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Demystifying LaTeX bibliographies. *

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Abstract In this essay, we will try to explore and explain the vexed problem of including bibliographic references in LaTeX documents (reports, papers, theses etc.). There is a huge plethora of literature on this subject. Infortunately, these materials are focused on LaTeX's experts, which is driven to a developer's point of view level. This current paper will examine bibliographies for common user's point of view, trying to pass by only the essentials of this very vast and involved bibliographic topic. The author hopes that this paper will make LaTeX, enjoyable for more people.

1 Preamble

It is a common practice to refer to various publications when writing a paper, or a report, on a complex subject. LaTeX provides very elegant tools for including details of external publications which you have cited in your main paper. Unfortunately, there is not much material which makes it easy to understand how all this works. This current paper is based on the experiences of a person, who has gone through the pains of understanding how Bibliography works under LaTeX. To make it easier for reader to learn the concepts, this paper has made some simplifications. For a more rigorous and deep research, you must refer to the LaTeX book [lam-1] by Lamport or the Companion book [goo-1] by Goossens. There are some people that say "Lamport wrote the Bible, and Goossens *et al* wrote the Gospel". There is also an excellent tutorial available on the w-w-web [nic-1] with a very detailed review of the concepts behind LaTeX bibliographies. It also gives some very good and practical tips and lots of examples.

*Ask the author for a copy of the LaTeX source of this document (demystify.tex) . You can try out all the examples yourself, by hacking the source.

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2 Terminology and basics

In this section, we introduce some basic terms with a special meaning. For example:

Main document : the document in which you are going to include (cite) external documents;

External document : the material cited in the main document. We are primarily interested in publication details about the external document, and not the contents itself;

Bibliographic list : a consolidated list of external documents. A list gives you essential details about each external document cited in the main document. Also called by "shopping list", it is usually generated and included at the end of the main document, and printed (or rendered) along with the main document, as a separate section. Sometimes, the section is titled as **References**, or **Bibliography**, depending on your document style. If you wish, it is possible to replace the title **References** or **Bibliography** by any title of your choice, using the `\renewcommand` command, but this is other topic to be written;

You will also need a "bibliographic style" file (.bst), which is responsible to format the bibliographic list displayed in the document. The style specifies the sequence/ordering in which details will be given for each external document cited by you,such as font style and size and so one. The bibliography style may be either a standard one defined by editors, or a specific style was defined by you;

Bibliographic database: the bibliographic list, rich of details, to be cited in your main document. It can be grouped and located as:

1. **Built-in :** in the case of `\begin{thebibliography}...\end{thebibliography}` environment, the database is part of the main document itself.
2. **External :** a external database file has the publication details of various external documents (e.g. BibTeX file (.bib)).

Each external document (identified by a `\bibitem` command) occupies one

record of the database. Each record can be composed of several fields, such as:

1. Name(s) of the author(s);
2. Title;
3. Journal, book, conference, or other location where the document was published;
4. Volume number, issue number etc.;
5. Place of publication;
6. Name of publisher;
7. Date of publication.

This current paper shows you a simple way to switch between these two options.

3 Choose the right tool

The first thing that we must remember is that, it is not always necessary (or justified) to use an elaborate tool in order to create a Reference/Bibliography list. You can always make-do with :

1. Footnotes;
2. Enumerated lists, combined with `\ref & \label`.

Maybe, these methods can be clumsy, and cumbersome at times, but they are down-to-earth, and need no special skills. However, there are situations when a more sophisticated method is necessary. To this case, two alternatives are available:

1. **Built-in bibliography**, using the `\begin{thebibliography}...\end{thebibliography}` environment.
   The `\begin{thebibliography}...\end{thebibliography}` environment is simpler. It is part of the main document itself. In this approach, you will have to retype, for each main document, all details of all the publications, cited by you in the main document.

2. **External bibliographic database** (usually, BibTeX).
   This is an external database (given usually as a .bib file). It is much more elaborated than the `\begin{thebibliography}...\end{thebibliography}` option. The benefits are that you do not need to retype details of all the publications, whenever you use the data from this database and share it. In addition, you can use more than one external database (in the same main document), if you wish. The bibliographic list includes details of all the documents cited by you (even if they are stored in different databases). This feature helps you to avoid huge monolithic databases. You can create smaller (and more manageable) databases, grouped by theme, or grouped in some other convenient way.

   Sometimes, you would like to list out a document in the bibliographic list, even if you have not cited it explicitly in the main document. You can fake a `\cite` using the `\nocite` command (please visit Section 6 for more details).

This paper uses the built-in bibliography `\begin{thebibliography}...\end{thebibliography}`, to illustrate the actual use of bibliography tools. However, this paper will examine both the above tools. For the case of special bibliographic database (BibTeX), you will have to use a different set of files (horse.tex, zebra.bib) as example. You can get these two files by sending an email to the author.

4 Built-in bibliography

Use the `\begin{thebibliography}....\end{thebibliography}` environment if you have a (.bib) file but wish to transport a final but compilable version or to develop a particular and small "dataset" inside the main document. This flexibility permits you to pack only the necessary references from the whole database (.bib). This is the easiest way to include bibliography in your main document. In fact, as D Venugopal[1], a remarkably mature user of LaTeX usually says:

> If you are not a serious researcher, and write only one or two research papers in your entire life, then use the

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`\begin{thebibliography}....\end{thebibliography}` environment. Otherwise it is best to create a .bib file.

Your main document will look like this :

```
\documentclass{someclassname}
Preamble stuff goes here
\begin{document}
The contents of your main document go here.
You can cite  an external document like this:
In \cite{paper1} Partha has given a long lecture
about LaTeX. And in \cite{paper2} he gives examples
about how to use LaTeX. In \cite{shake3},
Mark Anthony said ``Friends, Romans,
Countrymen...lend me your ears''.
```

If you use, the `\begin{thebibliography}...\end{thebibliography}` environment (like this paper), details about the above three external documents must be listed in the `\begin{thebibliography}...\end{thebibliography}` environment (as part of your main document itself), like this :

```
\begin{thebibliography}{abc}
\bibitem{paper1}Authornameofpaper1, and other details
\bibitem{paper2}Authornameofpaper2, and other details
\bibitem{shake3} William Shakespeare, Julius Caesar,
Pub.: Shakespeare Press,
Stratford-upon-Avon (UK), July 1623.
\end{thebibliography}
\end{document}
```

Run LaTeX twice on this main document, and you will get your final documentincluding the bibliography, listed at the end of the document (bibliographic list). In the current paper, the bibliographic list is shown as **References**, at the end of the paper. You can also take a look at the source code to understand how it `\thebibliography` works.

5 External bibliography

LaTeX provides a standardised way of building an external bibliographic database. Unfortunately, this method is not frequently used. Do not get discouraged if you do not understand BibTeX in your first run. BibTeX is a complex subject, i.e., a rich approach. Even the name is confusing! For instance, some authros refer BibTeX as a database file, a database format and also the name of the program that is used for processing the datasets included in a BibTeX database. It has many variants and options. Fortunately for us, BibTeX has been explained in this paper by simple concepts to be used for.

When you use BibTeX, you will need :

1. A method of specifying where the bibliographic data is stored (a path).
2. A method of specifying how the data will be displayed in the bibliographic list (a style stored in a .bst file).

In our example for the use of BibTeX, the main document is called horse.tex (horse.tex is similar to the current demystify.tex, except that the built-in `\thebibliography` environment was replaced by the external bibliographic database zebra.bib). Let us create and use a BibTeX database called zebra.bib (BibTeX files always have the extension .bib)[2]. Each record of the database will have an identifier key (used by the `\cite`), followed by the fields. Each field of each record has a name + value pair. The name and the value are separated by an = mark. The name/value pair is used by LaTeX to decide the style in which the bibliographic list will be composed (sequence/ordering of fields, fonts style/size etc.). Below, an example of a record from the horse.bib file is shown:

```
@BOOK{goossens1,
   author = "M Goossens and F Mittelbach and A Samarin",
   title = "The \LaTeX\ Companion",
   publisher = "Addison-Wesley",
   year = 1984
   }
```

2. You can get horse.tex and zebra.bib from the author

Notice that the author names are connected by "and". You may get a lot of warnings when you run LaTeX on horse.tex for the first time. So, LaTeX must be run two more (three times). The warnings will disappear. Notice also, that the .bib file does not have any `\bibitem`. Actually, LaTeX generates a new file with the extension .bbl where it puts the data in a structured list-like form, using the `\bibitem` (similar to `\item` in a list).

You will also notice that BibTeX files have a very cumbersome syntax. There are special tools available for creating BibTeX files e.g. Bibdb[3], tkbib[4] or JabRef[5]. But, the price you pay, is that you have to spend time, to learn using these tools. Creating all your bibliography data as a BibTeX file would be necessarily painful. So, why bother at all ? There are many reasons :

1. BibTeX is a standardised way of collecting bibliographic data. Many organisations and publishers use this standard. It makes sense to follow such a widely accepted standard;
2. You can cite references from more than one BibTeX file inside your main document. Imagine, you have two BibTeX files : zebra.bib and tiger.bib. You can decide to use the references from both these databases, into the same document, like this : `\bibliography{zebra,tiger}` Of course, the citekeys you use in `\cite` must uniquely belong to one of the many BibTeX files you have selected in the `\bibliography` command;
3. You can reuse the bibliographic data, in more than one document. Imagine, you have created two main documents : horse.tex and mule.tex. In both these documents, you can use the data from the same database using e.g. `\bibliography{zebra}`.

Imagine a research team working on a special project. All the references and bibliographies used by the team, can be assembled in one BibTeX file. In a school, all scholar researchers can share the same BibTeX file and cite references from the common bibliography, in their individual papers. The students will not have to collect and type out the bibliographic details each time.

3. Bibdbit is downlodable at http://www.mackichan.com
4. tkbib is downlodable at http://vlsicad.cs.binghamton.edu/~pmadden/tkbib
5. JabRef is downlodable at http://jabref.sourceforge.net/

Now, imagine all research teams in the same institution, but working on different subjects, they have their own BibTeX files, for their own subject. The Director of the institution can draw references from all these bibliographies, when he writes a paper giving an overview of the institution and all the research activities of the institution. He will not have to collect, and compile, a bibliography of his own. BibTeX comes in as a handy database tool in such cases.

Usually, a researcher publishes his work in different journals and conferences. Each journal/conference has its own standards for presenting the bibliography list. The sequence in which the records are sorted, the sequence in which the fields of each record are presented, the formatting style for presenting each field, is specified by the journal/conference. Using a standard base like BibTeX, you can easily switch between various presentation styles, just by changing the `\bibliographystyle` command.
In all these case, the effort of creating a database using the clumsy-looking syntax of BibTeX becomes worthwhile.

6 Uncited citations

Now, what does that mean ? Maybe you want to refer a work from the .bib file but you do not actually `\cite` in the text. So, you use the `\nocite{MOZART}` command in the .tex source. As a consequence, the reference labeled by MOZART will appear at the bibliography list, although there is no place in the rendered main text where you have cited it. The `\nocite{MOZART}` document is a kind of orphan, who exists in the bibliography list (orphanage), but has no home (in the body of the main text). To give you an practical example, there is a book of Don Knuth in the bibliography list of the horse.tex file, but it was not mentioned anywhere in the body of the main document. You will need this artefact, if you want to give a list of useful reference documents, but have no specific reason to cite them in the body of the main document.

7 Closing remarks

LaTeX produces very elegant documents. It gives you tools for develop your documents. In addition, several facilities to cite bibliographies inside your main text. These facilities are useful for storing and presenting your bibliographic data in a standardised way (and reusing them, if necessary).
Note : The following portion gives you the thebibliography database in two forms. You can block any of the these forms by using a `verbatim` environment as an envelope. You will see the citations shown as plain numbers or as small texts (in the rendered version) , depending on which portion you decide to leave unblocked. The part which is blocked using `verbatim` will show up as unordered code, in the rendered version, like this :

```
\begin{thebibliography}{ww}
\bibitem{lampo1}L. Lamport, LaTeX : A document preparation system,
Pub.: Addison-Wesley, 1986 (The LaTeX bible)
\bibitem{goossens1} M Goossens, F Mittelbach, A Samarin,
The \LaTeX\ Companion, Pub.: Addison Wesley, 1994. (The LaTeX gospel)
\bibitem{beast1}Nicolas Markey, Tame the beast,
URL http://
http://tug.ctan.org/tex-archive/info/BibTeX/tamethebeast/ttb_en.pdf
\end{thebibliography}
```

Bibliography management is a very crucial part of the work of people who desire to publish technical papers and reports regularly. LaTeX provides convenient tools for bibliography management. This paper has given an overview of the concepts involved. In particular, we have seen some fundamental details about BibTeX. BibTeX is a very rich and sophisticated tool. The reader must study the references given at the end of this paper, to fully master all the concepts involved.

8 Acknowledgements

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References

[lam-1] L. Lamport, LaTeX : A document preparation system, Pub.: Addison Wesly, 1986 (The LaTeX bible)

[goo-1] M Goossens, F Mittelbach, A Samarin, The LaTeX Companion, Pub.: Addison Wesley, 1994. (The LaTeX gospel)

[nic-1] Nicolas Markey, Tame the beast, URL
`http://tug.ctan.org/tex-archive/info/BibTeX/tamethebeast/ttb_en.pdf`

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