that all commands starting with \mk... take one or more mandatory arguments.

\bibrangedash

The language specific range dash.

\bibdatedash

The language specific date range dash.

\mkbibdatelong

Takes the names of three field as arguments which correspond to three date components (in the order year/month/day) and uses their values to print the date in the language specific long date format.

\mkbibdateshort

Similar to \mkbibdatelong but using the language specific short date format.

\finalandcomma

Prints the comma to be inserted before the final 'and' in an enumeration, if applicable in the respective language.

\mkbibordinal{⟨integer⟩}

Takes an integer argument and prints it as an ordinal number.

\mkbibmascord{⟨integer⟩}

Similar to \mkbibordinal, but prints a masculine ordinal, if applicable in the respective language.

\mkbibfemord{⟨integer⟩}

Similar to \mkbibordinal, but prints a feminine ordinal, if applicable in the respective language.

\mkbibneutord{⟨integer⟩}

Similar to \mkbibordinal, but prints a neuter ordinal, if applicable in the respective language.

187
\mkbiboredition{⟨integer⟩}

Similar to \mkbibordinal, but intended for use with the term 'edition'.

\mkbiborderseries{⟨integer⟩}

Similar to \mkbibordinal, but intended for use with the term 'series'.

**4.10.3 User-definable Lengths and Counters**

This section corresponds to § 3.8.3 in the user part of the manual. The length registers and counters discussed here are meant to be altered by users. Bibliography and citation styles should incorporate them where applicable and may also provide a default setting which is different from the package default.

\bibhang

The hanging indentation of the bibliography. Bibliography styles should incorporate this length in the definition of the bibliography environment, if applicable.

\biblabelsep

The horizontal space between entries and their corresponding labels. Bibliography styles which use list environments and print a label should set \labelsep to \biblabelsep in the definition of the respective environment.

\bibitemsep

The vertical space between the individual entries in the bibliography. Bibliography styles using list environments should set \itemsep to \bibitemsep in the definition of the respective environment.

\bibparsep

The vertical space between paragraphs within an entry in the bibliography. Bibliography styles using list environments should set \parsep to \bibparsep in the definition of the respective environment.

\abbrvpenalty

The penalty used by \addabbrvspace, \addabthinspace, and \adddotspace, see § 4.7.4 for details.

\lownamepenalty

The penalty used by \addlowpenspace and \addlpthinspace, see § 4.7.4 for details.

\highnamepenalty

The penalty used by \addhighpenspace and \addhpthinspace, see § 4.7.4 for details.

\biburlnumpenalty

If this counter is set to a value greater than zero, \biblatex will permit linebreaks after numbers in all strings formatted with the \url command from the url package. This will affect urls and dois in the bibliography. The breakpoints will be penalized by the value of this counter. If urls and/or dois in the bibliography run into the margin, try setting this counter to a value greater than zero but less than 10000 (you normally want to use a high value like 9000). Setting the counter to zero disables this feature. This is the default setting.

\biburlucpenalty

Similar to \biburlnumpenalty, except that it will add a breakpoint after all uppercase letters.

\biburllcpenalty

Similar to \biburlnumpenalty, except that it will add a breakpoint after all lowercase letters.
4.10.4 Auxiliary Commands and Hooks

The auxiliary commands and facilities in this section serve a special purpose. Some of them are used by biblatex to communicate with bibliography and citation styles in some way or other.

\mkbibemph{(text)}

A generic command which prints its argument in italics. This is a simple wrapper around the standard \textit command. Apart from that, it uses \setpunctfont from § 4.7.1 to adapt the font of the next punctuation mark following the text set in italics. If the punctfont package option is disabled, this command behaves like \textit.

\mkbibbold{(text)}

Similar in concept to \mkbibemph but prints bold text. This is a simple wrapper around the standard \textbf command which incorporates \setpunctfont. If the punctfont package option is disabled, this command behaves like \textbf.

\mkbibquote{(text)}

A generic command which wraps its argument in quotation marks. If the csquotes package is loaded, this command uses the language sensitive quotation marks provided by that package. \mkbibquote also supports ‘American-style’ punctuation, see \DeclareQuotePunctuation in § 4.7.5 for details.

\mkbibparens{(text)}

A generic command which wraps its argument in parentheses. This command is nestable. When nested, it will alternate between parentheses and brackets, depending on the nesting level.

\mkbibbrackets{(text)}

A generic command which wraps its argument in square brackets. This command is nestable. When nested, it will alternate between brackets and parentheses, depending on the nesting level.

\bibopenparen{text}\bibcloseparen

Alternative syntax for \mkbibparens. This will also work across groups. Note that \bibopenparen and \bibcloseparen must always be balanced.

\bibopenbracket{text}\bibclosebracket

Alternative syntax for \mkbibbrackets. This will also work across groups. Note that \bibopenbracket and \bibclosebracket must always be balanced.

\mkbibfootnote{(text)}

A generic command which prints its argument as a footnote. This is a wrapper around the standard LaTeX \footnote command which removes spurious whitespace preceeding the footnote mark and prevents nested footnotes. By default,
\mkbibfootnote requests capitalization at the beginning of the note and automatically adds a period at the end. You may change this behavior by redefining the \bibfootnotewrapper macro introduced below.

\mkbibfootnotetext{⟨text⟩}

Similar to \mkbibfootnote but uses the \footnotetext command.

\mkbibendnote{⟨text⟩}

Similar in concept to \mkbibfootnote except that it prints its argument as an endnote. \mkbibendnote removes spurious whitespace preceeding the endnote mark and prevents nested notes. It supports the \endnote command provided by the endnotes package as well as the \pagernote command provided by the pagernote package and the memoir class. If both commands are available, \endnote takes precedence. If no endnote support is available, \mkbibendnote issues an error and falls back to \footnote. By default, \mkbibendnote requests capitalization at the beginning of the note and automatically adds a period at the end. You may change this behavior by redefining the \bibendnotewrapper macro introduced below.

\mkbibendnotetext{⟨text⟩}

Similar to \mkbibendnote but uses the \endnotetext command. Please note that as of this writing, neither the pagernote package nor the memoir class provide a corresponding \pagenotetext command. In this case, \mkbibendnote will issue an error and fall back to \footnotetext.

\bibfootnotewrapper{⟨text⟩}

An inner wrapper which encloses the ⟨text⟩ argument of \mkbibfootnote and \mkbibfootnotetext. For example, \mkbibfootnote eventually boils down to this:

\footnote{\bibfootnotewrapper{text}}

The wrapper ensures capitalization at the beginning of the note and adds a period at the end. The default definition is:

\newcommand{\bibfootnotewrapper}[1]{\bibsentence #1\addperiod}

If you don't want capitalization at the beginning or a period at the end of the note, do not modify \mkbibfootnote but redefine \bibfootnotewrapper instead.

\bibendnotewrapper{⟨text⟩}

Similar in concept to \bibfootnotewrapper but related to the \mkbibendnote and \mkbibendnotetext commands.

\mkbibsuperscript{⟨text⟩}

A generic command which prints its argument as superscripted text. This is a simple wrapper around the standard LaTeX \textsuperscript command which removes spurious whitespace and allows hyphenation of the preceeding word.
\mkbibmonth{⟨integer⟩}

This command takes an integer argument and prints it as a month name. Even though the output of this command is language specific, its definition is not, hence it is normally not redefined in localization modules.

\mkdatezeros{⟨integer⟩}

This command strips leading zeros from a number or preserves them, depending on the datezeros package option (§ 3.1.2.1). It is intended for use in the definition of date formatting macros.

\stripzeros{⟨integer⟩}

This command strips leading zeros from a number. It is intended for date formatting and ordinals.

shorthandwidth

A special field formatting directive which is used internally by biblatex. When the bibliographic data is read from the bbl file, biblatex measures the values of all shorthand fields and sets the length register \shorthandwidth to the width of the widest shorthand (see § 4.10.5). In order to determine the correct width, the package considers two factors: the definition of \bibfont and this formatting directive. All styles should adjust this directive such that it corresponds to the format used in the list of shorthands.

labelnumberwidth

Similar to shorthandwidth, but referring to the labelnumber field and the length register \labelnumberwidth. Numeric styles should adjust this directive such that it corresponds to the format used in the bibliography.

labelalphawidth

Similar to shorthandwidth, but referring to the labelalpha field and the length register \labelalphawidth. Alphabetic styles should adjust this directive such that it corresponds to the format used in the bibliography.

bibhyperref

A special formatting directive for use with \printfield and \printtext. This directive wraps its argument in a \bibhyperref command, see § 4.6.4 for details.

bibhyperlink

A special formatting directive for use with \printfield and \printtext. It wraps its argument in a \bibhyperlink command, see § 4.6.4 for details. The ⟨name⟩ argument passed to \bibhyperlink is the value of the entrykey field.

bibhypertarget

A special formatting directive for use with \printfield and \printtext. It wraps its argument in a \bibhypertarget command, see § 4.6.4 for details. The ⟨name⟩ argument passed to \bibhypertarget is the value of the entrykey field.

volcitepages

A special formatting directive which controls the format of the page/text portion in the argument of citation commands like \volcite.

volcitevolume

A special formatting directive which controls the format of the volume portion in the argument of citation commands like \volcite.

date

A special formatting directive which controls the format of \printdate (§ 4.4.1). Note that the date format (long/short etc.) is controlled by the package option
date from § 3.1.2.1. This formatting directive only controls additional formatting such as fonts etc.

\urldate Similar to date but controls the format of \printurldate.

\origdate Similar to date but controls the format of \printorigdate.

\eventdate Similar to date but controls the format of \printeventdate.

4.10.5 Auxiliary Lengths, Counters, and Other Features

The length registers and counters discussed here are used by \biblatex to pass information to bibliography and citation styles. Think of them as read-only registers. Note that all counters are LaTeX counters. Use \texttt{value(counter)} to read out the current value.

\shorthandwidth This length register indicates the width of the widest shorthand. Bibliography styles should incorporate this length in the definition of the list of shorthands, if applicable.

\labelnumberwidth This length register indicates the width of the widest labelnumber. Numeric bibliography styles should incorporate this length in the definition of the bibliography environment.

\labelalphawidth This length register indicates the width of the widest labelalpha. Alphabetic bibliography styles should incorporate this length in the definition of the bibliography environment.

maxextraalpha This counter holds the highest number found in any extraalpha field.

maxextrayear This counter holds the highest number found in any extrayear field.

refsection This counter indicates the current refsection environment. When queried in a bibliography heading, the counter returns the value of the refsection option passed to \texttt{printbibliography}.

refsegment This counter indicates the current refsegment environment. When queried in a bibliography heading, this counter returns the value of the refsegment option passed to \texttt{printbibliography}.

maxnames This counter holds the setting of the maxnames package option.

minnames This counter holds the setting of the minnames package option.

maxitems This counter holds the setting of the maxitems package option.

minitems This counter holds the setting of the minitems package option.

instcount This counter is incremented by \biblatex for every citation as well as for every entry in the bibliography and the list of shorthands. The value of this counter uniquely identifies a single instance of a reference in the document.

citetotal This counter, which is only available in the (loopcode) of a citation command defined with \texttt{DeclareCiteCommand}, holds the total number of valid entry keys passed to the citation command.
citecount \ This counter, which is only available in the \emph{loopcode} of a citation command defined with \texttt{\DeclareCiteCommand}, holds the number of the entry key currently being processed by the \emph{loopcode}.

multicitetotal \ This counter is similar to \texttt{citetotal} but only available in multicite commands. It holds the total number of citations passed to the multicite command. Note that each of these citations may consist of more than one entry key. This information is provided by the \texttt{citetotal} counter.

multicitecount \ This counter is similar to \texttt{citecount} but only available in multicite commands. It holds the number of the citation currently being processed. Note that this citation may consist of more than one entry key. This information is provided by the \texttt{citetotal} and \texttt{citecount} counters.

listtotal \ This counter holds the total number of items in the current list. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else. As an exception, it may also be used in the second optional argument to \texttt{\printnames} and \texttt{\printlist}, see §4.4.1 for details. For every list, there is also a counter by the same name which holds the total number of items in the corresponding list. For example, the author counter holds the total number of items in the author list. This applies to both name lists and literal lists. These counters are similar to \texttt{listtotal} except that they may also be used independently of list formatting directives. For example, a bibliography style might check the editor counter to decide whether or not to print the term “editor” or rather its plural form “editors” after the list of editors.

listcount \ This counter holds the number of the list item currently being processed. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else.

liststart \ This counter holds the \emph{start} argument passed to \texttt{\printnames} or \texttt{\printlist}. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else.

liststop \ This counter holds the \emph{stop} argument passed to \texttt{\printnames} or \texttt{\printlist}. It is intended for use in list formatting directives and does not hold a meaningful value when used anywhere else.

\currentfield \ The name of the field currently being processed by \texttt{\printfield}. This information is only available locally in field formatting directives.

\currentlist \ The name of the literal list currently being processed by \texttt{\printlist}. This information is only available locally in list formatting directives.

\currentname \ The name of the name list currently being processed by \texttt{\printnames}. This information is only available locally in name formatting directives.

4.10.6 General Purpose Hooks

\AtBeginBibliography{}\texttt{(code)}

Appends the \emph{code} to an internal hook executed at the beginning of the bibliogra-
phy. The \langle code \rangle is executed at the beginning of the list of references, immediately after the \langle begin code \rangle of \defbibenvironment. This command may only be used in the preamble.

\AtBeginShorts\{\langle code \rangle\}
Appends the \langle code \rangle to an internal hook executed at the beginning of the list of shorthands. The \langle code \rangle is executed at the beginning of the list of shorthands, immediately after the \langle begin code \rangle of \defbibenvironment. This command may only be used in the preamble.

\AtEveryBibitem\{\langle code \rangle\}
Appends the \langle code \rangle to an internal hook executed at the beginning of every item in the bibliography. The \langle code \rangle is executed immediately after the \langle item code \rangle of \defbibenvironment. The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

\AtEveryLositem\{\langle code \rangle\}
Appends the \langle code \rangle to an internal hook executed at the beginning of every item in the list of shorthands. The \langle code \rangle is executed immediately after the \langle item code \rangle of \defbibenvironment. The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

\AtEveryCite\{\langle code \rangle\}
Appends the \langle code \rangle to an internal hook executed at the beginning of every citation command. The \langle code \rangle is executed immediately before the \langle precode \rangle of the command (see § 4.3.1). No bibliographic data is available at this point. This command may only be used in the preamble.

\AtEveryCitekey\{\langle code \rangle\}
Appends the \langle code \rangle to an internal hook executed once for every entry key passed to a citation command. The \langle code \rangle is executed immediately before the \langle loopcode \rangle of the command (see § 4.3.1). The bibliographic data of the respective entry is available at this point. This command may only be used in the preamble.

\AtNextCite\{\langle code \rangle\}
Similar to \AtEveryCite but only affecting the next citation command. The internal hook is cleared after being executed once. This command may be used in the document body.

\AtNextCitekey\{\langle code \rangle\}
Similar to \AtEveryCitekey but only affecting the next entry key. The internal hook is cleared after being executed once. This command may be used in the document body.

\AtDataInput\{\langle entrytype \rangle\}\{\langle code \rangle\}
Appends the \langle code \rangle to an internal hook executed once for every entry as the bibli-
ographic data is imported from the bbl file. The \langle entrytype⟩ is the entry type the \langle code⟩ applies to. If it applies to all entry types, omit the optional argument. The \langle code⟩ is executed immediately after the entry has been imported. This command may only be used in the preamble. Note that, if there are any refsection environments in the document and an entry is cited in more than one of them, the \langle code⟩ may be executed multiple times for an entry. The refsection counter holds the number of the respective reference section while the data is imported.

4.11 Hints and Caveats

This section provides some additional hints concerning the author interface of this package. It also addresses common problems and potential misconceptions.

4.11.1 Entry Sets

Entry sets have already been introduced in § 3.10.5. This section discusses how to process entry sets in a bibliography style. From the perspective of the driver, there is no difference between static and dynamic entry sets. Both types are handled in the same way. You will normally use the \entryset command from § 4.4.1 to loop over all set members (in the order in which they are listed in the entryset field of the \@set entry, or in the order in which they were passed to \defbibentryset, respectively) and append \finentry at the end. That's it. The formatting is handled by the drivers for the entry types of the individual set members:

\DeclareBibliographyDriver{set}{\%\entryset\%\finentry\%}

You may have noticed that the numeric styles which ship with this package support subdivided entry sets, i.e., the members of the set are marked with a letter or some other marker such that citations may either refer to the entire set or to a specific set member. The markers are generated as follows by the bibliography style:

\DeclareBibliographyDriver{set}{\%\entryset\%
  \setunit*{\addnbspace}}\%\finentry\%}

The entrysetcount field holds an integer indicating the position of a set member in the entry set. The conversion of this number to a letter or some other marker is handled by the formatting directive of the entrysetcount field. All the driver needs to do is print the field and add some white space (or start a new line). Printing the markers in citations works in a similar way. Where a numeric style normally says \printfield{labelnumber}, you simply append the entrysetcount field:

\printfield{labelnumber}\printfield{entrysetcount}

Since this field is only defined when processing citations referring to a set member, there is no need to add any additional tests.
4.11.2 Electronic Publishing Information

The standard styles feature dedicated support for arXiv references. Support for other resources is easily added. The standard styles handle the eprint field as follows:

\iffieldundef{eprinttype}
  {\printfield{eprint}}
  {\printfield[eprint:\strfield{eprinttype}]{eprint}}

If an eprinttype field is available, the above code tries to use the field format eprint:\(\langle eprinttype\rangle\). If this format is undefined, \printfield automatically falls back to the field format eprint. There are two predefined field formats, the type-specific format eprint:arxiv and the fallback format eprint:

\DeclareFieldFormat{eprint}{...}
\DeclareFieldFormat{eprint:arxiv}{...}

In other words, adding support for additional resources is as easy as defining a field format named eprint:\(\langle resource\rangle\) where \(\langle resource\rangle\) is an identifier to be used in the eprinttype field.

4.11.3 External Abstracts and Annotations

External abstracts and annotations have been discussed in § 3.10.8. This section provides some more background for style authors. The standard styles use the following macros (from biblatex.def) to handle abstracts and annotations:

\newbibmacro*{annotation}{%}
  \iffieldundef{annotation}
    {\printfield[annotation]{\bibannotationprefix\thefield{entrykey}.tex}}%
    {\printfield{annotation}}%
  \newcommand*{\bibannotationprefix}{bibannotation-}

\newbibmacro*{abstract}{%}
  \iffieldundef{abstract}
    {\printfield[abstract]{\bibabstractprefix\thefield{entrykey}.tex}}%
    {\printfield{abstract}}%
  \newcommand*{\bibabstractprefix}{bibabstract-}

If the abstract/annotation field is undefined, the above code tries to load the abstracts/annotations from an external file. The \printfile commands also incorporate file name prefixes which may be redefined by users. Note that you must enable \printfile explicitly by setting the loadfiles package option from § 3.1.2.1. This feature is disabled by default for performance reasons.

4.11.4 Name Disambiguation

The uniquename and uniquelist options introduced in § 3.1.2.3 support various modes of operation. This section explains the differences between these modes by way of example. The uniquename option disambiguates individual names in the labelname list. The uniquelist option disambiguates the labelname list if it
has become ambiguous after maxnames/minnames truncation. You can use either option stand-alone or combine both.

### 4.11.4.1 Individual Names (uniquename)

Let's start off with some uniquename examples. Consider the following data:

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Doe</td>
<td>2008</td>
</tr>
<tr>
<td>Edward Doe</td>
<td>2008</td>
</tr>
<tr>
<td>John Smith</td>
<td>2008</td>
</tr>
<tr>
<td>Jane Smith</td>
<td>2008</td>
</tr>
</tbody>
</table>

Let's assume we're using an author-year style and set uniquename=false. In this case, we would get the following citations:

Doe 2008a  
Doe 2008b  
Smith 2008a  
Smith 2008b

Since the last names are ambiguous and all works have been published in the same year, an extra letter is appended to the year to disambiguate the citations. Many style guides, however, mandate that the extra letter be used to disambiguate works by the same authors only, not works by different authors with the same last name. In order to disambiguate the author's last name, you are expected to add additional parts of the name, either as initials or in full. This requirement is addressed by the uniquename option. Here are the same citations with uniquename=init:

J. Doe 2008  
E. Doe 2008  
Smith 2008a  
Smith 2008b

uniquename=init restricts name disambiguation to initials. Since 'J. Smith' would still be ambiguous, no additional name parts are added for the 'Smiths'. With uniquename=full, names are printed in full where required:

J. Doe 2008  
E. Doe 2008  
John Smith 2008  
Jane Smith 2008

In order to illustrate the difference between uniquename=init/full and allinit/allfull, we need to introduce the notion of a 'visible' name. In the following, 'visible' names are all names at a position before the maxnames/minnames/uniquelist truncation point. For example, given this data:

William Jones/Edward Doe/Jane Smith  
John Doe  
John Smith

and maxnames=1, minnames=1, uniquename=init/full, we would get the following names in citations:
When disambiguating names, uniquename=init/full only consider the visible names. Since all visible last names are distinct in this example, no further name parts are added. Let's compare that to the output of uniquename=allinit:

Jones et al.
J. Doe
Smith

allinit considers all names in all labelname lists, including those which are hidden and replaced by 'et al.' as the list is truncated. In this example, 'John Doe' is disambiguated from 'Edward Doe'. Since the ambiguity of the two 'Smiths' can't be resolved by adding initials, no initials are added in this case. Now let's compare that to the output of uniquename=allfull which also disambiguates 'John Smith' from 'Jane Smith':

Jones et al.
J. Doe
John Smith

The options uniquename=mininit/minfull are similar to init/full in that they only consider visible names, but they perform minimal disambiguation. That is, they will disambiguate individual names only if they occur in identical lists of last names. Consider the following data:

John Doe/William Jones
Edward Doe/William Jones
John Smith/William Edwards
Edward Smith/Allan Johnson

With uniquename=init/full, we would get:

J. Doe and Jones
E. Doe and Jones
J. Smith and Edwards
E. Smith and Johnson

With uniquename=mininit/minfull:

J. Doe and Jones
E. Doe and Jones
Smith and Edwards
Smith and Johnson

The 'Smiths' are not disambiguated because the visible name lists are not ambiguous and the mininit/minfull options serve to disambiguate names occurring in identical last name lists only. Another way of looking at this is that they globally disambiguate last name lists. When it comes to ambiguous lists, note that a truncated list is considered to be distinct from an untruncated one even if the visible names are identical. For example, consider the following data:
With `maxnames=1, uniquename=init/full`, we would get:

J. Doe et al.
E. Doe

With `uniquename=mininit/minfull`:

Doe et al.
Doe

Because the lists differ in the 'et al.', the names are not disambiguated.

### 4.11.4.2 Lists of Names (`uniquelist`)

Ambiguity is also an issue with name lists. If the `labelname` list is truncated by the `maxnames/minnames` options, it may become ambiguous. This type of ambiguity is addressed by the `uniquelist` option. Consider the following data:

- Doe/Jones/Smith 2005
- Smith/Johnson/Doe 2005
- Smith/Doe/Edwards 2005
- Smith/Doe/Jones 2005

Many author-year styles truncate long author/editor lists in citations. For example, with `maxnames=1` we would get:

- Doe et al. 2005
- Smith et al. 2005a
- Smith et al. 2005b
- Smith et al. 2005c

Since the authors are ambiguous after truncation, the extra letter is added to the year to ensure unique citations. Here again, many style guides mandate that the extra letter be used to disambiguate works by the same authors only. In order to disambiguate author lists, you are usually required to add more names, exceeding the `maxnames/minnames` truncation point. The `uniquelist` feature addresses this requirement. With `uniquelist=true`, we would get:

- Doe et al. 2005
- Smith, Johnson et al. 2005
- Smith, Doe and Edwards 2005
- Smith, Doe and Jones 2005

The `uniquelist` option overrides `maxnames/minnames` on a per-entry basis. Essentially, what happens is that the ‘et al.’ part of the citation is expanded to the point of no ambiguity – but no further than that. `uniquelist` may also be combined with `uniquename`. Consider the following data:

- John Doe/Allan Johnson/William Jones 2009
- John Doe/Edward Johnson/William Jones 2009
- John Doe/Jane Smith/William Jones 2009
- John Doe/John Smith/William Jones 2009
With maxnames=1:

Doe et al. 2009a
Doe et al. 2009b
Doe et al. 2009c
Doe et al. 2009d
Doe et al. 2009e
Doe et al. 2009f

With maxnames=1, uniquename=full, uniquelist=true:

Doe, A. Johnson et al. 2009
Doe, E. Johnson et al. 2009
Doe, Jane Smith et al. 2009
Doe, John Smith et al. 2009
Doe, Edwards and Jones 2009
Doe, Edwards and Johnson 2009

With uniquelist=minyear, list disambiguation only happens if the visible list is identical to another visible list with the same labelyear. This is useful for author-year styles which only require that the citation as a whole be unique, but do not guarantee unambiguous authorship information in citations. This mode is conceptually related to uniquename=mininit/minfull. Consider this example:

Smith/Jones 2000
Smith/Johnson 2001

With maxnames=1 and uniquelist=true, we would get:

Smith and Jones 2000
Smith and Johnson 2001

With uniquelist=minyear:

Smith et al. 2000
Smith et al. 2001

With uniquelist=minyear, it is not clear that the authors are different for the two works but the citations as a whole are still unambiguous since the year is different. In contrast to that, uniquelist=true disambiguates the authorship even if this information is not required to uniquely locate the works in the bibliography. Let's consider another example:

Vogel/Beast/Garble/Rook 2000
Vogel/Beast/Tremble/Bite 2000
Vogel/Beast/Acid/Squeeze 2001

With maxnames=3, minnames=1, uniquelist=true, we would get:

Vogel, Beast, Garble et al. 2000
Vogel, Beast, Tremble et al. 2000
Vogel, Beast, Acid et al. 2001
With uniquelist=minyear:

Vogel, Beast, Garble et al. 2000
Vogel, Beast, Tremble et al. 2000
Vogel et al. 2001

In the last citation, uniquelist=minyear does not override maxnames/minnames as the citation does not need disambiguating from the other two because the year is different.

4.11.5 Trackers in Floats and TOC/LOT/LOF

If a citation is given in a float (typically in the caption of a figure or table), scholarly back references like ‘ibidem’ or back references based on the page tracker get ambiguous because floats are objects which are (physically and logically) placed outside the flow of text, hence the logic of such references applies poorly to them. To avoid any such ambiguities, the citation and page trackers are temporarily disabled in all floats. In addition to that, these trackers plus the back reference tracker (backref) are temporarily disabled in the table of contents, the list of figures, and the list of tables.

4.11.6 Mixing Programming Interfaces

The biblatex package provides two main programming interfaces for style authors. The \DeclareBibliographyDriver command, which defines a handler for an entry type, is typically used in bbx files. \DeclareCiteCommand, which defines a new citation command, is typically used in cbx files. However, in some cases it is convenient to mix these two interfaces. For example, the \fullcite command prints a verbose citation similar to the full bibliography entry. It is essentially defined as follows:

\DeclareCiteCommand{\fullcite}
  {...}
  {\usedriver{...}{\thefield{entrytype}}}
  {...}
  {...}

As you can see, the core code which prints the citations simply executes the bibliography driver defined with \DeclareBibliographyDriver for the type of the current entry. When writing a citation style for a verbose citation scheme, it is often convenient to use the following structure:

\ProvidesFile{example.cbx}[2007/06/09 v1.0 biblatex citation style]
\DeclareCiteCommand{\cite}
  {...}
  {\usedriver{...}{\thefield{entrytype}}}
  {...}
  {...}
\DeclareBibliographyDriver{cite:article}{...}
\DeclareBibliographyDriver{cite:book}{...}
Another case in which mixing interfaces is helpful are styles using cross-references within the bibliography. For example, when printing an \@incollection entry, the data inherited from the \@collection parent entry would be replaced by a short pointer to the respective parent entry:


One way to implement such cross-references within the bibliography is to think of them as citations which use the value of the \texttt{xref} or \texttt{crossref} field as the entry key. Here is an example:

When defining \texttt{\bbx@xref}, the \texttt{(precode)}, \texttt{(postcode)}, and \texttt{(sepcode)} arguments of \texttt{\DeclareCiteCommand} are left empty in the above example because they will not be used anyway. The cross-reference is printed by the \texttt{(loopcode)} of \texttt{\bbx@xref}. For further details on the \texttt{xref} field, refer to § 2.2.3 and to the hints in § 2.4.1. Also see the \texttt{\iffieldxref}, \texttt{\iflistxref}, and \texttt{\ifnamexref} tests in § 4.6.2. The above could also be implemented using the \texttt{\entrydata} command from § 4.4.1:
4.11.7 Using the Punctuation Tracker

4.11.7.1 The Basics

There is one fundamental principle style authors should keep in mind when designing a bibliography driver: block and unit punctuation is handled asynchronously. This is best explained by way of example. Consider the following code snippet:

\printfield{title}\
\newunit\n\printfield{edition}\
\newunit\n\printfield{note}\

If there is no edition field, this piece of code will not print:

Title. . Note

but rather:

Title. Note

because the unit punctuation tracker works asynchronously. \newunit will not print the unit punctuation immediately. It merely records a unit boundary and puts \newunitpunct on the punctuation buffer. This buffer will be handled by subsequent \printfield, \printlist, or similar commands but only if the respective field or list is defined. Commands like \printfield will consider three factors prior to inserting any block or unit punctuation:

- Has a new unit/block been requested at all?
  = Is there any preceding \newunit or \newblock command?

- Did the preceding commands print anything?
  = Is there any preceding \printfield or similar command?
  = Did this command actually print anything?

- Are we about to print anything now?
  = Is the field/list to be processed now defined?

Block and unit punctuation will only be inserted if all of these conditions apply. Let’s reconsider the above example:

\printfield{title}\
\newunit\n\printfield{edition}\
\newunit\n\printfield{note}\

Here’s what happens if the edition field is undefined. The first \printfield command prints the title and sets an internal ‘new text’ flag. The first \newunit sets an internal ‘new unit’ flag. No punctuation has been printed at this point. The second \printfield does nothing because the edition field is undefined. The next \newunit command sets the internal flag ‘new unit’ again. Still no punctuation has been printed. The third \printfield checks if the note field is defined. If so, it...
looks at the ‘new text’ and ‘new unit’ flags. If both are set, it inserts the punctuation buffer before printing the note. It then clears the ‘new unit’ flag and sets the ‘new text’ flag again.

This may all sound more complicated than it is. In practice, it means that it is possible to write large parts of a bibliography driver in a sequential way. The advantage of this approach becomes obvious when trying to write the above code without using the punctuation tracker. Such an attempt will lead to a rather convoluted set of \iffielddundef tests required to check for all possible field combinations (note that the code below handles three fields; a typical driver may need to cater for some two dozen fields):

\iffielddundef{title}%
{\iffielddundef{edition}%
{\printfield{note}%
{\printfield{edition}%
\iffielddundef{note}%
}
{. \printfield{note}}})%
{\printfield{title}%
\iffielddundef{edition}{}
{. \printfield{edition}}%
\iffielddundef{note}{}
{. \printfield{note}}}%

4.11.7.2 Common Mistakes

It is a fairly common misconception to think of the unit punctuation as something that is handled synchronously. This typically causes problems if the driver includes any literal text. Consider this erroneous code snippet which will generate misplaced unit punctuation:

\printfield{title}%
\newunit
{\printfield{series} \printfield{number}}%

This code will yield the following result:

Title (., Series Number)

Here’s what happens. The first \printfield prints the title. Then \newunit marks a unit boundary but does not print anything. The unit punctuation is printed by the next \printfield command. That’s the asynchronous part mentioned before. However, the opening parenthesis is printed immediately before the next \printfield inserts the unit punctuation, leading to a misplaced period. When inserting any literal text such as parentheses (including those printed by commands such as \bibopenparen and \mkbibparens), always wrap the text in a \printtext command. For the punctuation tracker to work as expected, it needs to know about all literal text inserted by a driver. This is what \printtext is all about. \printtext interfaces with the punctuation tracker and ensures that the
punctuation buffer is inserted before the literal text gets printed. It also sets the internal 'new text' flag. Note there is in fact a third piece of literal text in this example: the space after \printfield{series}. In the corrected example, we will use the punctuation tracker to handle that space.

\printfield{title} %
newunit
\printfield{} %
\printfield{series} %
\setunit*{\addspace} %
\printfield{number} %
\printfield{} %

While the above code will work as expected, the recommended way to handle parentheses, quotes, and other things which enclose more than one field, is to define a field format:

\DeclareFieldFormat{parens}{\mkbibparens{#1}}

Field formats may be used with both \printfield and \printtext, hence we can use them to enclose several fields in a single pair of parentheses:

\printtext[parens]{%
\printfield{series} %
\setunit*{\addspace} %
\printfield{number} %
}%

We still need to handle cases in which there is no series information at all, so let's improve the code some more:

\iffielundef{series}
{}
\printfield[parens]{%
\printfield{series} %
\setunit*{\addspace} %
\printfield{number} %
}%

One final hint: localization strings are not literal text as far as the punctuation tracker is concerned. Since \bibstring and similar commands interface with the punctuation tracker, there is no need to wrap them in a \printtext command.

4.11.7.3 Advanced Usage

The punctuation tracker may also be used to handle more complex scenarios. For example, suppose that we want the fields location, publisher, and year to be rendered in one of the following formats, depending on the available data:

...text. Location: Publisher, Year. Text...
...text. Location: Publisher. Text...
...text. Location: Year. Text...
...text. Publisher, Year. Text...
...text. Location. Text...
...text. Publisher. Text...

205
This problem can be solved with a rather convoluted set of `\iflistundef` and `\iffieldundef` tests which check for all possible field combinations:

```
\iflistundef{location}
  {\iffieldundef{publisher}
    {\printfield{year}}
    \iffieldundef{year}
    {}
    {, \printfield{year}}}
  {\printlist{location}\
    \iffieldundef{publisher}\
    {\iffieldundef{year}
      {}\
      {: \printfield{year}}\
      {: \printfield{year}}\
      {, \printfield{year}}}\
    {, \printfield{year}}}%
```

The above could be written in a somewhat more readable way by employing `\ifthenelse` and the boolean operators discussed in § 4.6.3. The approach would still be essentially the same. However, it may also be written sequentially:

```
\newunit\printlist{location}\
\setunit*{\addcolon\space}\
\printlist{publisher}\
\setunit*{\addcomma\space}\
\printfield{year}\
\newunit
```

In practice, you will often use a combination of explicit tests and the implicit tests performed by the punctuation tracker. For example, consider the following format (note the punctuation after the location if there is no publisher):

```
...text. Location: Publisher, Year. Text...
...text. Location: Publisher. Text...
...text. Location, Year. Text...
...text. Publisher, Year. Text...
...text. Location. Text...
...text. Publisher. Text...
...text. Year. Text...
```

This can be handled by the following code:

```
\newunit\printlist{location}\
\iffieldundef{publisher}
  {\setunit*{\addcomma\space}}
  {\setunit*{\addcolon\space}}\printfield{publisher}%
\printlist{publisher}%
```
Since the punctuation after the location is special if there is no publisher, we need one \iflistundef test to catch this case. Everything else is handled by the punctuation tracker.

4.11.8 Custom Localization Modules

Style guides may include provisions as to how strings like ‘edition’ should be abbreviated or they may mandate certain fixed expressions. For example, the MLA style guide requires authors to use the term ‘Works Cited’ rather than ‘Bibliography’ or ‘References’ in the heading of the bibliography. Localization commands such as \DefineBibliographyStrings from § 3.7 may indeed be used in cbx and bbx files to handle such cases. However, overloading style files with translations is rather inconvenient. This is where \DeclareLanguageMapping from § 4.9.1 comes into play. This command maps an lbx file with alternative translations to a babel language. For example, you could create a file named french-humanities.lbx which provides French translations adapted for use in the humanities and map it to the babel language french in the preamble or in the configuration file:

\DeclareLanguageMapping{french}{french-humanities}

If the document language is set to french, french-humanities.lbx will replace french.lbx. Coming back to the MLA example mentioned above, an MLA style may come with an american-mla.lbx file to provide strings which comply with the MLA style guide. It would declare the following mapping in the cbx and/or bbx file:

\DeclareLanguageMapping{american}{american-mla}

Since the alternative lbx file can inherit strings from the standard american.lbx module, american-mla.lbx may be as short as this:

\ProvidesFile{american-mla.lbx}[2008/10/01 v1.0 biblatex localization]
\InheritBibliographyExtras{american}
\DeclareBibliographyStrings{%
  inherit = {american},
  bibliography = {{Works Cited}{Works Cited}},
  references = {{Works Cited}{Works Cited}},
}\endinput

Alternative lbx files must ensure that the localization module is complete. They will typically do so by inheriting data from the corresponding standard module. If the language american is mapped to american-mla.lbx, biblatex will not load american.lbx unless this module is requested explicitly. In the above example, inheriting ‘strings’ and ‘extras’ will cause biblatex to load american.lbx before applying the modifications in american-mla.lbx.
Note that \DeclareLanguageMapping is not intended to handle language variants (e.g., American English vs. British English) or babel language aliases (e.g., USenglish vs. american). For example, babel offers the USenglish option which is similar to american. Therefore, biblatex ships with an USenglish.lbx file which simply inherits all data from american.lbx (which in turn gets the ‘strings’ from english.lbx). In other words, the mapping of language variants and babel language aliases happens on the file level, the point being that biblatex’s language support can be extended simply by adding additional lbx files. There is no need for centralized mapping. If you need support for, say, Portuguese (babel: portuges), you create a file named portuges.lbx. If babel offered an alias named brasil, you would create brasil.lbx and inherit the data from portuges.lbx. In contrast to that, the point of \DeclareLanguageMapping is handling stylistic variants like ‘humanities vs. natural sciences’ or ‘MLA vs. APA’ etc. which will typically be built on top of existing lbx files.

4.11.9 Grouping

In a citation or bibliography style, you may need to set flags or store certain values for later use. In this case, it is crucial to understand the basic grouping structure imposed by this package. As a rule of thumb, you are working in a large group whenever author commands such as those discussed in § 4.6 are available because the author interface of this package is only enabled locally. If any bibliographic data is available, there is at least one additional group. Here are some general rules:

• The entire list of references printed by \printbibliography and similar commands is processed in a group. Each entry in the list is processed in an additional group which encloses the ⟨item code⟩ of \defbibenvironment as well as all driver code.

• The entire list of shorthands printed by \printshorthands is processed in a group. Each entry in the list is processed in an additional group which encloses the ⟨item code⟩ of \defbibenvironment as well as all driver code.

• All citation commands defined with \DeclareCiteCommand are processed in a group holding the complete citation code consisting of the ⟨precode⟩, ⟨sepcode⟩, ⟨loopcode⟩, and ⟨postcode⟩ arguments. The ⟨loopcode⟩ is enclosed in an additional group every time it is executed. If any ⟨wrapper⟩ code has been specified, the entire unit consisting of the wrapper code and the citation code is wrapped in an additional group.

• In addition to the grouping imposed by all backend commands defined with \DeclareCiteCommand, all ‘autocite’ and ‘multicite’ definitions imply an additional group.

• \printfile, \printtext, \printfield, \printlist, and \printnames form groups. This implies that all formatting directives will be processed within a group of their own.

• All lbx files are loaded and processed in a group. If an lbx file contains any
code which is not part of \DeclareBibliographyExtras, the definitions must be global.

Note that using \aftergroup in citation and bibliography styles is unreliable because the precise number of groups employed in a certain context may change in future versions of this package. If the above list states that something is processed in a group, this means that there is at least one group. There may also be several nested ones.

4.11.10 Namespaces

In order to minimize the risk of name clashes, LaTeX packages typically prefix the names of internal macros with a short string specific to the package. For example, if the foobar package requires a macro for internal use, it would typically be called \FB@macro or \foo@macro rather than \macro or \@macro. Here is a list of the prefixes used or recommended by biblatex:

- **blx**: All macros with names like \blx@name are strictly reserved for internal use. This also applies to counter names, length registers, boolean switches, and so on. These macros may be altered in backwards-incompatible ways, they may be renamed or even removed at any time without further notice. Such changes will not even be mentioned in the revision history or the release notes. In short: never use any macros with the string blx in their name in any styles.

- **abx**: Macros prefixed with abx are also internal macros but they are fairly stable. It is always preferable to use the facilities provided by the official author interface, but there may be cases in which using an abx macro is convenient.

- **bbx**: This is the recommended prefix for internal macros defined in bibliography styles.

- **cbx**: This is the recommended prefix for internal macros defined in citation styles.

- **lbx**: This is the recommended base prefix for internal macros defined in localization modules. The localization module should add a second prefix to specify the language. For example, an internal macro defined by the Spanish localization module would be named \lbx@es@macro.

**Appendix**

**A Default crossref Setup**

The following table shows the Biber cross-referencing rules defined by default. Please refer to §§ 2.4.1 and 4.5.3 for explanation.
<table>
<thead>
<tr>
<th>Types</th>
<th>Source</th>
<th>Target</th>
<th>Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td>crossref</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>xref</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>entryset</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>entrysubtype</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>execute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>label</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>options</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>presort</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>related</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>relatedstring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>relatedtype</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>shorthand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>shorthandintro</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>sortkey</td>
</tr>
<tr>
<td>mvbook, book</td>
<td>inbook, bookinbook, suppbook</td>
<td>author</td>
<td>author</td>
</tr>
<tr>
<td></td>
<td></td>
<td>author</td>
<td>bookauthor</td>
</tr>
<tr>
<td>mvbook</td>
<td>book, inbook, bookinbook, suppbook</td>
<td>title</td>
<td>maintitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subtitle</td>
<td>mainsubtitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>titleaddon</td>
<td>maintitleaddon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indextitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indexsorttitle</td>
<td></td>
</tr>
<tr>
<td>mvcollection, mvreference</td>
<td>collection, reference, incollection, inreference, suppcollection</td>
<td>title</td>
<td>maintitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subtitle</td>
<td>mainsubtitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>titleaddon</td>
<td>maintitleaddon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indextitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indexsorttitle</td>
<td></td>
</tr>
<tr>
<td>mvproceedings</td>
<td>proceedings, inproceedings</td>
<td>title</td>
<td>maintitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subtitle</td>
<td>mainsubtitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>titleaddon</td>
<td>maintitleaddon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indextitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indexsorttitle</td>
<td></td>
</tr>
<tr>
<td>book</td>
<td>inbook, bookinbook, suppbook</td>
<td>title</td>
<td>booktitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subtitle</td>
<td>booksubtitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>titleaddon</td>
<td>booktitleaddon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indextitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indexsorttitle</td>
<td></td>
</tr>
<tr>
<td>collection, reference</td>
<td>incollection, inreference, suppcollection</td>
<td>title</td>
<td>booktitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>subtitle</td>
<td>booksubtitle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>titleaddon</td>
<td>booktitleaddon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>shorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sorttitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indextitle</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>indexsorttitle</td>
<td></td>
</tr>
</tbody>
</table>
### B Default Sorting Schemes

#### B1 Alphabetic Schemes 1

The following table shows the standard alphabetic sorting schemes defined by default. Please refer to § 3.4 for explanation.

<table>
<thead>
<tr>
<th>Option</th>
<th>Sorting scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>nty</td>
<td>presort → sortname → sorttitle → sortyear → volume</td>
</tr>
<tr>
<td></td>
<td>← mm → author → title → year → 0000</td>
</tr>
<tr>
<td></td>
<td>← editor</td>
</tr>
<tr>
<td></td>
<td>← translator</td>
</tr>
<tr>
<td></td>
<td>← sorttitle</td>
</tr>
<tr>
<td></td>
<td>← title</td>
</tr>
<tr>
<td>nyt</td>
<td>presort → sortname → sortyear → sorttitle → volume</td>
</tr>
<tr>
<td></td>
<td>← mm → author → year → title → 0000</td>
</tr>
<tr>
<td></td>
<td>← editor</td>
</tr>
<tr>
<td></td>
<td>← translator</td>
</tr>
<tr>
<td></td>
<td>← sorttitle</td>
</tr>
<tr>
<td></td>
<td>← title</td>
</tr>
<tr>
<td>nyvt</td>
<td>presort → sortname → sortyear → volume → sorttitle</td>
</tr>
<tr>
<td></td>
<td>← mm → author → year ← 0000 → title</td>
</tr>
<tr>
<td></td>
<td>← editor</td>
</tr>
<tr>
<td></td>
<td>← translator</td>
</tr>
<tr>
<td></td>
<td>← sorttitle</td>
</tr>
<tr>
<td></td>
<td>← title</td>
</tr>
<tr>
<td>all</td>
<td>presort → sortkey</td>
</tr>
<tr>
<td></td>
<td>← mm</td>
</tr>
</tbody>
</table>

#### B2 Alphabetic Schemes 2

The following table shows the alphabetic sorting schemes for alphabetic styles defined by default. Please refer to § 3.4 for explanation.
### B3 Chronological Schemes

The following table shows the chronological sorting schemes defined by default. Please refer to § 3.4 for explanation.

<table>
<thead>
<tr>
<th>Option</th>
<th>Sorting scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>anyt</td>
<td>presort → labelalpha  → sortname → sortyear → sorttitle → volume  ↪ mm  → author → year → title → 0000 → editor → translator → sorttitle → title</td>
</tr>
<tr>
<td>anyvt</td>
<td>presort → labelalpha  → sortname → sortyear → volume  → sorttitle → 9999  ↪ mm  → author → year → 0000 → title → editor → translator → sorttitle → title</td>
</tr>
<tr>
<td>all</td>
<td>presort → labelalpha  → sortkey  ↓ mm</td>
</tr>
</tbody>
</table>

### C Option Scope

The following table provides an overview of the scope (global/per-type/per-entry) of various package options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Load-time</td>
</tr>
<tr>
<td>abbreviate</td>
<td>•</td>
</tr>
<tr>
<td>alldates</td>
<td>•</td>
</tr>
<tr>
<td>arxiv</td>
<td>•</td>
</tr>
<tr>
<td>autocite</td>
<td>•</td>
</tr>
<tr>
<td>autopunct</td>
<td>•</td>
</tr>
<tr>
<td>babel</td>
<td>•</td>
</tr>
<tr>
<td>Option</td>
<td>Load-time</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>backend</td>
<td></td>
</tr>
<tr>
<td>backref</td>
<td>•</td>
</tr>
<tr>
<td>backrefsetstyle</td>
<td>•</td>
</tr>
<tr>
<td>backrefstyle</td>
<td>•</td>
</tr>
<tr>
<td>bibencoding</td>
<td>•</td>
</tr>
<tr>
<td>bibstyle</td>
<td>•</td>
</tr>
<tr>
<td>bibwarn</td>
<td>•</td>
</tr>
<tr>
<td>block</td>
<td>•</td>
</tr>
<tr>
<td>citecounter</td>
<td>•</td>
</tr>
<tr>
<td>citereset</td>
<td>•</td>
</tr>
<tr>
<td>citestyle</td>
<td>•</td>
</tr>
<tr>
<td>citetracker</td>
<td>•</td>
</tr>
<tr>
<td>clearlang</td>
<td>•</td>
</tr>
<tr>
<td>dataonly</td>
<td>–</td>
</tr>
<tr>
<td>doi</td>
<td>•</td>
</tr>
<tr>
<td>eprint</td>
<td>•</td>
</tr>
<tr>
<td>eventdate</td>
<td>•</td>
</tr>
<tr>
<td>firstinits</td>
<td>•</td>
</tr>
<tr>
<td>hyperref</td>
<td>•</td>
</tr>
<tr>
<td>ibidtracker</td>
<td>•</td>
</tr>
<tr>
<td>idemtracker</td>
<td>•</td>
</tr>
<tr>
<td>indexing</td>
<td>•</td>
</tr>
<tr>
<td>isbn</td>
<td>•</td>
</tr>
<tr>
<td>labelalpha</td>
<td>•</td>
</tr>
<tr>
<td>labelnumber</td>
<td>•</td>
</tr>
<tr>
<td>labelyear</td>
<td>•</td>
</tr>
<tr>
<td>language</td>
<td>•</td>
</tr>
<tr>
<td>loadfiles</td>
<td>•</td>
</tr>
<tr>
<td>loccittracker</td>
<td>•</td>
</tr>
<tr>
<td>maxalphanames</td>
<td>•</td>
</tr>
<tr>
<td>maxbibnames</td>
<td>•</td>
</tr>
<tr>
<td>maxcitenames</td>
<td>•</td>
</tr>
<tr>
<td>maxitems</td>
<td>•</td>
</tr>
<tr>
<td>maxnames</td>
<td>•</td>
</tr>
<tr>
<td>maxparensl</td>
<td>•</td>
</tr>
<tr>
<td>mcite</td>
<td>•</td>
</tr>
<tr>
<td>minalphanames</td>
<td>•</td>
</tr>
<tr>
<td>minbibnames</td>
<td>•</td>
</tr>
<tr>
<td>mincitenames</td>
<td>•</td>
</tr>
<tr>
<td>minitems</td>
<td>•</td>
</tr>
<tr>
<td>minnames</td>
<td>•</td>
</tr>
<tr>
<td>natbib</td>
<td>•</td>
</tr>
<tr>
<td>notetype</td>
<td>•</td>
</tr>
<tr>
<td>opcittracker</td>
<td>•</td>
</tr>
<tr>
<td>openbib</td>
<td>•</td>
</tr>
<tr>
<td>origdate</td>
<td>•</td>
</tr>
<tr>
<td>pagetracker</td>
<td>•</td>
</tr>
<tr>
<td>parenttracker</td>
<td>•</td>
</tr>
</tbody>
</table>
### Option Scope

<table>
<thead>
<tr>
<th>Option</th>
<th>Load-time</th>
<th>Global</th>
<th>Per-type</th>
<th>Per-entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>punctfont</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>resection</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>refsegment</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>safeinputenc</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>singletitle</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>skipbib</td>
<td>–</td>
<td>–</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>skiplab</td>
<td>–</td>
<td>–</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>skiplos</td>
<td>–</td>
<td>–</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>sortcase</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>sortcites</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>sorting</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>sortlocale</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>sortlos</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>sortupper</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>style</td>
<td>•</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>terseinits</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>texencoding</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>uniquelist</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>uniquename</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>urldate</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>url</td>
<td>•</td>
<td>•</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>useauthor</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>useeditor</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>useprefix</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>usetranslator</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

### D Revision History

This revision history is a list of changes relevant to users of this package. Changes of a more technical nature which do not affect the user interface or the behavior of the package are not included in the list. If an entry in the revision history states that a feature has been *improved* or *extended*, this indicates a modification which either does not affect the syntax and behavior of the package or is syntactically backwards compatible (such as the addition of an optional argument to an existing command). Entries stating that a feature has been *modified*, *renamed*, or *removed* demand attention. They indicate a modification which may require changes to existing styles or documents in some, hopefully rare, cases. The numbers on the right indicate the relevant section of this manual.

#### 1.7 2011-11-13

- Added `xdata` containers .............................................. 3.10.6  Biber only
- Added special entry type `xdata` ..................................... 2.1.1  Biber only
- Added special field `xdata` .......................................... 2.2.3  Biber only
- Support `maxnames/minnames` globally/per-type/per-entry ........ 3.1.2.1  Biber only
- Support `maxbibnames/minbibnames` globally/per-type/per-entry ... 3.1.2.1  Biber only
- Support `maxcitenames/mincitenames` globally/per-type/per-entry ... 3.1.2.1  Biber only
- Support `maxitems/minitems` globally/per-type/per-entry .......... 3.1.2.1  Biber only
- Support `maxalphanames/minalphanames` globally/per-type/per-entry . 3.1.2.3  Biber only
Support uniquelist globally/per-type/per-entry .......................... 3.1.2.3  Biber only
Support uniquename globally/per-type/per-entry .......................... 3.1.2.3  Biber only
Added \textcite and \textcites to all verbose citation styles ............ 3.3.1
Added special field formats date, urldate, origdate, eventdate ....... 4.10.4
Added \mkcomprange* ..................................................... 4.6.4
Added \mkfirstpage* ....................................................... 4.6.4
Added \volcitedelim ..................................................... 4.10.1
Added missing documentation for ifentrytype ........................... 4.6.2
Added \mkbibneutord ........................................................ 3.8.2
Added counter biburlnumpenalty ........................................... 4.10.3
Added counter biburlucpenalty ........................................... 4.10.3
Added counter biburllcpenalty .......................................... 4.10.3
Added localization keys book, part, issue, forthcoming ................ 4.9.2
Added some lang... and from... localization keys ..................... 4.9.2
Expanded documentation ....................................................... C
Added support for Russian (Oleg Domanov)
Updated support for Dutch (Pieter Belmans)
Fixed compatibility issue with textcase package
Fixed some bugs

1.6  2011-07-29

Added special field sortshorthand ........................................ 2.2.3  Biber only
Revised options maxnames/minnames ..................................... 3.1.2.1  Biber only
Options maxcitenames/mincitenames now supported by backend ...... 3.1.2.1  Biber only
Options maxbibnames/minbibnames now supported by backend ......... 3.1.2.1  Biber only
Added options maxalphanames/minalphanames ........................... 3.1.2.3  Biber only
Removed local options maxnames/minnames from \printbibliography ... 3.5.2  Biber only
Removed local options maxitems/minitems from \printbibliography ... 3.5.2  Biber only
Removed local options maxnames/minnames from \bibbysection ........ 3.5.2  Biber only
Removed local options maxitems/minitems from \bibbysection ........ 3.5.2  Biber only
Removed local options maxnames/minnames from \bibbysegment ...... 3.5.2  Biber only
Removed local options maxitems/minitems from \bibbysegment ...... 3.5.2  Biber only
Removed local options maxnames/minnames from \bibbycategory ...... 3.5.2  Biber only
Removed local options maxitems/minitems from \bibbycategory ...... 3.5.2  Biber only
Removed local options maxnames/minnames from \printshorthands ... 3.5.3  Biber only
Removed local options maxitems/minitems from \printshorthands ... 3.5.3  Biber only
Added special field format volcitevolume ................................ 3.6.6  Biber only
Added special field format volcitedepages ............................ 3.6.6  Biber only
Added special field hash ................................................ 4.2.4.1  Biber only
Added \mkcomprange ....................................................... 4.6.4
Added \mkfirstpage ....................................................... 4.6.4
Removed \mkpagefirst .................................................... 4.6.4
Fixed some bugs

215
1.5a 2011-06-17
Fixed some bugs

1.5 2011-06-08
Added option uniquename=mininit/minfull 3.1.2.3 Biber only
Added option uniquelist=minyear 3.1.2.3 Biber only
Updated documentation of uniquename counter 4.6.2 Biber only
Updated documentation of uniquelist counter 4.6.2 Biber only
Expanded documentation for uniquename/uniquelist options 4.11.4 Biber only
Added editorial role reviser 2.3.6
Added localization keys reviser, revisers, byreviser 4.9.2
Added bibliography heading none 3.5.7
Fixed some memoir compatibility issues

1.4c 2011-05-12
Fixed some bugs

1.4b 2011-04-12
Fixed some bugs

1.4a 2011-04-06
Enable uniquename and uniquelist in all authortitle styles 3.3.1
Enable uniquename and uniquelist in all authoryear styles 3.3.1
Fixed some bugs

1.4 2011-03-31
Added package option uniquelist 3.1.2.3 Biber only
Added special counter uniquelist 4.6.2 Biber only
Revised and improved package option uniquename 3.1.2.3 Biber only
Revised and improved special counter uniquename 4.6.2 Biber only
Added \bibnamedelimi 3.8.1 Biber only
Added \bibindexnamedelima 3.8.1
Added \bibindexnamedelimb 3.8.1
Added \bibindexnamedelimc 3.8.1
Added \bibindexnamedelimd 3.8.1
Added \bibindexnamedelimi 3.8.1
Added \bibindexinitperiod 3.8.1
Added \bibindexinitdelim 3.8.1
Added \bibindexinitthyphdelim 3.8.1
Fixed conflict with some AMS classes

1.3a 2011-03-18
Fixed some bugs
1.3 2011-03-14

Support @thesis with isbn .......................... 2.1.1
Updated terseinit option ................................... 3.1.2.1
Allow macros in argument to \addbibresource and friends .......... 3.5.1
Allow macros in argument to \bibliography ................. 3.5.1
Introducing experimental support for Zotero RDF/XML .......... 3.5.1
Introducing experimental support for EndNote XML ............ 3.5.1

Biber only

Added option citecounter ........................................ 3.1.2.3
Added citecounter ............................................. 4.6.2
Added \smartcite and \Smartcite ............................ 3.6.2
Added \smartcites and \Smartcites ............................... 3.6.3
Added \svolcite and \Svolcite .......................... 3.6.6
Added \bibnamedelima ............................................. 3.8.1
Added \bibnamedelimb .............................................. 3.8.1
Added \bibnamedelimc .............................................. 3.8.1
Added \bibnamedelimd .............................................. 3.8.1
Added \bibinitperiod ............................................. 3.8.1
Added \bibinitdelim .............................................. 3.8.1
Added \bibinitdelim .............................................. 3.8.1
Added \bibinitperiod ............................................. 3.8.1
Expanded documentation ...................................... 3.11.4

Biber only

1.2a 2011-02-13

Fix in \mkbibmonth ............................................. 4.10.4

1.2 2011-02-12

Added entry type @mvbook ........................................... 2.1.1
Added entry type @mvcollection .................................... 2.1.1
Added entry type @mvproceedings .................................. 2.1.1
Added entry type @mvreference .................................... 2.1.1
Introducing remote resources .................................. 3.5.1
Introducing experimental rus support .......................... 3.5.1
Added \addbibresource ............................................ 3.5.1
\bibliography now deprecated ..................................... 3.5.1
\bibliography* replaced by \addglobalbib .................. 3.5.1
Added \addsectionbib ............................................. 3.5.1
Updated and expanded documentation ....................... 2.4.1
Introducing smart crossref data inheritance .................. 2.4.1.2
Introducing crossref configuration interface .................. 4.5.3
Added \DefaultInheritance ....................................... 4.5.3
Added \DeclareDataInheritance ................................... 4.5.3
Added \ResetDataInheritance ..................................... 4.5.3
Added \ifkeyword ................................................. 4.6.2
Added \ifentrykeyword ............................................. 4.6.2
Added \ifcategory ................................................ 4.6.2
217
Added \ifentrycategory ........................................ 4.6.2
Added \ifdriver .............................................. 4.6.2
Added \forcecsvfield ........................................ 4.6.4
Extended \mkpageprefix ...................................... 4.6.4
Extended \mkpagetotal ....................................... 4.6.4
Extended \mkpagefirst ........................................ 4.6.4
Added localization key inpreparation ..................... 4.9.2
Rearranged manual slightly, moving some tables to the appendix

1.1b 2011-02-04

Added option texencoding .................................. 3.1.2.1  Biber only
Added option safeinputenc .................................. 3.1.2.1  Biber only
Expanded documentation .................................... 2.4.3.4
Improved mergedate option of bibliography style authoryear .... 3.3.2
Removed pass option of \DeclareSortingScheme ................ 4.5.1  Biber only
Fixed some bugs

1.1a 2011-01-08

Added unsupported entry type \bibnote ...................... 2.1.3
Added \bibliography* ........................................ 3.5.1
Fixed some bugs

1.1 2011-01-05

Added option maxbibnames .................................. 3.1.2.1
Added option minbibnames .................................. 3.1.2.1
Added option maxcitenames .................................. 3.1.2.1
Added option mincitenames .................................. 3.1.2.1
Fixed idemtracker=strict and idemtracker=constrict ....... 3.1.2.3  Biber only
Added option mergedate to bibliography style authoryear .. 3.3.2
Added support for prefixnumbers to bibliography style alphabetic ... 3.3.2
Made option useprefix settable on a per-type basis ........ 3.1.3  Biber only
Made option useauthor settable on a per-type basis ........ 3.1.3  Biber only
Made option useeditor settable on a per-type basis ........ 3.1.3  Biber only
Made option usetranslator settable on a per-type basis .... 3.1.3  Biber only
Made option skipbib settable on a per-type basis ........ 3.1.3  Biber only
Made option skiplos settable on a per-type basis .......... 3.1.3  Biber only
Made option skipslab settable on a per-type basis .......... 3.1.3  Biber only
Made option dataonly settable on a per-type basis ......... 3.1.3  Biber only
Made option labelalpha settable on a per-type basis ....... 3.1.2.3  Biber only
Made option labelnumber settable on a per-type basis ...... 3.1.2.3
Made option labelyear settable on a per-type basis ........ 3.1.2.3  Biber only
Made option singletitle settable on a per-type basis ....... 3.1.2.3  Biber only
Made option uniquename settable on a per-type basis ...... 3.1.2.3  Biber only
Made option indexing settable on a per-type basis ....... 3.1.2.1
Made option indexing settable on a per-entry basis ...... 3.1.2.1
Extended \ExecuteBibliographyOptions ................... 3.2.2
Added \citedate ........................................ 3.6.5
Improved static entry sets ............................ 3.10.5  Biber only
Introducing dynamic entry sets ........................ 3.10.5  Biber only
Added \defbibentryset .................................... 3.5.10  Biber only
Added option mcite ....................................... 3.1.1  Biber only
Added mcite/mciteplus-like commands ................. 3.6.10  Biber only
Added \sortalphaother .................................... 3.8.1  Biber only
Extended \DeclareNameFormat ............................ 4.4.2
Extended \DeclareIndexNameFormat ...................... 4.4.2
Extended \DeclareListFormat ............................ 4.4.2
Extended \DeclareIndexListFormat ....................... 4.4.2
Extended \DeclareFieldFormat ........................... 4.4.2
Extended \DeclareIndexFieldFormat ..................... 4.4.2
Added \DeclareNameFormat* ............................... 4.4.2
Added \DeclareIndexNameFormat* ......................... 4.4.2
Added \DeclareListFormat* ............................... 4.4.2
Added \DeclareIndexListFormat* ......................... 4.4.2
Added \DeclareFieldFormat* .............................. 4.4.2
Added \DeclareIndexFieldFormat* ....................... 4.4.2
Introducing configurable sorting schemes
Biber only
Added \DeclareSortingScheme ............................ 4.5.1  Biber only
Added \DeclarePresort ..................................... 4.5.1  Biber only
Added \DeclareSortExclusion ............................ 4.5.1  Biber only
Added \DeclareLabelname ................................. 4.5.2  Biber only
Added \DeclareLabelyear ................................. 4.5.2  Biber only
Improved special field labelname ..................... 4.2.4  Biber only
Improved special field labelyear ........................ 4.2.4  Biber only
Added \entrydata* ........................................ 4.4.1
Added \RequireBiber ........................................ 4.6.4
Added option check to \printbibliography .............. 3.5.2
Added option check to \printshorthands ................. 3.5.3
Added \defbibcheck ........................................ 3.5.9
Updated support for Portuguese (José Carlos Santos)
Fixed conflict with titletoc
Fixed some bugs

1.0 2010-11-19

First officially stable release
Renamed option bibencoding=inputenc to bibencoding=auto ...... 3.1.2.1
Made bibencoding=auto the package default .................. 3.1.2.1
Added option backend=bibtexu ................................ 3.1.2.1
Slightly updated documentation ............................. 2.4.3
Updated support for Dutch (Alexander van Loon)
Updated support for Italian (Andrea Marchitelli)