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THE PracTeX Journal

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THE PracTeX Journal

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Paul Blaga and Lance Carnes

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In this issue

This issue marks the completion of the third year of The PracTeX Journal. One of the Journal's original objectives is broadening the base of TeX and LaTeX users. So it is fitting that this issue's theme is **Teaching LaTeX and TeX**.

Two of the ten papers from this issue (that of Paul Blaga and Nicola Talbot) directly address the problems related to the teaching process. Here we should also mention Jonathan Fine's article describing a new approach to learning TeX through a web service. Several other papers, by Rohit Kumar, Lapo Mori and Maurizio Himmelmann, and Keith Jones, are devoted to related subjects (writing a thesis or a curriculum vitae with LaTeX).

The remaining three papers are more technical and describe how to use packages for handling tables (paper by Wybo Dekker), construction of a conference proceedings (Vincent Verfaille), and drawing scientific graphics (Senthil Kumar). Wybo and Vincent are also the authors of the respective packages.

Finally, the paper by S. Parthasarathy is about using lists in LaTeX.

Thank you and enjoy this issue!

Next issue: LaTeX-niques

For the next issue we invite readers to submit articles on how parts of documents are constructed. Let us know how you deal with figures, tables, bibliographies, indexes, tables of contents, or any other document part. Your article can be a short note on a technique you have used successfully, or it can be a full-blown survey of some particular aspect, such as indexes. Send your article idea to the editors.

Thanks

Many people have collaborated directly or indirectly to the success of this electronic journal: the authors, particularly the ones who have worked with me in the revision process, the production editors, and the readers.

Thanks to Production editors Will Robertson, Yuri Robbers, Francisco Reinaldo, and Keith Jones; reviewers Jon Breitenbucher, David Auslander; and to others who proofread the articles and provided useful comments and feedback.

Editorial: Teaching LaTeX and TeX

TeX and its various extensions (LaTeX, ConTeX, ...) are without doubt among the most important contributions to the digital typesetting landscape in the last three decades. It is, therefore, somehow strange to discover that, although many people ***learn*** TeX, there are only a few who teach it. The emphasized ***learn*** is significant. How ***is*** LaTeX actually learned? Well, in most situations people just apply the ***learning by doing*** paradigm. They begin with a sample document, found online or from a colleague, and modify it. What this method misses, though, is a lot of the richness of LaTeX. As we have discovered more than once while editing this journal, many authors rarely use automatic citations, lists, numbered equations, and other basic constructions.

Many users either don't understand the philosophy of LaTeX or are perhaps reluctant to venture out and discover some of the finer points. To use LaTeX in the same way as an ordinary text processor, using only centering, boldface fonts, italic fonts, is like owning a deluxe car and using it only for trips to the neighborhood market. By not using more of LaTeX's rich set of formatting capabilities the user is producing only ordinary-looking documents and is missing out on a lot of the fun.

One of the offerings of The PracTeX Journal is downloadable source files of the articles. Readers continually ask for these, in order to study them and learn, and many authors consent to make them available. But some authors do not want to make their source documents public. The reasons for this vary, but one excuse often heard is that the author is afraid that he or she has not used LaTeX correctly, and of course doesn't want this made public. What is this elusive LaTeX ***correctness ?*** Is it an esoteric game only for a handful of the initiated, or can anyone learn it?

These are some of the reasons we think the TeX community should offer as many teaching opportunities as possible. It would be ideal, of course, to offer long courses, providing the students the opportunity to learn about LaTeX's richer constructions. But short courses are also welcome, teaching a range of topics from the introductory basics to the more specialized areas such as ***beamer*** for producing slides, or on a particular subject like tabular material, graphics, and commutative diagrams.

Another area where the TeX community can assist in teaching is through reference materials. There are many excellent LaTeX and TeX books on the market, and many web sites with useful material. However, only a small number of the books are suitable for classroom texts, and few of the web sites are targeted to the beginning or intermediate LaTeX user.

We are confident that only through teaching LaTeX can we broaden LaTeX's user base and help people produce better, nicely-formatted documents. If you are an experienced LaTeX user consider teaching a LaTeX class or session at your organization &mdash it has high job satisfaction. The user will get more out of the hard work of composing a document, and those of us who must work with these documents, such as journal editors and publication production staff, will have an easier job.

So, happy teaching (and learning)!

THE PracTeX Journal

News from Around: Conferences in Pisa and Cluj (Romania); LaTeX workshop in Berkeley; *Helvetica* — the movie

The Editors

- Comment on this paper
- Send submission idea to editor

Recent events

The 4th Annual GuIT Meeting
By Lapo Mori

The Fourth Italian Conference on TeX, LaTeX, and digital typography, organized by GuIT (Italian TUG), was held in Pisa at Scuola Superiore Sant'Anna on October 13, 2007. The success of the meeting, with over 80 people attending the morning session, is a clear sign that the Italian LaTeX community is growing. This is certainly due to the activities promoted by GuIT, including a semiannual journal (Ars TeXnica), the annual meeting, the website, the forum and LaTeX courses.

The talks, which were all open to the public for free, were held both in the morning and in the afternoon. They covered a wide range of topics, and were chosen to appeal to all levels of users.

Lapo Mori talked about the curriculum vitae, first from a generic point of view and then showing the available LaTeX packages and how to customize them. Claudio Beccari and Andrea Guadagni presented their experience in preparing with LaTeX both the paper and the electronic version of a technical manual (il Prontuario dell'Ingegnere, published by Hoepli).

The following session was all about graphics (and in particular PSTricks) in LaTeX. The three talks

regarding graphics were of different difficulty. Massimo Caschili reviewed the basics of PSTricks, Luciano Battaia showed some advanced application that he carried out with his high school students, and Agostino De Marco presented some amazing 3D drawings that he created with Sketch/LaTeX/PSTricks/Tikz.

Stйphane Matiz and Gianluca Gorni presented a package that they developed to include LaTeX fonts into figures made with Mathematica.

The following session focused on using fonts with LaTeX. Claudio Beccari presented the new edition of the Type1 fonts that are used by the slide class. Massimiliano Dominici showed some advanced typographic adjustments that he used to reproduce a seventeenth century document with Fell Types.

As usual, many talks were given by international spokesmen. Klaus Hцppner (DANTE e.V.) spoke about tables with LaTeX, Norbert Preining explained some innovations in TeX Live, and Jean-Michel Hufflen talked about automatic references in LaTeX. Kaveh Bazargan, from River Valley Technologies, recorded the talks which are now available at the GuIT web site.

The meeting coincided with the end of the term of the GuIT presidency. Maurizio Himmelmann gave his final speech as president and Massimiliano Dominici took charge. Despite the good results obtained by GuIT in the past few years a lot of work lies ahead: mainly with the LaTeXpedia project and with the organization of EuroTeX 2010, for which GuIT is a candidate host. As regards LaTeXpedia, a task force of GuIT members has just started to work on the software infrastructure and we hope to go public in a couple of months. We will keep PracTeX Journal readers informed about the developments.

(Recently, GuIT published the third annual issue of their journal, ***Ars TeXnica .*** Contact GuIT to order a copy of this nicely typeset journal (in Italian).)

The **Transylvania TeX Conference**, and the founding meeting of the **Romanian TeX Users (GROTeX)**
by Paul Blaga
The first Transylvania TeX Conference was held in Cluj-Napoca, Romania, on September 1, 2007. It was attended by colleagues from several universities in Transylvania. The aim of the meeting was twofold:

- to discuss some specific TeX topics: Paul Blaga and Horia Pop talked about problems related to the LaTeX curriculum, and Sandor Horvath spoke about the `hyperref` package;
- to discuss the creation of a TeX Users Group in Transylvania, and establishing a journal dedicated to TeX and friends.

We decided to proceed with the formal aspects creating the group, writing a charter, and the legal issues of registering the organization. As for the TeX journal, we decided to ask for support from the "Babes-Bolyai" University from Cluj-Napoca and Cluj University Press, the publishing house of the university. We also decided to create a CTAN mirror at "Babes-Bolyai" University in the near future.

LaTeX workshops in Berkeley

Four LaTeX workshops were held October 12, 2007 at the UC Faculty Club on the University of California, Berkeley campus. The topics were: Introduction to LaTeX, Document Structure, Graphics and Tables, and Typesetting Mathematics. The presenters were David Auslander, Richard Cottle, and Lance Carnes. The first two speakers are experienced university professors and long-time LaTeX users. The event was sponsored by PCTeX.

There were 20 attendees, each with a laptop computer and a LaTeX system installed. Most attendees had less than three months experience with LaTeX.

Each of the four 90-minute workshops was to follow this format: the speaker would present a topic for about 15-20 minutes, then pause to allow attendees to do exercises based on the new material. Each exercise was to be followed by an explanation and a Q&A. Each 90-minute session would have three of these 30-minute segments.

Attendees reported that they learned a lot and that the workshops were useful in getting past that uncomfortable start of using a new software system. At the end of the day they had enough LaTeX skills to compose a document with figures, math, a table of contents, bibliography, and index.

Future workshops are being planned. Based on this first one some adjustments will be made. Having two workshops in a day rather than four will be more effective, and more time will be spent with exercises and Q&A.

Helvetica — The Movie

In the spring of 2007 **Helvetica**, a movie about the popular typeface, was released. It has been shown in a number of theatres around the world and been well-received. Check the web site for screening locations and DVD availability.

Below are some comments on the movie by Charles Bigelow, co-designer of the Lucida fonts, Professor of Typography at Rochester Institute of Technology, and a film enthusiast. This spring he will introduce a screening of the film at the Dryden Theatre in Rochester, NY.

It's an enjoyable, informative, and interesting movie, though by focusing on contemporary personalities - which is natural for a movie - it creates a misperception. If your knowledge of Helvetica came only from this movie, you might think the face is a unique creation of the mid-20th century, instead of just one of several competing faces in the "grotesque" genre, such as Univers, Akzidenz Grotesk, Folio, Venus, and related sans-serif designs of the 19th and 20th centuries.

That quibble aside, it is true that Helvetica (originally named Haas Neue Grotesk) is the grotesque design that became the most famous of its genre (excluding its various clones, plagiarisms and close imitations), and the reasons for its success are entertainingly discussed and debated by the various talking heads in the film.

I particularly liked Wim Crouwel's lucid explanation of Helvetica's relationship to modernism.

(The generic name "grotesque" used for a subset of sans-serif typefaces dates back to 1832, when the Thorowgood typefoundry in England issued sans-serifs named "Grotesque". The first sans-serif type was issued by the Caslon foundry in 1816, under the name "Egyptian.")

THE PracTEX Journal

Teaching LaTeX: Why and How?

Paul Blaga

Abstract

We discuss some of the problems related to the process of learning of LaTeX and the challenge of designing a LaTeX course. We also propose a syllabus for such a course and briefly mention some of the LaTeX books which, in my opinion, are suitable to be adopted as course material.

Paul Blaga is an Assistant Professor of Geometry at the Faculty of Mathematics and Computer Sciences of the "Babes-Bolyai" University in Cluj-Napoca, Romania. He started using LaTeX in the early 1990's. Initially, his interest was just for writing scientific papers, but afterwards he became more and more involved and gradually turned into a great LaTeX fan.

He has served several years as an editor of the mathematical journal **Studia Universitatis Napocensis, Mathematica** and was responsible for switching it to LaTeX in the late 1990's. He is also the co-author of a book on LaTeX.

His main interests in LaTeX are related, especially, to the graphical capabilities -- not only commutative diagrams, but also more complicated drawings, made, for instance, with PSTricks.

You can reach Paul at `pablaga@cs.ubbcluj.ro`

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Teaching LATEX: Why and How?

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Romania

Abstract We discuss some of the problems related to the process of learning of LATEX and the opportunity of a LATEX course. We also propose a syllabus for such a course and briefly mention some of the LATEX books which, in our opinion, are suitable to be adopted as course material.

1 Is teaching LATEX really necessary?

Let's face it: LATEX courses are very rare. Only now and then one can find a university offering an introduction to the basics. Some probable reasons for the scarcity of organized LATEX learning are, in the opinion of many LATEX users:

- LATEX is very easy to learn, after all;
- there are plenty of excellent (and free) introductions on the internet.

In spite of the validity of these claims, from our experience as editors of this journal and in discussions with colleagues, it seems to us that:

- Many users of LATEX learned the basic elements of writing a document only and stopped there, having yet to explore LATEX's richer features.
- Many mathematical users don't employ equation-like or theorem-like environments. Other users don't use some of the *real* advantages of LATEX, such as automatic numbering, reference citations, figure references, etc. Often an article document appears without the title, author, sectioning, and other usual commands, thereby missing most of the fun.
- The great majority of users rarely use fonts other than the default Computer Modern Fonts.

- Very few people use the many customization options available in LaTeX. As a consequence, even users with a fair knowledge of LaTeX produce documents which all look alike. As a result we are left to read a huge number of journals and books (some of them produced by well-known international publishers) which all look the same. It is no longer possible to tell, looking at a document's typography, who produced it.
- It is sad to see at many mathematics conferences, for instance, how few presentations use (in a proper way) the capabilities of LaTeX. Actually, most of the presentations are either just pages from an article, or they are prepared using Power Point (which is a shame for a mathematician).

We are of the opinion that if the LaTeX community doesn't get more involved in making LaTeX more accessible to a wider audience, for instance through teaching, the best part of it will remain only an esoteric game for the few initiated. An additional barrier to more widespread use is that although there are plenty of books on LaTeX only a few can effectively be used as textbooks in a teaching environment.

2 The goals of a LaTeX course

In our opinion, after taking a LaTeX course, the student (a mathematician or computer scientist, for instance) should be able to do at least the following:

- format an article or book in a correct and structured manner, and using fonts other than the default ones;
- be familiar with the tools for producing bibliography and indexes (such as BibTeX or Makeindex);
- include graphics files in the document; and
- use LaTeX to produce professional-looking PDF documents.

In addition, mathematicians should be able to

- build complex mathematical structures;
- produce specialized graphical material such as commutative diagrams and graphs.

Computer science students and others who have technical skills should be able to format specialized figures and diagrams, such as the description of an algorithms or the production of simple drawings using LaTeX tools.

3 A LaTeX course outline

Creating a course syllabus is not an easy job. This is true for any course, and especially for a LaTeX course where there are few existing course outlines to draw from. There are many things to consider: you have to take into account the background of the students, the goals of the course, the teaching facilities available, and so on. We provide here one example of such a syllabus, for teaching students in mathematics or computer science. The amount of material that can be covered depends, of course, on the time available and the level of the students' interest. This course outline can be adapted for students in other disciplines as well.

3.1 Introductory notions. Handling errors.

Years ago, before the era of the personal computers and notebooks, TeX distributions were usually installed by the system engineers and were available for everyone. Nowadays, however, each user would like to have TeX installed on his own computer. Since there are many different personal computer versions available, some of them command-line and some graphical interface, one of the first problems a course designer faces is which one or ones to use for the course.

As we all know, the LaTeX source files are plain text files, therefore any text editor is sufficient enough to prepare them. It is, however, wise to choose an integrated editor, specialized for LaTeX, and give students some basic ideas on its use. It is always a good idea to choose a free editor, if available (such as TeXnic Center under Windows, or Kile under Linux), but this is not necessarily the rule, especially if the students are willing to make a small investment in a better editor.

With the system installed and with some familiarity of the basic use of the LaTeX system, the students are now prepared to begin learning the basics of LaTeX. Clearly, we should start with the simplest LaTeX files, including only the basic commands. Later, additional commands and structures can be introduced.

It is also useful to describe the main types of errors that can occur. When using LaTeX for the first several times the student is likely to make more errors

than anything else. It is a good idea to get the students used to reading the LOG file. It is fairly common for LaTeX users to ignore the log file. However, it contains a lot of useful information and can point out why the output you get is not exactly what you expected it to be.

We might also introduce here the sectioning commands for articles and books, as well as the bibliography environment. By doing so the student is equipped to format a simple article. Later, the student can return and add richer commands to the basic set. It is probably best to avoid a teaching method that tries to present too much detail at once.

3.2 Formatting text and mathematics

In this part of the course the goal is to learn the basic formatting methods for both text and mathematics. We should describe first the "modes" of LaTeX: paragraph mode, left-to-right (LR) mode, and math mode, and explain how LaTeX behaves in each mode. At this stage we can describe the basic commands for formatting text, such as special characters, using fonts, and a description of ways to change their characteristics, such as spacing and justifying text. For formatting mathematics, describe how to enter and leave math mode, for both inline math, display math, and the use of math symbols in text.

Also, it is a good idea to introduce the `babel` package, enabling the use of text in other languages.

3.3 Often-used LaTeX environments

In this part of the course, the intention is to familiarize the student with the most often used environments:

- theorem-like environments (with the extensions provided by the packages `amsthm` and `theorem` from the `tools` group);
- environments of equation type (for the moment, only `equation` and the starred version, provided by `amsmath`). We shall avoid the (by now obsolete) `eqnarray`).
- environments for producing tabular material (including the packages `tabularx` and `longtable`). If the course is addressed to computer scientists, then it is

a good idea to mention, also, the `tabbing` environments, on which the packages for typesetting algorithms are usually based.

- text environments, like `quote`, `quotation`, `verse`, more useful to non-mathematicians, but, also, the `minipage` environment.

3.4 Mathematical formulae

This is a part of the course devote, almost entirely, to mathematicians (and, maybe, physicists). The intention is to speak about more complex formulae, including, for instance, systems of equations, matrices, large operators with indices and so on. Essential here is the `amsmath` package, providing a wealth of commands and environments for typesetting complex mathematics, as well as the font package `amsfonts`, containing a lot of symbols which are not available in standard LaTeX. While teaching the basics of math typesetting it is an appropriate time to give the students the list of symbols provided by standard LaTeX, as well as various symbols provided by other packages the students might be using.

3.5 LaTeX programming

This is something for more advanced users, but is, nevertheless, important. The students will be taught how to define new commands, new environments, lists, counters, length, boxes, and other techniques.

3.6 Bibliographies and indices

First, we shall review the basic commands for producing bibliographies, and then show how two use several programs for handling bibliography databases (BibTeX), and indexes (Makeindex and, possibly, xindy).

3.7 Producing and including graphics in a LaTeX file

We shall describe here several packages and programs for producing graphical material. There are many programs that produce graphics, of course, and almost any ot them can be used. Our intention, however, is to focus on programs providing (among others) LaTeX output. The intention is to familiarize the students

with the basics of PSTricks (for general graphics) and Xy-Pic (for commutative diagrams) and to initiate them in the use of programs such as LaTeXDraw, JsDraw or Xfig.

For the inclusion of graphics, of course, the natural choice is the package `graphicx` and its relatives from the `graphics` bundle (for instance, `color` for producing colored text or background).

3.8 Floating bodies

Floating bodies are, essentially, figures and tables. We shall describe both their basic function and the packages which allow better handling of (`subfigure`, `float`, `rotating`, ...).

3.9 Producing slides with LaTeX

There are several packages and classes for producing slides with LaTeX. Our first choice is `beamer` which is surprisingly easy to use and the results are spectacular. `beamer` has a wide assortment of frame styles, and can produce many special effects.

3.10 Postscript fonts

Postscript fonts are indispensable for producing professional-looking documents. We recommend some free (and some non-free) Postscript fonts which are available, both for text and mathematics. We also explain how to replace the default Computer Modern fonts with other fonts, by using the Postscript New Fonts Selection Scheme (PSNFSS).

3.11 LaTeX and other markup languages

The intention is to describe the package `hyperref` for producing PDF files, as well as the connections between LaTeX and MathML.

4 How to teach LaTeX?

There are few reports on LaTeX teaching available (see, for instance, the paper of Nicola Talbot, in this issue of the journal for some very useful tips) because, apart from very short introductions, LaTeX courses are rather rare.

The author is currently giving a course for undergraduate students in mathematics and computer science. Here are some of outcomes to date:

- As the main operating system in use in the university (and, more generally, in Romania) is Windows, the natural choice for the TeX distribution to use was MikTeX. The computer experts of the university were kind enough to install it on all the computers we used in the classroom.
- As someone pointed out, "LaTeX is not a spectator sport." It is crucial for the students to use it on their own personal computers. Therefore, we chose ProTeXt as the most complete and easy to install version. Because the installation kit is rather large, we provided CD versions for all the students.
- There are, basically, two excellent LaTeX-adapted editors for Windows: TeXnic Center and Winedt. We decided to use TeXnicCenter because because it is completely free and is included with ProTeXt, whereas Winedt is shareware. We would like to mention, nevertheless, that some of the commercial implementations of TeX also have free editors which are useful. An example is the "PCTeX Reader", which comes with the shareware version of PCTeX (and can be downloaded from the web page http://www.pctex.com). The free Reader version can edit and view TeX files, but you must have a licensed version in order to typeset files and perform other functions.
- We decided to use an interactive teaching method, where the students follow along with the instructor and immediately try all new material.
- As a teaching tool, we provided the PDF version of a document and the students attempted to "recreate" the LaTeX source.
- Besides the basic material, the rest of the subjects were strictly related to the students' interests, as the main aim of the course is to help students prepare their diploma theses with LaTeX. We discussed, therefore, some non-standard subjects such as algorithms.

- Obviously, there is not enough time in the classroom to discuss everything in detail. Therefore, detailed lecture notes were prepared and made available, along with many examples, on a web page. This might be expanded to provide advanced LaTeX courses as well if needed.
- The outline we have been discussing is meant for a course devoted to computer science and mathematics students. While some of the subjects, algorithms and MathML, for instance, are specialized, a large part of the course is general and can be taught to students of any discipline. The syllabus can be adapted for other course subjects as well, for instance, for physics we could include the package for drawing Feynman diagrams, or, for chemistry packages that format chemical formulae. A significant part of the course can be taught, as well, to students in literature, concentrating on formatting text, poetry, plays and the like; or even to musicians, because LaTeX has musical typography capabilities (see the Distractions column in this issue).

5 Documentation

In spite of the wealth of LaTeX books, there are few that are suitable for use as textbooks in a classroom setting. In our opinion, aside from classical book by Leslie Lamport (see [3]), the books most useful for teaching are those by George Grätzer ([1, 2]). Among the free resources available over the Internet, the closest to our idea of teaching LaTeX is, no doubt, the book by Peter Flynn, *Beginner's LaTeX*, available at many internet sites. This book, however, doesn't treat the "mathematical" part of LaTeX.

6 Acknowledgments

The author would like to thank Lance Carnes for his interests in this article and his pertinent remarks.

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[2] Grätzer, G. – *More Math into LaTeX*, Springer, 2007

[3] Lamport, L. – *LaTeX: A Document Preparation System*, second edition, Addison-Wesley, 1994

[4] Talbot, N. – *Teaching LaTeX for a staff development course*, this issue of the PracTeX Journal

THE PracTeX Journal

A new package for conference proceedings

Vincent Verfaille

Abstract

The new confproc package is a simple and efficient solution to build conference proceedings. Built from scripts developed for the DAFx-06 proceedings, it deals with various aspects: layout issues, table of contents, index of authors, maybe a general bibliography, etc. It combines the pdfpages package (to include PDF papers), the hyperref package (to provide hyper-links) plus other packages; and it runs pdfLaTeX.

Vincent is a post-doctoral student in Music Technology at McGill University. He first enthusiastically used LaTeX during his engineering studies in Applied Mathematics in 1995 to produce a technical report. During his PhD in Mathematics, Acoustics and Computer Science Applied to Music (ATIAM), his experience of LaTeX convinced him that "learning a new LaTeX package every day keeps the doctor away". The post-doc experience, and the co-organization of a conference, changed it into "writing a LaTeX package once keeps you away from writing another one"! Contact him at: vincent [@at@] music [.dot.] mcgill [.dot.] ca

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Abstract The new confproc package is a simple and efficient solution to build conference proceedings. Built from scripts developed for the DAFx-06 proceedings, it deals with various aspects: layout issues, table of contents, index of authors, maybe a general bibliography, etc. It combines the pdfpages package (to include PDF papers), the hyperref package (to provide hyper-links) plus other packages; and it runs pdfLATEX.

Contents

1 About this package

1.1 History

1.1.1 The Origins: a set of scripts

When building the proceedings of the 9th International Conference on Digital Audio Effects[1], I wanted to provide the best quality proceedings possible. Even though valuable contributions explain how to generate PDF proceedings [1, 2, 3], I had to use many tricks and to develop my set of LaTeX commands in order to combine several packages, to build and automate a LaTeX with the features I wanted. Tricks used and choices made have been partially explained on the DAFx-06 website [4], and more deeply in an internal report [5]. After a while, a few people started to use those scripts for other conference proceedings including:

- 5th International Linux Audio Conference[2], Marije Baalman, editor;
- 13th International Conference on Auditory Display[3], Gary Scavone, editor;
- Journal on Multimodal User Interfaces[4] Christian Frisson, editor;
- 10th International Conference on Digital Audio Effects[5], Sylvain Marchand.

So, I distributed a short example version to them.

1.1.2 A class?

The demand for these scripts prompted me to convert them to a class so that a wider community could benefit from them. To write the `.cls` file, I used the documentation for class and package writers [6].

1.1.3 A `package`!

Later on, I learned to use Docstrip and wrote a `.dtx` file that produces all necessary files (class, example, scripts, documentation), using Docstrip's documentation [7] and the very helpful documentation on how to package a package [8].

1. DAFx-06, Sept. 2006, Montréal: http://www.dafx.ca/proceedings.html
2. LAC2007, March 2007, Berlin: http://www.kgw.tu-berlin.de/~lac2007/proceedings.shtml
3. ICAD'07, June 2007, Montreal: http://www.music.mcgill.ca/icad2007/proceedings.php
4. JMUI 1, 2007: http://www.jmui.org/index.php/JMUI/issue/view/
5. DAFx-07, Sept. 2007, Bordeaux: http://dafx.labri.fr/dafx07_proceedings.html

1.2 Description of the solution developed

Based on the `book` package, `confproc` lets you build a document containing:

1. preamble: definitions;
2. front matter: cover, publishing info, welcome letters, TOC (roman numbers);
3. main matter: compilation of papers (arabic numbers);
4. back matter: general bibliography, index of authors.

It runs pdfLaTeX and simplifies many processes by combining packages. It:

1. automatically (re)generates the proceedings (using LaTeX and Unix scripts);
2. concatenates PDFs papers with `pdfpages` [9];
3. provides 'clickable' links to corresponding pages from the TOC[6], the index of authors and the full bibliography, using `hyperref` [10];
4. accesses an individual paper by clicking on one of its pages (from `pdfpages`);
5. left-numbers the TOC (using `titlesec`);
6. displays the TOC with 1 or 2 columns, the index of authors with 2 or 3 columns, and the full bibliography in 1 or 2 columns (hack derived from `twocolindex`, and using `multicolumn`);
7. organizes the bookmarks by proceedings' sections: the preamble, the TOC, the days/sessions, the full bibliography, and the index of authors.
8. organizes the TOC: remove the TOC entry from itself (using `tocbibind`), authors' names appear under their relative paper title (using `titlesec`);
9. gives a procedure to build a full bibliography.
10. allows for right-flushed back-references (this is not 100% efficient however).
11. enables fast LaTeX run, using the `draft` option of `pdfpages`: useful when correcting errors, changing the layout, merging bibliographies, etc.
12. orders all the packages the class uses without compatibility errors with `hyperref`. This is however **not** the case for the packages you add.

6. TOC: table of contents.

2 Options

This section provides similar information as the `confproc` documentation [11], but in a more condensed format.

As any other class, the `confproc` class is loaded with:

```
\documentclass{confproc}
```

You can and are encouraged to modify the behavior of `confproc` with options:

```
\documentclass[<options>]{confproc}
```

Some options are specific to `confproc`, others are also passed to the `book`, `hyperref`, or `pdfpages` packages.

2.1 Options specific to `confproc`

2.1.1 Compilation step

An important option to set is compil[7]: it changes the speed of the LaTeX run, and page numbering. Depending on the building step, it uses one of the following 3 options:

- compil=bibmerge: should be used for the general bibliography merging process. Only the first and last page of each paper are inserted[8], plus a page with all the current paper's citations and back-references from the bibliography (as the compil=bibbackref option does, except that the page numbers are not the final ones).
- compil=bibbackref: should be used for all runs except the last, after the bibliography merging process (if any). It inserts all except the last page (replaced by a list of its citations to create proper back-references) of each paper. Several LaTeX runs will generate proper page numbering for the TOC and the index.

7. Use compil once the other options dealing with the layout suit you.
8. Page numbers are then not final, but LaTeX runs faster.

- compil=last: should be used only for the last LaTeX run. It assumes you're done with: ordering the papers (program), generating the general bibliography, re-compiling all papers (if necessary to re-number them all and/or have them using the new bibliography), and having the proper page numbering and back-references.

To speed up the LaTeX run, you can use the draft option from `pdfpages` (*e.g.* when changing the layout, editing welcome letters, or working on page numbering). Each PDF page is replaced by an almost blank page. It is configured by default depending on the compil option you used, but you still can modify it.

2.1.2 Proceedings type: printed or electronic

Depending if the proceedings are to be printed or distributed as a PDF, choose:

- printed for links without[9] color (same as colorlinks=false); or
- electronic for links with colors (same as the default colorlinks=true).

Note that in both cases, all the hyperlink features will work properly.

2.1.3 Special sections layout

You may customise portions of the layout using:

- onecoltoc/twocoltoc to format the TOC with 1/2 columns;
- tocnumleft/tocnumright to place page numbers on the left/right of the TOC[10];
- twocolbib/onecolbib to format the general bibliography with 2/1 columns;
- threecolindex/twocolindex to format the index of authors with 3/2 columns.

Note: the first one item of each pair above is the default setting.

9. Printing color is expensive, and printing in greyscale reduces the linking text readibility.
10. Page numbers on the left seem to provide faster click access to the papers.

2.1.4 Headers/footers

The headers option has four exclusive values that defines which pages are added a header/footer :

- headers=no (default): no headers added to any pages;
- headers=pdfonly: added to PDF-included papers;
- headers=exceptpdf: added to all pages except PDF-included papers;
- headers=allpages: added to all pages.

For instance, if your paper templates do not have any headers, use headers=allpages. Conversely, if your paper template have a header and footer defined, use headers=exceptpdf. If you want to get proceedings without headers/footers (*e.g.* to add them in Acrobat [12] with other fancy fonts and layout), use headers=no.

If your paper templates have page numbers, you will have to renumber them. To check if the page numbers are identical for the papers and the proceedings, use movepagenumbers to move the footer by a few millimeters, combined with the headers=allpages or headers=pdfonly. You will see two footers appearing: the one from the paper, and below the one from the proceedings. Use it together with compil=last, or compil=bibbackref and final, to ensure you are seeing the final print ready version of the proceedings.

2.2 Options from other packages

There are 3 packages on which `confproc` is based, and to which options are passed, namely: `book`, `hyperref` and `pdfpages`. The following options are passed to `book`: a4paper/letterpaper, 10pt/11pt/12pt, and twoside/oneside.

2.2.1 Options from `hyperref`

All unknown options are passed to `hyperref` and any existing options[11] documented in `hyperref` can be used. For a basic use, I suggest using only the following:

11. Refer to the `hyperref` documentation [10] for more complete and accurate descriptions.

- colorlinks=true, colorlinks, colorlinks=false to provide/remove color to links. They are equivalent to the electronic/printed confproc option.
- citecolor=colorforcite: uses the colorforcite color (to be defined by the user) for links to bibliography items cited.
- linkcolor=colorforlink: uses the colorforlink color for links, such as from the index of authors, TOC and general bibliography back-references.
- urlcolor=colorforurl: uses the colorforurl color for URL (*e.g.* in the general bibliography and the publishing information).
- bookmarksopen=true/false: opens/closes the bookmark in the PDF file[12];
- bookmarksopenlevel=0/1/2: the bookmark is opened[12] till level 0 (resp. 1, 2).

The confproc use several default options[13] for hyperref. They change specific properties of hyperlinks you may wish to preserve for you electronic proceedings, so only change them if you know exactly what you are doing.

2.2.2 Options from pdfpages

Since confproc is also based on pdfpages for paper inclusion, you may use:

- final: inserts the PDF pages (slow LaTeX run); useful when working on the layout and during bibliography merging process.
- draft: replaces the PDF pages by an almost blank page (fast LaTeX run).

Note: the final/draft option pair is **not** exclusive: if using the two, the final option always 'wins'. So, when using draft, be sure not to leave any final anywhere else!

2.3 Options by default

If not defined by the user, confproc options are defaulted to:

- letterpaper, 10pt, twoside (passed to book);

12. To my knowledge, this is only supported by Adobe Acrobat [12].
13. The defaulted options are: pdftex, raiselinks, hyperindex, backref, pagebackref, plainpages=false, pdfpagelabels, breaklinks, linktocpage, and pdfstartview=XYZ.

- electronic, twosidepapers, headers=no, compil=bibbackref, tocnumleft, onecoltoc, threecolindex, twocolbib;
- colorlinks=true, linkcolor=red, citecolor=blue, pagecolor=red, urlcolor=blue, bookmarksopen=true, bookmarksopenlevel=1 (passed to hyperref).

3 Exhibit and explain the exquisite example

The example file provided in the confproc documentation (example.tex) shows how to customize: the proceedings PDF metadata; the front page; the document layout; the document header/footer; the publishing information; the welcome letter(s); the titles for special section; the title/author style in the TOC and bookmarks; the color for links; the number of columns for the TOC, bibliography and index of authors; using appropriate commands and options. To generate the example file, run confproc.ins through LaTeX. Then, run the bash script called buildproc: it will run all the steps for you.

3.1 Preamble

3.1.1 Using the confproc class

The confproc class is called as would be the book class, and the standard options a4paper, 10pt and twoside are simply passed to it. The compil=bibbackref option specifies the type of LaTeX run; headers=allpages adds a header/footer to all pages (including papers inserted), movepagenumbers moves the page numbers (for checking them). The remaining options are related to the colors of color links.

```
\documentclass[a4paper,10pt,twoside,
  compil=bibbackref,headers=allpages,movepagenumbers,electronic,
  citecolor=colorforcite,linkcolor=colorforlink,urlcolor=colorforurl,
  pagecolor=colorforpage]{confproc}
```

3.1.2 Using extra packages

Then, one should define the extra packages to be used. As previously mentioned, the packages used need to be correctly ordered to function correctly with

hyperref. Especially, any package that redefines some LaTeX internal macros should be inserted before the hyperref package. The packages used by the class have been properly ordered for that purpose. This is however not the case for packages added by the user after the document class insertion. Therefore, if a package that you have added does not behave as it should, it may be a package ordering issue. The only solution I know of at present consists in adding this package at the right place in the class file[14].

Proceedings often start with welcome letters, the texts of which may have another line spacing than the papers, using the setspace package:

```
\usepackage{setspace}
```

You may then change the input and font encodings, *e.g.* to allow for running LaTeX on a document with accents (for the authors' names and the paper titles):

```
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
```

You may change the default LaTeX font to Times as it displays better in PDF files. the best way to do so is:

```
\usepackage{mathptmx}
```

DAFx-06 proceedings' header contains a '9th', that requires to use:

```
\usepackage[super]{nth}
```

Note that the original DAFx-06 template used times and this has been changed accordingly in the confproc package (version 0.4b). Also, this template provides better the superscript ordinal by using the nth package, whereas the original templates used the \textsuperscript command. To tune the document header/footer so that they match the paper templates, use:

```
\usepackage{layout}
```

14. Please contact me if you know how to enforce the placement of a package insertion that is inserted after the class definition.

3.1.3 Define colors for links

You need to define the colors before using them:

```
\definecolor{colorforlink}{rgb}{0,0,0.8}
\definecolor{colorforpage}{rgb}{0,0,0.7}
\definecolor{colorforcite}{rgb}{0,0.8,0}
\definecolor{colorforurl}{cmyk}{1,0,0,0}
```

There are a few things you need to know about it:

- the way colors are declared is explained in the `color` package.
- colorforlink is for all links in the TOC, index, and back-references.
- colorforpage is not currently used in the example, as it concerns links to pages from the text.
- colorforurl is for URLs (*e.g.* in the preamble, or the general bibliography).
- colorforcite is useful only in two cases:
  1. without a general bibliography: if citing from the preamble (rare);
  2. with a general bibliography, except with the compil=last option.

3.1.4 Customize PDF metadata

The PDF metadata are informations about the proceedings electronic you get in the operating system. At least three metadata should be set:

- the PDF title (default: 'Proceedings title'). The example uses:

  ```
  \renewcommand{\procpdftitle}{DAFx-06 Proceedings}
  ```

- the PDF author (default: 'Proceedings author/editor'). The example uses:

  ```
  \renewcommand{\procpdfauthor}{V. Verfaille, McGill University}
  ```

- a description (default: 'Proceedings description'). The example uses:

  ```
  \renewcommand{\procpdfsubject}{Proc. 9th Int. Conf. on %
  Digital Audio Effects - Montreal, Quebec, Canada}
  ```

3.1.5 Special section titles

The titles of special sections can be redefined:

- the table of contents (default: 'Conference Program'). The example uses:
  `\renewcommand{\contentsname}{Conference Program}`
- the general bibliography (default: 'Full Bibliography'). The example uses:
  `\renewcommand{\bibname}{General Bibliography}`
- the index of authors (default: 'Index of Authors'). The example uses:
  `\renewcommand{\indexname}{List of Authors}`

3.1.6 Declare files and paths

Indicate all file names/paths at the same place; first, the bibliography file name:

```
\newcommand{\procbibfile}{\BIBPATH exbiblio}
```

Then declare paths to folders containing files included by `example.tex` file: pictures (*e.g.* logos for the cover page and welcome letters), bibliographies, papers[15], and texts (*e.g.* publishing informations, welcome letters, the paper switch):

```
\newcommand{\PICTPATH}{pictures/}
\newcommand{\BIBPATH}{}
\newcommand{\PAPERPATH}{papers/}
\newcommand{\TEXTPATH}{}
```

3.1.7 Fine tune the document layout

To ensure a coherent layout throughout the whole proceedings, the main document layout should match the paper template layout. To do so, set options of the `geometry` package[16], *e.g.* for the letter format:

15. This folder contains both the PDFs and all related folders to batch compile all papers at once.
16. See the `geometry` package manual for extensive options for setting the page layout, at CTAN: cgi-bin/ctanPackageInformation.py?id=geometry

```
\usepackage[width=175mm,height=229mm,voffset=-10.22mm,top=36.68mm,%
  headsep=7.05mm,footskip=11.29mm,twoside,left=20.44mm]{geometry}
```

Then, set the left/right and up/down shift of inserted PDFs files using:

```
\setlength{\LaTeXxShift}{0pt}
\setlength{\LaTeXyShift}{-28pt}
\setlength{\WordxShift}{10pt}
\setlength{\WordyShift}{-40pt}
```

The values may differ depending if the papers were generated using a LaTeX template and a Word template, as the templates may not be perfectly identical. Then, set the left/right and up/down shift of the inserted PDFs files using:

```
\setlength{\LaTeXxShift}{8.45pt}
\setlength{\LaTeXyShift}{-3pt}
```

3.1.8 Set headers and footers

If the paper templates have a header/footer, you may want to use the same header/footer for the proceedings. Then, redefine:

```
\renewcommand{\proclhead}{\em \small Proc.~of the \nth{9} %
  Int.~Conference on Digital Audio Effects (DAFx-06), Montreal, %
  Canada, September 18-20, 2006}
```

for the header and:

```
\renewcommand{\proccfoot}{\small DAFX-\thepage}
```

for the footer. If checking the page numbering (when inserting papers with page numbers), use the `movepagenumbers` option and set the vertical shift for the footer:

```
\setlength{\procoptfootskip}{3mm}
```

Trick: when setting the values for the page layout using the `geometry` package, remove the `movepagenumbers` option, change the headers and footers color (*e.g.* adding `\color{blue}` at the beginning of the redefinition) and zoom 1000%.

3.1.9 Title/author layout

The `\texorpdfstring` command allows for a different text in LaTeX and for the PDF (used to generate different bookmark titles and TOC entries). The default is to add a line break between the paper title and the authors' names in the TOC. You can customize the title font style using the `\papertitlestyle` command:

```
\renewcommand{\papertitlestyle}{\texorpdfstring{}{\scshape}}
```

that defines the paper's title in small capitals and no line break in the TOC between the paper title and the authors' names. You can also customize the author font style using the `\paperauthorstyle` command as in:

```
\renewcommand{\paperauthorstyle}{\texorpdfstring{, }{\break}}
```

This replaces the line break by a comma.

3.1.10 Index of authors

The last step is to make the index:

```
\makeindex
```

3.2 Front matter: cover, info, welcome and TOC

3.2.1 Start the document

We are now ready to start the document by using:

```
\begin{document}
\frontmatter
```

You may print the document layout (using `\layout`) at the document's beginning (page numbering changes, but will not be forgotten) or end (page numbering does not change, but may be forgotten). You may also ensure that the proceedings' first page (the cover) is at number 1:

```
\setcounter{page}{1}
```

3.2.2 Cover/front page

To reduce the bookmark length, all front matter bookmarks (cover page, welcome letters, etc) except the TOC are under the same bookmark as sub-items. This first bookmark is added by hand (so that you can get rid of it):

```
\pdfbookmark[0]{Preamble}{preamble}
```

The cover page is generated either with the usual commands[17]:

```
\pdfbookmark[1]{Cover}{cover}
\title{Proceedings of the \nth{9} International Conference\\
  on Digital Audio Effects\\ Montreal, Quebec, Canada}
\author{Vincent Verfaille, McGill University}
\date{Sept 18--20, 2006}
\maketitle
```

or as PDF image (if designing the cover with other tools):

```
\includepdf[noautoscale,pages=1,link]{\PICTPATH ex_1stpage.pdf}
```

3.2.3 Publishing information

Publishing information are then given on page 2, inside the cover.

```
\newpage
\vspace*{1.7cm}
\pdfbookmark[1]{Publishing information}{publishing}
\thispagestyle{empty}
```

As it is printed in page 2, there are no headers nor footers on this page.

```
\noindent {\bf Published by:}\\ Laboratory Name\\ Department name\\
School Name\\ University Name\\
\url{http:www.conferencesite.com}\\
```

You may also indicate an ISBN and the credits:

17. This would require fine tuning of this page parameters and adding logos, images, etc.

```
\vspace*{0.15cm}\newline
\noindent {\bf ISBN: X-XXXX-XXXXXX}\\
\vspace*{0.35cm}\newline
\noindent {\bf Credits:}\\
Cover design: Firstname Lastname\\
Logo photo: Firstname Lastname\\
\LaTeX{} editor: Firstname Lastname\\
using \LaTeX's ‘confproc’ class (optional: by V. Verfaille)\\
```

Isn't it a good place to acknowledge for the time saved by using this package? To promote this work, please spread the word by explicitly naming `confproc`.

You may then indicate where and when the proceedings were printed:

```
\vspace*{0.35cm}\newline
\noindent Printed in City by Print-Company --- Month 20XX
```

Published by:
Laboratory Name
Department name
School Name
University Name
http:www.conferencesite.com

ISBN: X-XXXX-XXXXXX

Credits:
Cover design: Firstname Lastname
Logo photo: Firstname Lastname
LaTeX editor: Firstname Lastname
using LaTeX's ‘confproc’ class (optional: by V. Verfaille)

Printed in City by Print-Company — Month 20XX

Figure 1: *Example of publishing information.*

3.2.4 Welcome letters

To ensure next page is numbered and has proper headers/footers, use:

```
\otherpagestyle
```

This is where the roman page numbering starts. We include the welcome letters (*e.g.* from the faculty dean, the department dean, the conference chair, etc.):

```
\clearsingleordoublepage
\vspace*{0.6cm}
\thisotherpagestyle
```

create the corresponding bookmark entry:

```
\pdfbookmark[1]{Welcome from Firstname Lastname}{welcome}
```

and the corresponding section (and TOC entry):

```
\section*{Welcome from Firstname Lastname, Conference Chair}
```

Depending on the text length, change the line spacing (from `setspace`):

```
\vspace*{1.1cm}
\begin{center}
  \onehalfspace
  \begin{minipage}[h]{14cm}
    Text of the welcome letter, with 1.5 lines spacing, blah blah...
    Text of the welcome letter, with 1.5 lines spacing, blah blah...
  \end{minipage}
\end{center}
```

3.2.5 Table of contents (TOC)

You may then insert the proceedings' TOC, also called the 'conference program':

```
\tableofcontents
```

that will appear as in Fig. 2. The bookmark is automatically generated (see Tab. 1).

Conference Program

Figure 2: *Example of a conference program (table of contents).*

▼ Preamble
Cover
Publishing informations
Welcome from Firstname Lastname
Program
▼ Day 1
▼ Oral Session 1
▶ Template for One Author
▶ Template for One Author with Two Affiliations
▼ Poster Session 1
▶ Template for Two Authors
▼ Day 2
▼ Oral Session 2
▶ Template for Three Authors
▶ Template fór Fòür Àuthors
Full Bibliography
Index of Authors

Table 1: *Second-level opened bookmarks for a conference organized by days.*

3.3 Main matter: the proceedings

3.3.1 Prepare the main matter

The main matter contains the proceedings, *i.e.* the collection of articles:

```
\mainmatter
```

Note: this command switches to arabic page numbering and redefines the corresponding style for TOC entries.

3.3.2 Days and sessions

You can organize the proceedings by day (see Tab. 1) or by session (for short conferences). A day creates a part and groups sessions in the bookmark:

```
\procday{Day 1}
```

whereas a session creates a chapter:

```
\session{Oral Session 1}
```

3.3.3 Inserting a paper

We now can insert our first paper for this first session of the first day, using the `\procinsertpaper` command. It has 9 arguments:

1. X and Y shifts (with a space in between, as in `{10 12}`);
2. the number of pages;
3. a reference (can be the PDF file name);
4. the title;
5. the list of authors;
6. the index entries;
7. the citations for the general bibliography;
8. the name of the PDF file to insert;
9. the bookmark entries for the authors.

If you often change the paper information, you may redefine local commands:

```
\renewcommand{\papertitle}{Templates for One Author}
\renewcommand{\paperauthors}{Alfred Alabama}
\renewcommand{\paperindex}{\index{Alabama, Alfred}}
\renewcommand{\paperref}{\paperswitch}
\renewcommand{\paperpagenum}{6}
\renewcommand{\papercite}{Mitra:Kaiser:1993:DSP:handbook,%
  Haykin:1991:adaptive:filter,Moorer:2000:AES:audio:millenium,%
  Arfib:1998:DAFx}
```

before inserting the paper:

```
\procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{\paperpagenum}%
  {\paperref}{\papertitle}{\paperauthors}{\paperindex}{\papercite}%
  {01}{\pdfbookmark[2]{Alfred Alabama}{#2.author1}}}
```

You can also directly pass arguments to the `\procinsertpaper` command:

```
\procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{5}{\paperswitch}%
  {Templates for One Author with Two Affiliations}% paper title
  {Bob Boogie-Woogie}% list of authors
  {\index{Boogie-Woogie, Bob}}% authors index entries
  {Haykin:1991:adaptive:filter,Serra:1996:sms,%
    Moorer:2000:AES:audio:millenium,Arfib:1998:DAFx}% cited bib items
  {02}{\pdfbookmark[2]{Bob Boogie-Woogie}{#2.author1}}
```

Even though it is less readible, this formatting is much shorter[18]: it is then easier to search in a file with dozens of paper definitions. We add a poster session:

```
\session{Poster Session 1}
```

with a single paper:

```
\procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{4}{\paperswitch}%
{Templates for Two Authors}%
{Alfred Alabama, Chris Christmas}%
{\index{Alabama, Alfred}\index{Christmas, Chris}}%
{Serra:1996:sms,Moorer:2000:AES:audio:millenium,%
  Arfib:1998:DAFx,Askenfelt:1976:automatic:transcription}%
{03}{\pdfbookmark[2]{Alfred Alabama}{#2.author1}%
  \pdfbookmark[2]{Chris Christmas}{#2.author2}}
```

together with a second day, an oral presentations session and 2 papers:

```
\procday{Day 2}
\session{Oral Session 2}
\procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{6}{\paperswitch}%
  {Templates for Three Authors}%
```

18. The `procswitchandtoc.pl` Perl script provided in `confproc` outputs such LaTeX code from a `.csv` program file. It is useful if you not plan to change the papers' information in the `.csv` file.

```
  {Bob Boogie-Woogie, Chris Christmas, Don Didon}%
  {\index{Boogie-Woogie, Bob}\index{Christmas, Chris}%
    \index{Didon, Don}}%
  {Arfib:1998:DAFx,Askenfelt:1976:automatic:transcription,%
    Egozy:1995:MIT:features:gesture}%
  {04}{\pdfbookmark[2]{Bob Boogie-Woogie}{#2.author1}%
    \pdfbookmark[2]{Chris Christmas}{#2.author2}%
    \pdfbookmark[2]{Don Didon}{#2.author3}}

\procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{7}{\paperswitch}%
  {Templates f\'or F\`o\"ur uthors}%
  {J\o{}hn J\"oe, K\'e\~{n}t K\^{\i}ng, L\`ou L\'ou, %
    M\`anfr\'ed J. M\^ost\u{e}k\i}%
  {\index{J\"oe, J\o{}hn}\index{K\^{\i}ng, K\'e\~{n}t}%
    \index{L\'ou, L\`ou}\index{M\^ost\u{e}k\i, M\`anfr\'ed J.}}%
  {Arfib:1998:DAFx,Askenfelt:1976:automatic:transcription,%
    Egozy:1995:MIT:features:gesture}%
  {05}{\pdfbookmark[2]{J\o{}hn J\"oe}{#2.author1}%
    \pdfbookmark[2]{K\'e\~{n}t K\^{\i}ng}{#2.author2}%
    \pdfbookmark[2]{L\`ou L\'ou}{#2.author3}%
    \pdfbookmark[2]{M\`anfr\'ed J. M\^ost\u{e}k\i}{#2.author4}}
```

3.4 Back matter: general bibliography and index

When done with the papers compilation, switch to the document back matter:

```
\backmatter
```

It redefines the corresponding style for TOC entries. The general bibliography is inserted with the style developed for DAFx-06:

```
\bibliographystyle{newapave}
```

It derives from `newapa`: the year indicated at the end (before the back-references), without parenthesis (see Fig. 3). Customize the introductory paragraph using:

```
\renewcommand{\procbibintro}{{\it This bibliography is blah blah...}}
```

Full Bibliography

This bibliography is a compilation of all bibliographic references from each paper. Page numbers that appear at the end of each entry link to the bibliography sections that include it. Please click on the URL or on the page number to access the linked item.

Arfib, D. Different ways to write digital audio effects programs. In *Proc. of the COST-G6 Workshop on Digital Audio Effects (DAFx-98)*, Barcelona, Spain, pp. 188–91, 1998. 6, 11, 16, 22

Askenfelt, A. Automatic notation of played music (status report). Technical report, STL-QPSR, Vol. 1, pp. 1–11, 1976. 16

Dutilleux, P. *Vers la machine à sculpter le son, modification en temps-réel des caractéristiques fréquentielles et temporellessons*. PhD thesis, University of Aix-Marseille II, 1991. 29

Egozy, E. B. Deriving musical control features from a real-time timbre of the clarinet. Master's thesis, Massachusetts Institute of Technology, 1995. 22

Fitz, K. and Haken, L. Current Research in Real-time Sound Morphing. Available at http://www.cerlsoundgroup.org/RealTimeMorph/, Accessed March 08, 2006. 29

Haykin, S. *Adaptive Filter Theory* (Second ed.). Englewood Cliffs: Prentice Hall, 1991. 11

Mitra, S. K. and Kaiser, J. F. *Handbook for Digital Signal Processing*. J. Wiley & Sons, 1993. 6

Moorer, J. A. Audio in the new millennium. *Journal of the AES*, 48(5), pp. 490–498, 2000. 6, 11, 16, 22, 29

Serra, X. *Musical Signal Processing*, chapter Musical Sound Modeling with Sinusoids plus Noise, pp. 91–122. G. D. Poli, A. Picialli, S. T. Pope and C. Roads,Eds. Swets & Zeitlinger, 1996. 6, 11, 16, 22, 29

Figure 3: *Example of a short general bibliography.*

The bibliography is then inserted (depicted in Fig. 3):

```
{\footnotesize\bibliography{\procbibfile}}
```

For very long general bibliographies, change the font size (*e.g.* to `\footnotesize` in the previous line). Finally, insert the index (depicted in Fig. 4):

```
\insertindex
\end{document}
```

Index of Authors

Figure 4: *Example of a 3-column index of authors.*

3.5 Turn the switch on, please!

3.5.1 Paper switch

When working on the conference program, you may need a switch to be able to work on the proceedings layout and information without yet knowing the final papers order. In the main matter, replace the papers inclusion by:

```
\input{\TEXTPATH expapersswitch}
```

Then define the program, *i.e.* the order of papers insertion, simply as:

```
\procday{Day 1}
  \session{Oral Session 1}
    \paperid{45}{p_001}
    \paperid{21}{p_003}
  \session{Poster Session 1}
    \paperid{33}{p_005}
\procday{Day 2}
  \session{Oral Session 2}
    \paperid{75}{p_007}
    \paperid{27}{p_009}
```

The `expapersswitch.tex` file contains the switch to all proceedings papers:

```
\newcommand{\paperid}[2]{
\renewcommand{\paperswitch}{#1}
\ifnum\paperswitch=21  %=========== PAPER ID = 21 ===========
```

```
  \procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{5}{\paperswitch}%
    {Templates for One Author with Two Affiliations}% paper title
    {Bob Boogie-Woogie}% list of authors
    {\index{Boogie-Woogie, Bob}}% authors index entries
    {Haykin:1991:adaptive:filter,Serra:1996:sms,% cited bib items
      Moorer:2000:AES:audio:millenium,Arfib:1998:DAFx}%
    {#2}{\pdfbookmark[2]{Bob Boogie-Woogie}{#2.author1}}
\ifnum\paperswitch=33  %=========== PAPER ID = 33 ===========
  \procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{4}{\paperswitch}%
    {Templates for Two Authors}%
    {Alfred Alabama, Chris Christmas}%
    {\index{Alabama, Alfred}\index{Christmas, Chris}}%
    {Serra:1996:sms,Moorer:2000:AES:audio:millenium,%
      Arfib:1998:DAFx,Askenfelt:1976:automatic:transcription}%
    {#2}{\pdfbookmark[2]{Alfred Alabama}{#2.author1}%
      \pdfbookmark[2]{Chris Christmas}{#2.author2}}
\ifnum\paperswitch=45 %=========== PAPER ID = 45 ===========
  \procinsertpaper{\LaTeXxShift{} \LaTeXyShift}{6}{\paperswitch}%
    {Templates for One Author}{Alfred Alabama}%
    {\index{Alabama, Alfred}}%
    {Mitra:Kaiser:1993:DSP:handbook,Haykin:1991:adaptive:filter,%
      Moorer:2000:AES:audio:millenium,Arfib:1998:DAFx}%
    {#2}{\pdfbookmark[2]{Bob Boogie-Woogie}{#2.author1}}
\fi} % and so on
```

3.5.2 Class option switch

To compile the example with a single Unix script, you need to switch between two options set for the class. The document class is inserted from a text file:

```
\input{exclass}
```

The first file (`exclasspre.tex`) is used for all LaTeX runs except the final one:

```
\documentclass[a4paper,10pt,twoside,%
  compil=bibbackref,headers=allpages,movepagenumbers,%
```

```
  citecolor=colorforcite,linkcolor=colorforlink,urlcolor=colorforurl,%
  pagecolor=colorforpage]{confproc}
```

This options set adds a header/footer on all pages (headers=allpages), and move the footer (movepagenumbers) so that we can check the page numbers. Also, the compilation option is compil=bibbackref, which creates the proper back-references. The second file (`exclasslast.tex`) is only used for the final LaTeX run:

```
\documentclass[a4paper,10pt,twoside,%
  compil=last,headers=exceptpdf,%
  citecolor=colorforcite,linkcolor=colorforlink,urlcolor=colorforurl,%
  pagecolor=colorforpage]{confproc}
```

This options set does not use movepagenumbers, and uses headers only on the pages where it is necessary (using headers=exceptpdf, as page numbering is now what will be used for generating the proceedings' final version). It also uses the compil=last option to insert the last page of each paper with proper back-references generated during the previous LaTeX runs. The Unix script copies and renames one of those two files into `exclass.tex` and runs LaTeX on `example.tex`.

4 Building the proceedings: mind your steps

4.1 Prepare the proceedings' final version

We now describe the steps to produce the final version of the example proceedings with some constraints. As paper templates have headers and footers, so the proceedings must have the same, in additionwe want a general bibliography.

4.1.1 Generate the paper switch

You may generate the paper switch corresponding to the program either by hand (check in the example); or using the `procswitchandtoc.pl` Perl script (described in the `confproc` documentation) to generate both the `exsessions.tex` and `expapersswitch.tex` files from the `exprogram.csv` program file.

4.1.2 Page numbering papers

1. make a first run with at least the following options:

```
\documentclass[a4paper,10pt,twoside,compil=last,%
  headers=allpages,movepagenumbers,electronic]{confproc}
```

2. update `expages.tex` by setting each paper's first page number:

```
\newcommand{\setpagenumber}[1]{
  \newcommand{\paperswitch}{#1}
    \ifnum\paperswitch=45 {\setcounter{page}{1}}\fi
    \ifnum\paperswitch=21 {\setcounter{page}{7}}\fi
    \ifnum\paperswitch=33 {\setcounter{page}{13}}\fi
    \ifnum\paperswitch=75 {\setcounter{page}{17}}\fi
    \ifnum\paperswitch=27 {\setcounter{page}{23}}\fi}
```

3. add the following in the preamble of each paper:

```
\input{../../expages.tex}\setpagenumber{45}
```

   and of course replace `45` by the paper number;

4. (re)generate each paper (using the `buildpapers` Unix script from `confproc`);
5. make a second run with at least the headers=allpages,movepagenumbers options. Repeat the last 3 steps till the page numbers are ok.

4.1.3 General bibliography

We worked with three files in order to simplify the bibliography merging process:

- `exbibconcat.bib` containing all citations for all papers;
- `exbibcommon.bib` containing common bibliography items, added one by one during the merging process;
- `exbibstrings.bib` containing common strings (conference/journal names, etc), to ensure coherence among citations from same journal/conference.

Here is how those files are created and used:

1. create the complete bibliography:

(a) for each paper:
   i. change each bib item tag to a unique tag, *e.g.* `paperID:origTag`;
   ii. correct the `\cite{}` according to those new tags;
   iii. add all those bib items into `exbibconcat.bib`;

(b) set the proceedings bibliography file to

```
\renewcommand{\procbibfile}{\BIBPATH exbibconcat.bib}
```

(c) run LaTeX with the compil=bibmerge option. It uses `\nocite{*}`, so items are include twice (by the paper and globally).

2. merge the bibliographic items:

(a) first, add `exbibcommon.bib` to the bibliography files list by setting:

```
\renewcommand{\procbibfile}{\BIBPATH exbibcommon.bib,%
  \BIBPATH exbibconcat.bib}
```

(b) for each item appearing multiple times:
   i. create a corresponding entry in the `exbibcommon.bib` file;
   ii. remove each appearance of it in `exbibconcat.bib`;
   iii. correct inconsistencies: title, authors, page numbers, etc.

3. merge the bibliography strings:

(a) add `exbibstrings.bib` to the bibliography files list by setting:

```
\renewcommand{\procbibfile}{\BIBPATH exbibstrings.bib,%
  \BIBPATH exbibcommon.bib,\BIBPATH exbibconcat.bib}
```

(b) merge the common strings. For each string shared by several items:
   i. define the corresponding string in `exbibstring.bib`, *e.g.* for the IEEE Trans. on Acoustics, Speech, and Signal Processing, add:

```
@string{IEEE-TASSP = "{IEEE Trans. Acoust., Speech,
  and Signal Proc.}"}
```

   ii. use `IEEE-TASSP` everywhere it should be used in `exbibconcat.bib`:

```
@article{paper027:Mcaulay86,
  Author = {Robert J. McAulay and Thomas F. Quatieri},
  Title = {Speech Analysis/Synthesis Based on a%
  Sinusoidal Representation},
  Journal = IEEE-TASSP,
```

```
Volume = {34}, Number = {4},
Pages = {744-754}, Year = {1986}}
```

4. updating papers once the general bibliography is completed:
   (a) for each paper:
      i. create a new file (*e.g.* `p_027.bib` for `p_027.tex`) that only includes the non-shared items remaining in `exbibconcat.bib`;
      ii. replace the bibliography inclusion command by:

      ```
      \bibliography{../../exbibstrings.bib,%
      ../../exbibcommon.bib,p_027.bib}
      ```

      to provide coherent common to both local and general bibliographies (reminder: `p_027.tex` is placed in `papers/pdftex/p_027/`).
   (b) re-run LaTeX on all papers (*e.g.* using the `buildpapers` Unix script);
   (c) if you did not use `buildpapers`, copy or move all PDF papers into `papers/`. The `buildcppdfpapers` Unix script can do it for you[19].

4.2 Generate the proceedings' final version

The provided `buildproc` Unix script describes all compilation steps to produce the final version of the proceedings (considering you prior merged the bibliography items by hand). It requires several compilations to create valid TOC, index of authors, general bibliography, and proper back-references. It renames of the class insertion file (described in sec. 3.5.2), so that you do not need to run one more time after changing the compil=backref option to compil=last.

```
#!/bin/sh
```

We first set the user-dependent file name

```
TXF="example"
```

Then, we set the system-dependent variables, *e.g.* the path to LaTeX binaries:

```
LATEXPATH="/usr/texbin/"
```

for TexLive 2007 on MacOsX. We then set the path to each LaTeX compiler:

19. This script is especially useful if changing only some of the papers.

```
PDFLATEX=$LATEXPATH"pdflatex"
BIBTEX=$LATEXPATH"bibtex"
MKIDX=$LATEXPATH"makeindex"
```

We can now run LaTeX on the document with the following steps:

1. copy/rename the class insertion file:	`cp exclasspre.tex exclass.tex`
2. creates the table of contents:	`$PDFLATEX  $TXF.tex`
3. generate the general bibliography:	`$BIBTEX $TXF`
4. create the index of authors:	`$MKIDX -s confproc.ist $TXF.idx`
5. include the index:	`$PDFLATEX $TXF.tex`
6. create proper back-references:	`$PDFLATEX $TXF.tex`
7. give proper page numbers to the TOC and back-references:	`$PDFLATEX $TXF.tex`
8. copy/rename the class insertion file:	`cp exclasslast.tex exclass.tex`
9. last run with full papers insertion:	`$PDFLATEX $TXF.tex`

5 To conclude

`confproc` automates several tasks and processes during the making of a conference proceedings. It consists of a class, with full documentation, a working example, and a series of Unix and Perl scripts to simplify your life. It has been developed to serve the community. If you find it useful or interesting, then, please use it, share it, or recycle it. All users are very welcome to propose new functionalities.

Many thanks to Will Robertson for proposing many code improvements, and to Eoin Brazil for his contagious enthusiasm and for proofreading this paper.

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THE PracTeX Journal

LaTeX tools for life scientists (BioTeXniques?)

Kumar M Senthil

Abstract

LaTeX has been a long time favorite of mathematicians and physicists alike. However now, many packages are available, that have tremendously extended the capabilities of LaTeX beyond routine typesetting and provide biologists new avenues to not only typeset documents, but also help in the visualization of membrane proteins and in the analysis of DNA or amino acid sequences by multiple sequence alignment. I will discuss with examples some of the \LaTeX\ packages and tools that are presently available for the biologists. Scientific journals (for biological research) now accept \TeX/\LaTeX\ formatted manuscripts, although they are still a rarity. This article will provide the references of those sources that might be helpful to prospective authors from life sciences that want to submit manuscripts in \TeX/\LaTeX\ format. This article is written in the perspective of a biologist who might be interested in creating better documents using LaTeX & friends.

Senthil finished his PhD work on Gene regulation in very late promoters of Baculovirus, from the Centre for DNA Fingerprinting & Diagnostics (http://www.cdfd.org.in {CDFD}), India. He claims to have written his entire PhD thesis, armed with nothing but Emacs + AUCTeX, LaTeX and a toothbrush. He is currently working as a Postdoctoral Research Associate at the Systems Biology Lab headed by Dr.~Sangdun Choi, at http://www.ajou.ac.kr/english/ {Ajou University}, Suwon, Republic of Korea.

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LATEX Tools for Life Scientists (BioTEXniques?)

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Abstract LATEX has been a long time favorite of mathematicians and physicists alike. However now, many packages are available, that have tremendously extended the capabilities of LATEX beyond routine typesetting and provide biologists new avenues to not only typeset documents, but also help in the visualization of membrane proteins and in the analysis of DNA or amino acid sequences by multiple sequence alignment. I will discuss with examples some of the LATEX packages and tools that are presently available for the biologists. Scientific journals (for biological research) now accept TEX/LATEX formatted manuscripts, although they are still a rarity. This article will provide the references of those sources that might be helpful to prospective authors from life sciences that want to submit manuscripts in TEX/LATEX format. This article is written in the perspective of a biologist who might be interested in creating better documents using LATEX & friends.

"Uncle Cosmo . . . why do they call this a word processor?"
"It's simple, Skyler . . . you've seen what food processors do to food, right?"
– Jeff MacNelly, "Shoe"

The advantages of LATEX over WYSIWYG applications are well known[1]. It has not only been the traditional application of choice to typeset mathematical formulae, but also had been employed to typeset music scores, games like crossword, chess and bridge. In this article, I will explain some of the tools that can be effectively used by life scientists for preparing documents in LATEX, briefly explain about two LATEX packages related to biology namely, TEXshade and TEXtopo, developed by Eric Beitz, discuss about XFig and Inkscape, two well known drawing programs and also give some examples illustrating the use of XyMTeX, a package for drawing chemical structures. I will end my article with some references to online sources that might be helpful to life science researchers in search of a style file or a bibliography file suitable for a particular journal and other LATEX sources.

Regular readers of this journal would have read an earlier article by Peter Flom[1]. It is one of the good places to start for academicians with little or no LATEX experience, since it provides a good introduction and shatters several myths about LATEX. The present article is written to help mainly biochemists and molecular biologists. A general background on using TEX or LATEX would be useful, but not essential to try the things described in this article.

1. For example: http://nitens.org/taraborelli/latex and links therein.

1 Importance of multiple sequence alignment

Proteins are polymers of amino acids and they form the building blocks of life. Enzymes that catalyze the chemical reactions in our cells, hemoglobin that carriers oxygen to our cells through bloodstream, actin that provides stability to cells are some examples of proteins. Proteins are encoded by specific genes. Information in DNA (in the form of 4 letters: A or T or G or C) are translated into amino acids (20 different letters) during protein synthesis. Therefore, analyzing DNA or protein sequences is pivotal to determine the nature of how genes and thus proteins have changed during evolution. Aligning multiple sequences of either DNA or protein sequences from many different organisms is called as multiple sequence alignment. It provides an overall view of comparative changes in the sequences under study, that may have occured due to mutations.

1.1 Aligning sequences using TEXshade

Availability: CTAN

Author: Eric Beitz

Current Version : 1.17

TEXshade, a LATEX package provides an ideal solution of displaying the key changes in DNA (4 letters: A, T, G and C) or protein (20 different amino acids, indicated by unique single letters) sequences with great control. Other programs do exist that provide a way to display sequence similarities in multiple sequence alignment `prettyplot`[2], included in EMBOSS[3], a open source software for molecular biology), is one good example. However, only TEXshade provides:

- LATEX quality output.
- Flexibility: The alignments can be typeset as per the needs for example, while writing a paper using LATEX. TEXshade provides different modes of shading, therefore, it takes less time to modify an alignment.

DNA or Protein sequences are aligned *a priori* using alignment programs like `clustalW` to generate an output file (usually a plain text ASCII file) containing the alignment of sequences from different species. TEXshade can then be used to highlight the level of similarity/identity/dissimilarity among the sequences.

TEXshade provides four predefined shading modes: identity, similarity, diversity and functionality. They come useful depending on what one requires. For example, if one would like to determine the sequence similarity (as shown in Figure 1), `similar` option highlights the residues that are similar in all the species. If one is interested in showing

2. http://bioweb.pasteur.fr/docs/EMBOSS/prettyplot.html
3. http://emboss.sourceforge.net/

the identity (*i.e.* residues that occur above a given threshold level). It is possible to show only those residues that differ among a set of sequences using diversity mode.

Example 1: A simple example using TEXshade. The output is shown in Figure 1.

```
\usepackage{texshade}
\begin{texshade}{protein-texshade.aln}
%Acceptable file formats are: ALN, MSF & FASTA
\residuesperline*{50}
\shadingmode[allmatchspecial]{similar}
\setends{1}{5..300}
\hideconsensus
\feature{top}{1}{25..25}{fill:$\downarrow$}
{First line of each block shows the human IF2 protein}
\feature{bottom}{1}{75..76}{brace}
{Residues that are absent in the human protein}
\end{texshade}
```

Under functionality, six different options are further available that truely shows the strong capabilities of TEXshade. So one can choose to highlight amino acid residues based on: charge, hydropathy, structure, chemical nature, standard area (surface area of amino acid sidechain), accessible area (by solvent molecules).

Apart from all these features, TEXshade can be further configured to read standard protein secondary structure files from the following format: DSSP, STRIDE, PHD or HMMTOP. These structural information provided from these files can then be used along with the sequence alignment to provide much more information. For an exhaustive list of options and examples please refer TEXshade documentation provided with the package[4] and the original research paper[2]. TEXshade can also be used through a web interface. Biology Workbench, Ver 3.2, available at the San Diego Supercomputer Center website, is a collection of bioinformatics tools and anyone can register and are allowed to use these online tools. TEXshade output options are clearly indicated by simple radio buttons or pull down menus (Figure 2).

2 TEXtopo and transmembrane proteins

Availability: CTAN

Author: Eric Beitz

Current Version : 1.4

4. Available here:
http://www.ctan.org/tex-archive/macros/latex/contrib/texshade/texshade.pdf

First line of each block shows the human IF2 protein

```
Human-mit    QDKVRKNKDAVRRPQADPALLTPRSPVVTIMGHVDHGKTTLLDKFRKTQV    54
Yeast-mit    ..................PKLLTKRAPVVTIMGHVDHGKTTIIDYLRKSSV    33
E.coli       LRRENELEEAVMSDRDTGAAAEPRAPVVTIMGHVDHGKTSLLDYIRSTKV   100
B.subtilis   VLEETELEKYEEPDNEE..DLEIRPPVVTIMGHVDHGKTTLLDSIRKTKV   101
NIF          EAKKKKQDQQQSAAFSKPSDANLRSPICCIMGHVDTGKTKLLDCIRGTNV   102
eIF5B        DKAKRRIEKRRLEHSKNVNTEKLRAPIICVLGHVDTGKTKILDKLRHTHV   242

Human-mit    AAVETGGITQHIGAFLVSLP.S................GEKITFLDTPGH    87
Yeast-mit    VAQEHGGITQHIGAFQITAPKS................GKKITFLDTPGH    67
E.coli       ASGEAGGITQHIGAYHVETE...................NGMITFLDTPGH   132
B.subtilis   VEGEAGGITQHIGAYQIEEN...................GKKITFLDTPGH   133
NIF          QEGEAGGITQQIGATYFPAENIRDRTKELK..ADATLKVPGLLVIDTPGH   150
eIF5B        QDGEAGGITQQIGATNVPLEAINEQTKMIKNFDRENVRIPGMLIIDTPGH   292
```

Residues that are absent in the human protein

```
Human-mit    AAFSAMRA    95
Yeast-mit    AAFLKMRE    75
E.coli       AAFTSMRA   140
B.subtilis   AAFTTMRA   141
NIF          ESFNNLRS   158
eIF5B        ESFSNLRN   300
```

Figure 1: Protein sequence alignment using TEXshade. Alignments can be annotated to describe the features of a particular stretch of residues.

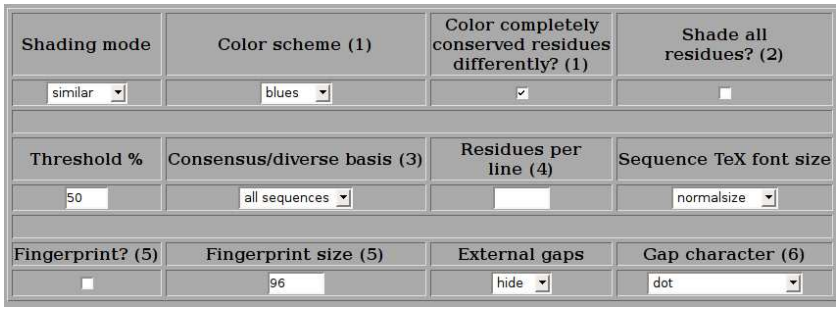


Figure 2: Biology Workbench (Ver 3.2) at the San Diego Supercomputer Center's site provides TEXshade through a simple, easy to use web interface.

Transmembrane proteins are an important class of proteins that play significant role in signaling, ATP production etc. Several such proteins are known and there are comprehensive databases that cater to biologists studying them[5].

2.1 A quick example of using TEXtopo

As an example, I will illustrate the use of TEXtopo using a `Swissprot` file. A sample file is shown here:

A SwissProt file.

```
ID   C56D1_HUMAN             Reviewed;         229 AA.
...
PE   2: Evidence at transcript level;
KW   Transmembrane; Transport.
FT                                  /FTId=PRO_0000151034.
FT   TOPO_DOM      1     24         Cytoplasmic (Potential).
FT   TRANSMEM     25     45         Potential.
FT   TRANSMEM    129    149         Potential.
FT   TRANSMEM    170    190         Potential.
FT   TRANSMEM    194    214         Potential.
FT   TOPO_DOM    215    229         Cytoplasmic (Potential).
FT   DOMAIN       22    224         Cytochrome b561.
SQ   SEQUENCE   229 AA;  25424 MW;  43978DAF7D8EC218 CRC64;
     MQPLEVGLVP APAGEPRLTR WLRRGSGILA HLVALGFTIF LTALSRPGTS LFSWHPVFMA
     LAFCLCMAEA ILLFSPEHSL FFFCSRKARI RLHWAGQTLA ILCAALGLGF IISSRTRSEL
     PHLVSWHSWV GALTLLATAV QALCGLCLLC PRAARVSRVA RLKLYHLTCG LVVYLMATVT
     VLLGMYSVWF QAQIKGAAWY LCLALPVYPA LVIMHQISRS YLPRKKMEM
//
```

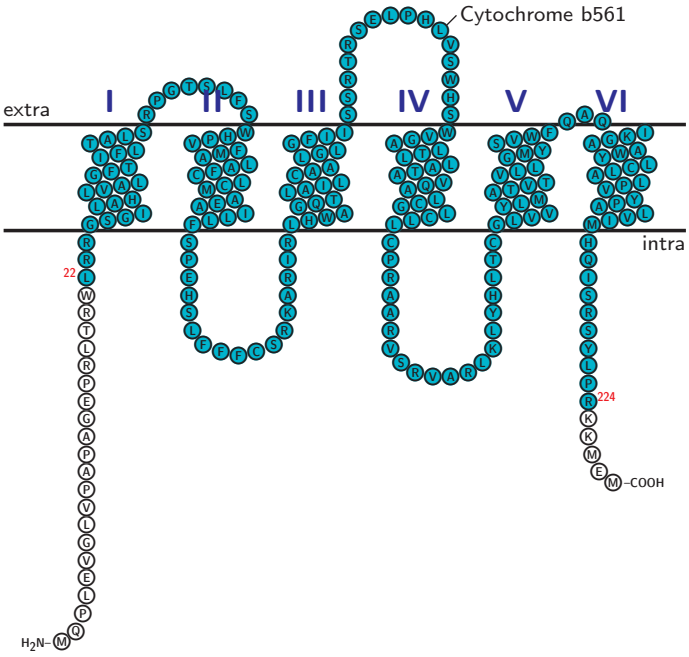
TEXtopo takes the features from this file (indicated by FT at the start of each line in the `SwissProt` file) and the sequence is depicted across a membrane with the number of transmembrane domains that the protein has. In this case, the number of transmembranes are Six. An example is given below.

Example 2: A simple example using TEXtopo. The output is shown in Figure 3.

```
\usepackage{textopo}
\begin{textopo}
\getsequence[make new]{SwissProt}{Q8N8Q1.SP}
\end{textopo}
```

Apart from Swissprot files, in TEXtopo (just like TEXshade), other file formats like PHD, HMMTOP can be used. Alignment files can also be used or even a raw sequence

5. For example see: http://www.expasy.org



Domain

Figure 3: Human Cytochrome b561 domain-containing protein 1 rendered with TEXtopo. Go on, zoom in and see it better!

can be entered using `\sequence` command. More examples are available from the package documentation[6] or in the original paper[3].

3 Preparation of publication quality figures

Traditionally, figures for papers in biological research have been prepared using presentation software[7]. Image files from Southern or Northern or Western blots, SDS-PAGE gels, Footprinting experiments would be imported in presentation software, then further text and other information regarding the experiments are added and the file is then saved as TIFF or JPEG image formats. These image files are then cropped using a image editing software to generate correctly cropped image files for publication.

6. Available here:
http://tug.ctan.org/cgi-bin/getFile.py?fn=/macros/latex/contrib/textopo/textopo.pdf
7. By presentation software, I mean Openoffice Impress/Draw or the more popular and commonly used Microsoft Powerpoint™.

3.1 XFig & Inkscape

Preparing figures from molecular biology experiments as we have have seen is much different from mathematics or physics where generally not much post processing is involved once a graph is ready. Basically what we generally do to make a figure, is:

1. To import images of gels, blots from properietary format to a general format like `TIFF` or `eps`.
2. Add text labels and other experimental details.
3. Export the finished product as a commonly used image format file.
4. Include this in your document.

XFig and Inkscape could be employed for doing these with high efficiency and it produces figures that are neater. Figures that take hours in presentation software could be easily prepared using XFig.

I have included one example that takes advantage of scalable vector graphics (Figure 3.1) which shows a map (drawn to scale) of different plasmid constructs. The documentation for XFig is widely available and the software itself is either installed default in many GNU/Linux distributions or can be downloaded from the web.[8] Other software available for scalable vector graphics are: Inkscape, Mayura (Windows) etc. So, XFig or Inkscape along with LaTeX is a powerful tool that is available to authors not only from mathematical background, but also from life sciences.

Some people might be baffled by the lack of an easy to use interface provided by XFig. For those, I heartily recommend Inkscape a versatile Scalable Vector Graphics creator and editor with a "modern" user interface. Creating figures using Inkscape is very intuitive (as it is in XFig, but with Inkscape it is more fun). Figure 5 shows such an example of a simple figure.

4 Creating chemical formulae with XyMTeX

XyMTeX[9] is a macro package for TeX, written by Fujita Shinsaku for rendering high quality chemical structures. A simple example to draw a phenol molecule (as shown in Table 1) is given:

```
\usepackage{xymtex}
\begin{document}
.
.
\bzdrh{4==OH}
\end{document}
```

8. Please refer: http://xfig.org
9. http://homepage3.nifty.com/xymtex/fujitas3/xymtex/indexe.html

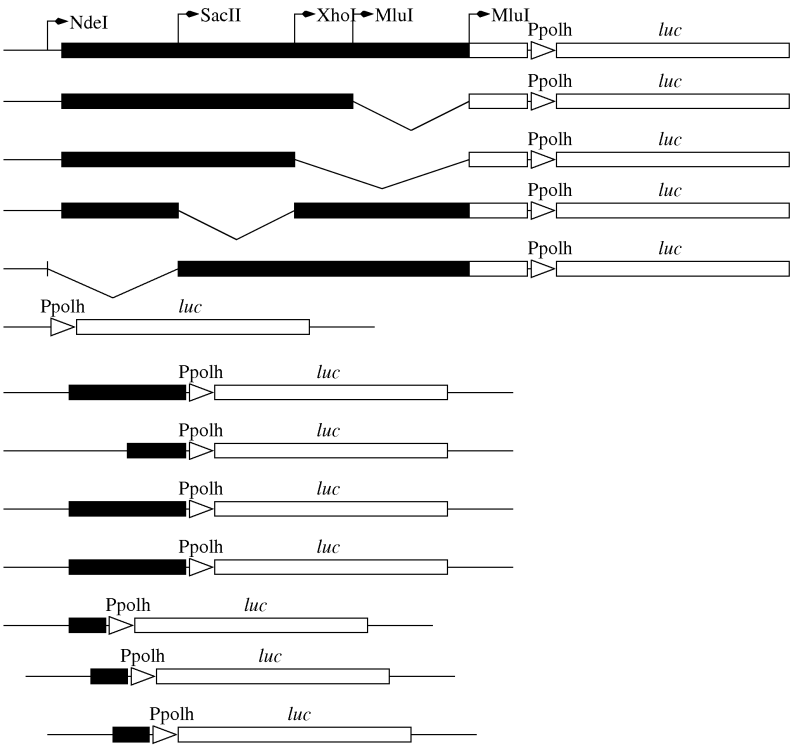


Figure 4: A simple example using XFig. Since the placement of objects in XFig is accurate, it is easy to create line drawings according to scale. Complex chemical structures could also be drawn without much effort. Moreover, the text can be flagged as "special" and LaTeX commands can then be included (Figure reprinted from the author's PhD thesis).

From simple chemical formulae to chemical structures that are complex, including steroid rings, plant products such as flavonoids can also be easily typeset using XyMTeX. Table 1 shows such a list of plant products. A good place to start will be the article written by Fujita Shinsaku[4].

5 Ready to publish your next article in LaTeX?

LaTeX has been the choice of publishers of mathematics and physics journals. The number of journals related to other subjects including biochemistry, molecular biology that accept TeX/LaTeX formatted manuscripts is slowly increasing.

Many of the journals such as *Cell*, *Science*, *Proceedings of the National Academy of Sciences, USA* that publish articles on biology (apart from physical sciences) now accept TeX/LaTeX formatted manuscripts. Well defined style files for preparing the main text of the manuscript and bibliography are available from the journal's website for prospective authors or from people who have created the style and bibliography files for their own use and decided to share it with others. However, LaTeX still has a long way to go before it supercedes `.rtf` & `.doc` as the preferred document format for manuscripts in

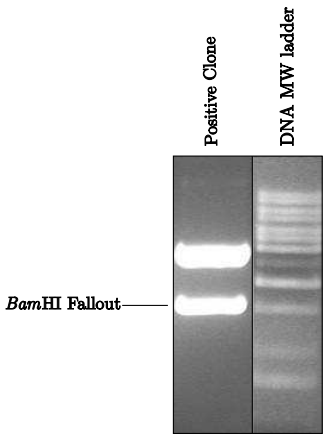


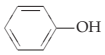
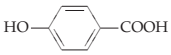
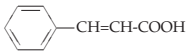
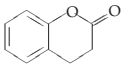
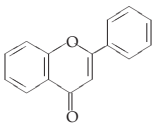
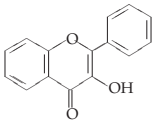
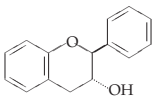
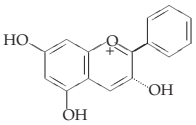
Figure 5: A figure to illustrate the ease of use of Inkscape. Notice the word *Bam*HI. In XFig, it takes a couple of tricks only a few people will attempt to get the italics and the "normal" font in the same word. In Inkscape, LaTeX typesetting commands can be entered even by novices and this feature provides the complete set of LaTeX tools available for authors that are interested in creating correct technical names accompanied by the figures, that they are trying to describe.

biology. Here are some of the sources that the readers will find useful for preparing their manuscripts in LaTeX for submission to journals in the area of Life Sciences.

- TeX FAQ: TeX Frequently asked questions. **The** place usually suggested by TeXperts for people learning TeX & LaTeX.[10]
- TeX showcase: Contains several excellent samples made with LaTeX. If you are not lured by this site into learning LaTeX, I doubt if anything else can make you do it.
- Tom Schneider's Page[11]: Well up to date. Provides style files and `.bst` files for various journals. Has several links to similar sites and lots of useful information.
- LaTeX Bibliography Styles Database: Searchable database of style files.
- Elsevier's site: Provides guidelines for preparing manuscripts in LaTeX for submission to Elsevier journals.[12]
- BioMed Central: Provides instruction for preparing manuscript in LaTeX format for publication in BMC journals.

10. Mailing lists provide a platform for discussing doubts, questions *not* in the FAQ. For example, texhax, TUGIndia mailing lists.
11. Inspired this author to take up using LaTeX seriously.
12. Please note that FEBS Letters, though being a Elsevier's journal, accepts only `.rtf` files.

Table 1: A list of chemical structures typeset using XyMTeX

Class	Basic Skeleton	Basic Structure	Examples
Simple phenols	C_6		Cresol, Thymol
Benzoic acids	C_6-C_1		Gallic acid, Vanillic acid
Cinnamic acids	C_6-C_3		*p*-Coumaric acid, Ferulic acid
Coumarins	C_6-C_3		Umbelliferone, Aesculetin
Flavone	C_6-C_3-C_6		Apigenin, Luteolin, Chrysin
Flavonol			Quercetin, Kaempferol, Myricetin
Flavan-3ols			Catechin, Epicatechin, Epigallocatechin
Anthocyanin			Cyanidin, Malvidin, Delphinidin

6 Conclusion

We saw in this article, the capabilities of the various TEX packages that are available for Life Scientists. Although this list is not comprehensive, the features of these packages discussed here only a glimpse, I hope that the readers will give a serious thought about using these tools that are wide open for them to explore.

About the author

Senthil finished his PhD work on *Gene regulation in very late promoters of Baculovirus*, from the Centre for DNA Fingerprinting & Diagnostics (CDFD), India. He claims to have written his entire PhD thesis, armed with nothing but Emacs + AUCTEX, LATEX and a toothbrush. He is currently working as a *Postdoctoral Research Associate* at the

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THE PracTeX Journal

Using LaTeX for writing a thesis

Vishal Kumar

Abstract

LaTeX has been successfully used for typesetting widely different document format. However, the complexity of typesetting some commonly used documents, normally acts as a deterrent for various people, who would like to use LaTeX for their work. Over the years, I have noticed that students who come to LaTeX, eager in their anticipation of using LaTeX, loose their enthusiasm, midway, and revert back to using MS Word. In this article, I have tried to described my own experiences of typesetting a doctoral thesis using widely available packages; in the hope that students can see the the ease with which LaTeX can be used for complex work.

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Using LaTeX for writing a Thesis

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Abstract LaTeX has been successfully used for typesetting widely different document format. However, the complexity of typesetting some commonly used documents, normally acts as a deterrent for various people, who would like to use LaTeX for their work. Over the years, I have noticed that students who come to LaTeX, eager in their anticipation of using LaTeX, loose their enthusiasm, midway, and revert back to using MS Word. In this article, I have tried to described my own experiences of typesetting a doctoral thesis using widely available packages; in the hope that students can see the the ease with which LaTeX can be used for complex work.

1 Introduction

A Thesis or a dissertation is probably the most complex document that a student of higher studies is compelled to write at some point of his academic career. The complexity of thesis arises from various factors some of which are beyond the control of student and have to be taken for granted. For example, the discipline in which the student is pursuing his studies may require use of special characters, shapes or formulas which may be difficult to typeset in a word processor. The university in which the student is enrolled may have its own requirements as to how to format the various parts of the thesis. Besides these, the viewpoint put forward by the student in the thesis may have its own peculiar requirements. Furthermore, the thesis normally requires that bibliography be provided in a particular style. Social sciences, for example, mostly require in-line citations where as more rigorous science may well require numerical citation.

So when a student first sits down to write the thesis, his first choice is the word processor with which he is most familiar with. Unfortunately, word processors are normally not designed for writing thesis. Their forte lies in writing

official documents like letters, small reports etc. — documents which do not require complex formatting; but which may require a plethora of eye candy.

LaTeX is a TeX macro package, originally written by Leslie Lamport, that provides a document processing system [Lam]. It allows markup to describe the structure of the document and the underlying TeX program reads the markup and format the document accordingly. This allows for significant advantage, in the sense, that the person can focus more or content, than on formatting the document. Beside this generic advantage, various other advantages are offered by LaTeX. The BibTeX program helps to insert the citation's in the document and provides the bibliography in almost any desired format. LaTeX can also be used for creating glossaries and indexes and of course, LaTeX excels in typesetting mathematical formulas. There are other advantages also — the LaTeX source code is a text file which is editable on almost any computer and operating system and does not run the risk of being corrupted with viruses. This makes the task of making backup simpler. Larger documents in LaTeX can be split up into smaller parts, which can then be inserted into the correct place with the minimum of effort. This also allows the user the flexibility to work on individual chapters, rather than the whole document at one go. Finally, LaTeX is adept at producing PostScript (PS) or Portable document File (PDF) — which can be printed on any printer without any loss of formatting.

Perhaps the paean of LaTeX may jar on some ear's, specially of the students used to word processors, but the jackpot at the end of the day is really huge. This article assumes that the reader has rudimentary knowledge of LaTeX and understands the basics. In the next section, we take a look at the parts of the thesis and subsequently we take a look at how to format a basic thesis which should meet the requirement of most universities.

In what follows, we assume the reader is already familiar with the basics of LaTeX and we shall use freely the LaTeX jargon.

2 A review of current solutions

Let us now take a look at how to write a thesis using LaTeX. A simple search of the Comprehensive TeX archive Network (CTAN) produces a fairly large number of thesis packages which can be used by the beginner in LaTeX. For example, `muthesis` [Gou06] aimed at University of Manchester, Department of Computer

Science, thesis style; `ut-thesis` [Pit99] aimed at University of Toronto thesis style; `utthesis` [Das95]for University of Texas (Austin), `uwthesis` [Fox03] for University of Washington thesis stye; `uaclasses` [Oli96] for University of Arizona theis style. The above classes can be found at `CTAN:/Formats/LaTeX/Contrib/`. Searching for other thesis classes, some more were found at the `CTAN:/Uncategorized` section, namely `thutthesis` (Tsinghua University), `stellenbosch` (University of Stellenbosch), `nddiss` (University of Notre Dame), `fbithesis` (University of Dortmund) `toptesi` (Polytechnique of Turin) etc. As can be seen, almost all of the thesis classes are geared to meet the requirements of a particular university. Any of these can be used as a starting point and then customised for writing the thesis. However, that may not be feasible for a new person who has just started using LaTeX.

Some other packages which are more flexible and generic in nature are reviewed here: (i) `hepthesis` [Buc06] a special thesis class aimed at writing thesis in the field of high energy particle physics. The package is flexible enough to be used as a general thesis package, but is dependent on various other packages which are available on CTAN. The package provides significant advantages without being too complex in nature. The problem is that if some non-standard specifications are required then the student may not have an easy way of making the changes. For example, the package provides for predefined margins and any changes are not easily made. (ii) `classicthesis` [Mie06] is another package which provides the first time users with an easy way of writing the thesis. However, the typographical formatting is done in homage to Robert Bringhurst book "The Elements of Typographic Style" and is overtly classical in nature. Another point of dispute is that it presumes that the thesis is a book and uses a wide outer margin on the right and the left hand pages. Customisation seems to be a problem, as the author himself requests the user not to change the style [Mie06, pp. 2]. (iii) `jkthesis` [Kup02] seems to be another generic thesis class. However as the documentation was in German, I could not do justice to the class. Prima Facie it seems to be reasonably flexible class for preparation of thesis.

Besides the above, some other classes were also found, but the documentation was not enough to form a definite opinion. Almost all the solutions given above seems to be hardwired to a particular university or a style and were not flexible enough, from the point of view of a layman. In search of something more flexible, I made two assumptions that the thesis is not a book but a report and that there

should be flexibility in adopting the thesis to ones needs.

3 Using LaTeX for Thesis Writing

The thesis can be looked upon as consisting of three basic parts which are discussed below.

The first part is the **Front Matter** In the front matter comes various parts which can be listed as follows : (i) Title page - which is in most of the cases also the cover page of the thesis (ii) Table of Contents (iii) List of tables and (iv) List of Figures. A dedication page or a quotation page can also be included.

The second and the longer part is the **main matter** The main matter would consist of the chapters of the thesis such as (i) Introduction (ii) Problem statement (iii) review of literature (iv) methodology (v) data analysis (vi) findings and (vii) conclusion. From the viewpoint of using LaTeX, appendicies can also be included in the main matter. This is where the student would develop the rationale for undergoing the research work and defend his or her findings. It is in this section, the student would include the mathematical equations, charts and graphs and other illustrations.

Finally at the end comes the **Back Matter**. This is the tail of the thesis and consist of some things which are extremely difficult to produce using a normal word processor. This normally consist of (i) Bibliography or References (ii) Glossary and (iii) Index. LaTeX, which was designed for typesetting takes care of the various aspects of the back matter in a more efficient way than any word processor and saves a lot of time and energy for the researcher.

3.1 Packages and Assumptions

The first assumption that I made is that the thesis is a report and not a book. This is because, almost universally, the thesis is printed on only the right hand side of a page. Secondly, thesis requires that one-half or double spacing be followed while typing the matter. And thirdly, it should conform to the margin requirements of the page setup. Most universities require that the left margin include a gutter or space for binding.

Based on these assumptions, I have selected the following packages which are needed for our task — `url`, `setspace` and `geometry`. The `url` package is a much

needed package which helps in formatting the long web url's, email id's etc. properly both in the document and in the bibliography. The usage is extremely simple and any url which needs to be typeset just needs to be enclosed in a `\url{...}` command. The `setspace` package provides a much easier method of controlling spacing in the document. Where ever we need a single spacing the command `\singlespacing` does the job. Similarly `\onehalfspacing` and `doublespacing` provides easy switch based mechanism to turn on or off the style of spacing desired. I made acquaintance with the `geometry` package much later in my thesis work but I wished I had done it sooner. It is an extremely powerful package which provides numerous options to control the page layout.

4 Laying out the Front Matter

4.1 Preamble

Given the above assumptions, and the objective to provide the user with control over the flexibility, the preamble looked as follows:

```
\documentclass[12pt, a4paper]{report}
\usepackage{graphicx}
\usepackage{url}
\usepackage{setspace}
\usepackage[left=1.2in, right=1in, top=1in, bottom=1in]{geometry}
\begin{document}
\pagenumbering{roman}
```

The standard 12 point type is used on a4paper. Two additional package seen — namely the `graphicx` — is the well know package for inclusion of graphics in to the final document. The use of `\pagenumbering{roman}` changes the default page numbering to small roman numerals in the front matter of the thesis.

4.2 Title Page

The title page normally requires five elements — the title of the thesis, the degree for which the thesis has been submitted, the name of the author, the department

in which the work was undertaken and the year of submission. To achieve this, we have provided a flexible alternative which is easy to understand and can be customized by anyone to meet his own requirement.

```
\begin{titlepage}
\vspace*{\stretch{1}}
\begin{center}
\Huge{\textsc{Title of the Thesis}} \\
\vspace{4em}
\large{Thesis Submitted To} \\
\vspace{2em}
\Large{\textsc{Name of the University}} \\
\vspace{1em}
\large{in partial fulfilment of the requirements} \\
\large{of the award of the degree} \\
\vspace{2em}
\Large{\textsc{Name of the Degree}} \\
\vspace{2em}
by \\
\vspace{1em}
\textbf{\textsc{Name of Candidate}} \\
\vspace{4em}
\Large{\textsc{Name of the Department}} \\
\Large{\textsc{Name of the University}} \\
\Large{Year}
\end{center}
\vspace*{\stretch{1}}
\end{titlepage}
```

This approach to title page design provides flexibility into the hands on newbie. The new user can also customize the cover page to meet the requirement of his university by inserting logo's, or incorporating relevant information. The generous use of spaces (`\vspace{}`) allows the user to customize the placements of the various elements on the title page.

4.3 Other Elements of Front Matter

The other elements that would require to appear in the front matter are the table of contents, tables and figures. This process is fairly straightforward and uses the standard LaTeX commands.

```
\tableofcontents
\listoftables
\listoffigures
\newpage
```

This brings us to the end of setting up the front matter of the thesis.

5 Laying out the Main Matter

Next, we turn our attention to designing the main matter. The main body of the thesis consists of the chapters and annexes, which are generally typeset in one-half or double spacing. The page numbering used is the Arabic numeral system and this continues till the end of the thesis.

Laying out the main matter, is perhaps, the easiest task in LaTeX and is accomplished by dividing the various chapters into individual files. I have assumed that each chapter is broken into a file. Each of these chapter files being with the command `\chapter{....}` and then has the necessary material which needs to be typeset; except for the "acknowledgement" which starts with the starred version of the chapter command viz `\chapter*{....}`. This is because, we don't want the acknowledgement to have a chapter number.

Under the assumption that there are five chapters and three annexes, we can set up the main body as follows:

```
\doublespacing
\include{CHAP_00}           % 0. Acknowledgement
\pagenumbering{arabic}
\part*{T H E S I S}
\include{CHAP_01}           % 1. Introduction
```

```
\include{CHAP_02}           % 2. Literature Review
\include{CHAP_03}           % 3. Research Methodology
\include{CHAP_04}           % 4. Findings and Outputs
\include{CHAP_05}           % 5. Conclusions
\part*{A P P E N D I X}
\appendix
\include{APD_01}            % Appendix I
\include{APD_02}            % Appendix II
\include{APD_03}            % Appendix III
```

This is all there is to set up the main body of the thesis. All a newbie has to take care is that he should remember to change the page numbering back into arabic. The `\part{}` command, in my opinion are purely decorative and may be dropped without much loss of formatting. However, keeping them in place produces a separator page with "T H E S I S" and "A P P E N D I X" written in the center, which help in demarcating the appendix from the main set of chapters.

6 Laying out the Back Matter

We are almost at the end of our thesis layout. In the back matter, I have made a simplifying assumption that the student has only to submit the bibliography. Bibliography can either be set up within the document or it can be done as a separate file. To produce the bibliography within the document we normally use the `\thebibliography` environment.

As this method is cumbersome and does not lead to easy use with the various bibliographical packages, this method is not recommended. It is always much better to go in for a separate bibliography file and the best way to create a bibliography file would be to use a graphical bibliography manager such as Jabref (http://jabref.sourceforge.net/). Once the user has created the bibliography file, it needs to be inserted in the document.

```
\newpage
\footnotesize
\singlespacing
```

```
\bibliographystyle{plain}
\bibliography{mybib}
\end{document}
```

The `\newpage` command forces LaTeX to insert a new page. The `\footnotesize` changes the default font size to a smaller font size and the `\singlespacing` turns on the single spacing for the bibliography. The `\bibliographystyle{plain}` tells LaTeX to use the `plain` bibliographical style.

LaTeX, by default provides the following four styles — `alpha` for producing a bibliography which is sorted alphabetically, the labels being formed from the name of the author and the year of publication, `unsrt` for producing bibliography similar to the `plain` style, but the entries are in the order of citation, `abbrev` for producing the abbreviated bibliography and `plain` for producing the alphabetically sorted with numerical label styles. The command `\bibliography{mybib}` tells LaTeX to use the bibliographical file named `mybib.bib`. More than one bibliography file can be used by passing on the names as arguments as shown: `\bibliography{file1,file2,...,fileN}`.

For getting the author-date citation style, more common in social sciences, it requires additional packages. Some packages that can be used to provide "author-date" citation style are `apacite` and `natbib`. All it requires is that one additional command be used in the preamble like — `\usepackage{apacite}`. As each of the packages have different ways of usage and modify the default `\cite{}` command, it is suggested that the student familiarize himself with the package before using it.

7 In Sum

This bring us to an end of trying to write a thesis in LaTeX. The above format is generic enough to meet many requirements and is flexible enough to meet the need's of the advanced user and specific subjects. Packages desired for a specific discipline can be included in the preamble. Another major advantage of such an approach is that the students can work on any chapter of their choice and compile only the desired chapter. Say, for example, we are working on the chapter 3 of our hypothetical thesis. We can only compile this chapter by issuing the command `\includeonly{CHAP_03}` in the preamble.

The included zip file contains the skeleton structure of the thesis, along with the chapters. The bibliography of this article has been included. It is hoped that this article will provide encouragement to the students writing their thesis and encourage them to use LaTeX for the same.

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THE PracTeX Journal

The ctable package

Wybo Dekker

Abstract

The ctable package provides a ctable command for the typesetting of table and figure floats. You will not need to type the usual nested begin...end sequences, as ctable is a command, not an environment. ctable has only 4 arguments, but the optional first one may hold many key=value pairs and makes ctable very flexible and extensible. It uses Simon Fear's booktabs package for better vertical spacing around horizontal rules and it provides facilities for making table footnotes.

Wybo Dekker: wybo@servalys.nl http://www.servalys.nl, is a retired organic and analytical chemist. He ran an Analytical Chemistry Research Consultancy for 16 years where he did all documentation (research reports, books, administration) in LaTeX. He has served as the treasurer of the NTG, the Dutch TeX Usergroup, since 1997. He maintains the Electronic LUG Database: http://www.servalys.nl/lug.

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The ctable package.*

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Abstract The ctable package provides a ctable command for the typesetting of table and figure floats. You will not need to type the usual nested begin...end sequences, as ctable is a command, not an environment. ctable has only 4 arguments, but the optional first one may hold many *key=value* pairs and makes ctable very flexible and extensible. It uses Simon Fear's booktabs package for better vertical spacing around horizontal rules and it provides facilities for making table footnotes.

1 Purpose

The ctable package lets you easily typeset captioned table and figure floats with optional footnotes. Both caption and footnotes will normally be forced within the width of the table. If the width of the table is specified, then tabularx will be used to typeset it, and one or more X column specifiers should be specified. Otherwise tabular will be used.

This package defines the commands \ctable, \tnote and \tmark, as well as four \tabularnewline generating commands. The latter generate reasonable amounts of whitespace around horizontal rules and are also useful for tabulars outside this package.

Since the ctable package imports the array and booktabs packages, all commands from those packages are available as well.

Note that, in line with the comments that Simon Fear made describing his booktabs package, vertical rules for column separation can be produced with \ctable, but no provisions are made to have them make contact with horizontal rules.

2 Usage

The following describes the commands (emphasized in magenta) available in the ctable package:

*This document corresponds to ctable 1.10, dated 2007/08/17. The most recent version of this package can be found on CTAN, an experimental version is on the author's web site

\ctable is called with 4 arguments, of which the first is optional:

```
\ctable[options]       % key=value,...
       {coldefs}       % for \begin{tabular}
       {foottable}     % zero or more \tnote commands (see below)
       {table rows}    % rows for the table
```

Options are given as key=value pairs, separated by comma's. Extra comma's, including one behind the last pair, don't hurt. Arguments to option should be put between braces if they contain comma's or equals signs. Currently the following option keys have been defined:

`caption={...}`	table caption; the braces are needed only if your caption contains a comma or an equals sign.
`cap={...}`	for a short caption to go to the `\tableofcontents`.
`captionskip=...`	moves the caption relative to the table; the default is `0ex`, which puts captions at their default LaTeX positions: a top caption's baseline at `1ex` above the top rule position of the table and a bottom caption's baseline at `4ex` below the bottom rule position.
`mincapwidth=...`	sets the minimum width of the float. Without this option, the width is set to that of the tabular, and the caption and footnotes are typeset within that width. This may be a problem with very narrow tables; `mincapwidth` can then be used to give the float a minimum width. The tabular will be centered in it.
`pos=...`	float position, default: `tbp`.
`label=...`	for `\label`
`width=...`	tabularx will be used to typeset the table at the specified width — one or more `X` column specifiers must be provided.
`maxwidth=...`	like the *width* option, but any `X` column specifiers will be replaced with `l` if the resulting table width would thus stay within the specified maximum width. This is especially useful where the LaTeX source is generated by a script.
`center`	center the table in the available text width; this is the default.
`left`	left align the table in the available text width.
`right`	right align the table in the available text width.
`figure`	produce a figure float instead of a table float.

`botcap`	put the caption at the bottom of the float instead of on top of it.
`sideways`	rotate table or figure by 90 degrees anticlockwise and put it on a separate page. With the twoside option for the standard LaTeX document classes, rotation will be -90 on even pages. If you use this option, the `pos` option is not allowed.
`star`	use the starred versions of the `table` and `figure` environments, which place the float over two columns when the `twocolumn` option or the `\twocolumn` command is active.
`nosuper`	in the footnote table, typeset footnote markers on the line, instead of superscripted.
`framerule=...`	draw a frame around the table with the given rule thickness. The default is `0pt`, so that no frame will be seen.
`framesep=...`	set the distance between the frame and the table to the given dimension. The default is `0pt`.
`framefg=`*r g b*	set the foreground color of the frame (the rule color) to the given triplet of *rgb*-values. The values should be numbers between 0 and 1. The default is `0 0 0` (black).
`framebg=`*r g b*	set the background color of the frame (the color inside the frame) to the given triplet of *rgb*-values. The values should be numbers between 0 and 1. The default is `1 1 1` (white).

The footnotes are placed under the table, without a rule. You therefore probably will want to use the `\LL` (last line) command if you use footnotes.

`\tnote[label]{footnote text}` places [*label*] footnote text under the table. Can only be used in the `foottable` argument described above. The label is optional, the default label is a single *a*. For more detailed control, you can also replace this command with something like `labeltext&footnotetext\NN`.

`\tmark[label]` this command places the superscripted label in the table. It is equivalent with `$^{label}$`. The label is optional, the default label is a single *a*.

The newline generating commands are a combination of `\tabularnewline` and zero or one of `booktabs`' `\toprule`, `\midrule` or `\bottomrule`. These combinations have been made, and short names have been defined, because source texts for complex tables often become very crowded:

`\NN` (Normal Newline), generates just a normal new line. An optional `dimen` parameter

inserts extra vertical space under the line.

\FL (First Line), generates a new line and a thick rule with some extra space under it. An optional dimen parameter sets the line width; the default is 0.08em.

\ML (Middle Line), generates a new line and a thin rule with some extra space over and under it. An optional dimen parameter sets the line width; the default is 0.05em.

\LL (Last Line), generates a new line and a thick rule with some extra space over it. An optional dimen parameter sets the line width; the default is 0.08em.

These macros can be used outside \ctable constructs.

Finally, for completeness, here are some of booktabs' commands that may be useful:

\toprule[<wd>] where <wd> is the optional thickness of the rule.

\midrule[<wd>].

\bottomrule[<wd>].

\cmidrule[<wd>](<trim>){a-b} where <trim> can be r, l, or rl and the rule is drawn over columns a through b.

\morecmidrules must be used to separate two successive cmidrules.

\addlinespace[<wd>] inserts extra space between rows.

\specialrule{<wd>}{<abovespace>}{<belowspace>}.

See the booktabs documentation for details.

2.1 The width and maxwidth options

When LaTeX-sources containing tables are generated automatically by a script, it is often not known in advance what the maximum size of an l column will be. A good solution for this is to use an X specifier, typesetteing the table at the text width with the tabularx package. However, this will result in too much white space in cases where the column contains small texts only. This problem can be solved by using the maxwidth option instead of the width option. The X specifiers will then be replaced with l as long as the width of the resulting table stays with the specified maximum width.

3 Examples

Table 2 is an example taken from the related package threeparttable.sty by Donald Arseneau, with an extra footnote. It was typeset with:

```
\ctable[
   cap     = The Skewing Angles,
   caption = The Skewing Angles ($\beta$) for
             $\fam0 Mu(H)+X_2$ and $\fam0 Mu(H)+HX$~\tmark,
   label   = nowidth,
   pos     = b
]{rlcc}{
   \tnote{for the abstraction reaction,
          $\fam0 Mu+HX \rightarrow MuH+X$.}
   \tnote[b]{1 degree${} = \pi/180$ radians.}
   \tnote[c]{this is a particularly long note, showing that
             footnotes are set in raggedright mode as we don't like
             hyphenation in table footnotes.}
}{                                                                  \FL
  &            & $\fam0 H(Mu)+F_2$     & $\fam0 H(Mu)+Cl_2$ \ML
  &$\beta$(H)  & $80.9^\circ$\tmark[b] & $83.2^\circ$       \NN
  &$\beta$(Mu) & $86.7^\circ$          & $87.7^\circ$       \LL
}
```

Table 2: The Skewing Angles (β) for $\mathrm{Mu(H)} + \mathrm{X_2}$ and $\mathrm{Mu(H)} + \mathrm{HX}$ [a]

	$\mathrm{H(Mu)} + \mathrm{F_2}$	$\mathrm{H(Mu)} + \mathrm{Cl_2}$
β(H)	80.9° [b]	83.2°
β(Mu)	86.7°	87.7°

[a] for the abstraction reaction, $\mathrm{Mu} + \mathrm{HX} \rightarrow \mathrm{MuH} + \mathrm{X}$.

[b] 1 degree $= \pi/180$ radians.

[c] this is a particularly long note, showing that footnotes are set in raggedright mode as we don't like hyphenation in table footnotes.

Table 3: Example with a specified width of 100mm

Example using tabularx			
Multicolumn entry!		THREE	FOUR
one	The width of this column depends on the width of the table.[a]	three	Column four will act in the same way as column two, with the same width.

[a] footnotes are placed under the table

Table 3 is an example with a width specification, taken from the `tabularx` documentation, with the vertical rules removed. By using the trimming parameters of the `booktabs` `\cmidrule` command, some of the horizontal splitting was regained. The `left` option left aligns the table. It was typeset with:

```
\ctable[
   caption = Example with a specified width of 100mm,
   label   = width,
   width   = 100mm,
   left
]{c>{\raggedright}Xc>{\raggedright}X}{
   \tnote{footnotes are placed under the table}
}{                                                          \FL
   \multicolumn{4}{c}{Example using tabularx}               \ML
   \multicolumn{2}{c}{Multicolumn entry!} & THREE & FOUR   \NN
       \cmidrule(r){1-2}\cmidrule(rl){3-3}\cmidrule(l){4-4}
   one&
   The width of this column depends on the width of the
       table.\tmark &
   three&
   Column four will act in the same way as
   column two, with the same width.                         \LL
}
```

Figures, even single ones, are always put in tabular cells. This is not particularly handy for single pictures, but it eases the construction of arrays of pictures, including subcaptions, delineation, and spacing. Figure 1 shows a figure that has been produced with the `\ctable` command, in combination with `\usepackage{carom}` it has been typeset with:

```
\ctable[
   figure,
   botcap,
   caption   = The di- and tri-bromobenzenes,
   label     = fig,
   pos       = h,
   framebg   = .53 .81 .92,
   framerule = 1pt,
   framesep  = 4ex,
]{ccc}{}{                      \NN
   \bzdrv{1==Br;2==Br}&
   \bzdrv{1==Br;3==Br}&
   \bzdrv{1==Br;4==Br}         \NN
   1,2 & 1,3 & 1,4             \NN[3ex]
   \bzdrv{1==Br;2==Br;3==Br}&
   \bzdrv{1==Br;2==Br;4==Br}&
   \bzdrv{1==Br;3==Br;5==Br}   \NN
   1,2,3 & 1,2,4 & 1,3,5
}
```

(The excessive whitespace at the left of the figure is caused by the bounding boxes generated by the `carom` package.)

4 Option examples

In the following, small examples will be shown illustrating the effect of options. In the left column the relevant part of the source is shown, in the right column you see the result. In most cases you see a standard example on a light yellow background, followed by one or more variations on a light blue background. Where necessary, the example will show boxes to indicate the page and the text body.

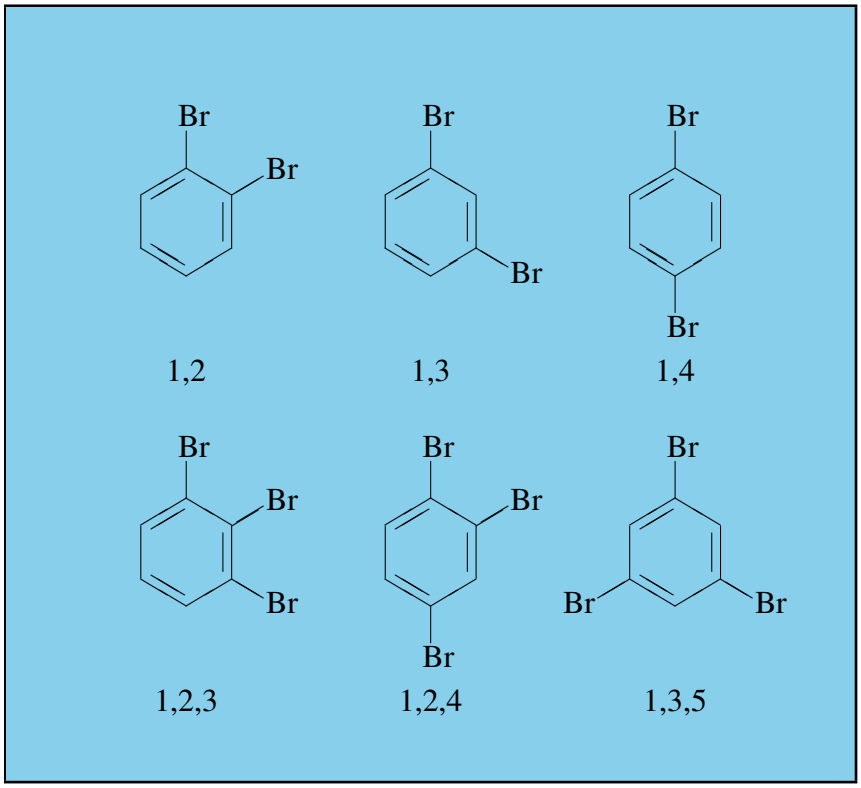


Figure 1: The di- and tri-bromobenzenes

4.1 `center, left, right`

These options align the float in the page; the default is `center`:

```
\ctable[
  caption = Centered,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Centered

Table's first row

```
\ctable[
  caption = Left,
     left
]{c}{}{\FL Table's first row\LL}
```

Table 1: Left

Table's first row

```
\ctable[
  caption = Right,
     right
]{c}{}{\FL Table's first row\LL}
```

Table 1: Right

Table's first row

4.2 `mincapwidth`

`ctable` forces caption and footnotes to stay within the width of the table. Sometimes, however, tables are so narrow, that this is not really what you want. In such cases, use the `mincapwidth` option to give caption and footnotes some extra room:

```
\ctable[
  caption = a lengthy caption
]{c}{}{\FL row1\LL}
```

Table 1: a lengthy caption

row1

```
\ctable[
mincapwidth = 55mm,
    caption = a lengthy caption
]{c}{}{\FL row1\LL}
```

Table 1: a lengthy caption

row1

You can set `mincapwidth` to a large value, say `\hsize`, if you want a one-line caption. Note, however, that this may influence the horizontal positioning of the table: values larger than `\hsize` will move a centered table out of the center, a value of `\hsize` will prevent the `left` and `right` options to do their work, because the table is already captured between the left and right margins.

4.3 `maxwidth`

When LaTeX-sources containing tables are generated automatically by a script, it is often not known in advance what the maximum size of an `l` column will be. A good solution for this is to use an `X` specifier, typesetting the table at the text width with the `tabularx` package. However, this will result in too much white space in cases where the column contains small texts only. This problem can be solved by using the maxwidth option instead of the width option. The `X` specifiers will then be replaced with `l` as long as the width of the resulting table stays with the specified maximum width.

```
\ctable[
  framerule = .1pt,
  maxwidth=3cm
]{lX}{}{\FL 1 & first row\LL}
```

1	first row

```
\ctable[
  framerule = .1pt,
  maxwidth=3cm
]{lX}{}{\FL 1 & test\LL}
```

1	test

4.4 `nosuper`

Footnote markers in `ctable` are typeset superscripted by default. Use the `nosuper` option to place them on the base line:

```
\ctable{c}{
  \tnote{First footnote}
  \tnote[b]{Second footnote}
}{\FL Table's\tmark\ first\tmark[b]\ row\LL}
```

Table's[a] first[b] row

[a] First footnote
[b] Second footnote

```
\ctable[nosuper]{c}{
  \tnote[a.]{First footnote}
  \tnote[b.]{Second footnote}
}{\FL Table's\tmark\ first\tmark[b]\ row\LL}
```

Table's[a] first[b] row

a. First footnote
b. Second footnote

4.5 `framerule`

The following examples show the use of frames and backgrounds. Every table is typeset by `ctable` with a frame around it, but the frame is, by default, drawn with a zero width line, and is therefore invisible. You can make it visible by either changing the linewidth to a positive value or by giving it a background color, which will be used to fill the frame.

Here is a simple table without a frame, followed by one with a red, `1pt` thick frame:

```
\ctable[
  caption = Frame,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

```
\ctable[
  caption = Frame,
  framerule = 2pt,
  framefg = .8 0 0
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

As you see, the frame fits closely to the first (`\FL`) and last (`\LL`) table lines. This can be a reason to either remove those lines, or to introduce some whitespace between the frame and the table with the `framesep` option:

```
\ctable[
  caption = Frame,
  framerule = 1pt,
  framefg = .8 0 0,
  framesep=10pt
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

And finally, we could also frame the table by giving it a, say, yellow backgound instead of a red frame line, or even do both:

```
\ctable[
  caption = Frame,
  framebg = 1 1 0,
  framesep=10pt
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

```
\ctable[
  caption = Frame,
  framerule = 2pt,
  framesep = 5pt,
  framebg = 1 1 0,
  framefg = 1 0 0,
  framesep=10pt
]{c}{}{\FL Table's first row\LL}
```

Table 1: Frame

Table's first row

4.6 `captionskip`

The distance between a top caption's baseline and the table is `1ex`, but it can be varied with `captionskip`:

```
\ctable[
  caption = Caption,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Caption

Table's first row

```
\ctable[
    caption =  Caption,
captionskip = 1ex,
]{c}{}{\FL Table's first row\LL}
```

Table 1: Caption

Table's first row

This works for bottom caption, too; the default distance between the baseline and the table is `4ex`, but `captionskip=-2ex` moves it up to `2ex`:

```
\ctable[
  caption = Caption,
   botcap
]{c}{}{\FL Table's first row\LL}
```

Table's first row

Table 1: Caption

```
\ctable[
    caption =  Caption,
captionskip = -2ex,
     botcap
]{c}{}{\FL Table's first row\LL}
```

Table's first row

Table 1: Caption

4.7 `sideways`

The `sideways` option creates a landscape table with its head pointing at the spine — when the documentclass' twoside option has been used, that is. The following examples show the effect of the `sideways` option, first on page one, then on page 2. Note that the `caption` option has not been used, so no caption appears:

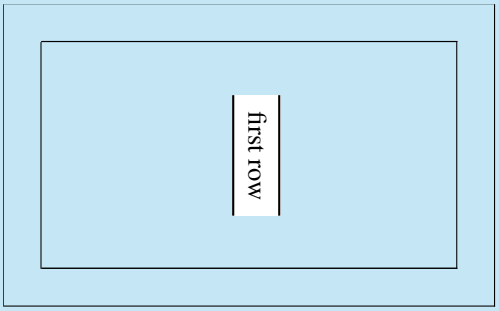
```
\ctable[
]{c}{}{\FL first row\LL}
```

first row

```
\ctable[
  sideways
]{c}{}{\FL first row\LL}
```

first row

```
\setcounter{page}{2}
\ctable[
  sideways
]{c}{}{\FL first row\LL}
```



4.8 `figure, botcap`

By default, `ctable` generates a table float, but with the `figure` option, a figure float is generated instead. The caption stays on top, so if you are accustomed to have bottom caption for your figures, you will probably also need the `botcap` option:

```
\ctable[caption = a table]{c}{
}{\FL Table's first row\LL}
```

Table 1: a table

Table's first row

```
\let\H\hsize
\ctable[
  caption = a figure,
  figure, botcap,
  width=.4\H,
]{@{}>{\H=.4\H}X>{\H=.6\H}X@{}}{}{\FL
  \includegraphics[width=\H]{penguin}&
  \includegraphics[width=\H]{lion}\LL
}
```

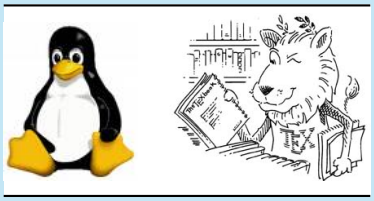


Figure 1: a figure

THE PracTeX Journal

Teaching LaTeX for a staff development course

Nicola Talbot

Abstract

This article describes the headaches and lessons learnt from teaching LaTeX as part of a staff development course. It is intended to assist those who are planning to teach LaTeX in a practical environment.

Nicola is a mathematician and computer programmer. She first learnt LaTeX as a PhD student in the early 1990s, and except for a brief excursion with Plain TeX has used LaTeX every since. She is the author of several LaTeX packages and online LaTeX tutorials. She may be contacted at: theoval.cmp.uea.ac.uk/~nlct/

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Teaching LaTeX for a staff development course

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Abstract I taught LaTeX at the University of East Anglia from 1997 to 2004 as part of the staff development course. In this article I will describe the headaches and lessons I learnt which helped me improve the course. This article is intended to assist those who are planning to teach LaTeX in a practical environment.

1 Introduction

I first started teaching LaTeX at the University of East Anglia around 1997 for the Centre for Staff Educational Development (CSED). It was the first time I had to do a presentation where the participants sat at a computer and my talk was interspersed with the participants doing a practical exercise based on what I had just described. This method does have the advantage in that the participants can get a feel for what is involved, and they have someone on hand to help them if they have problems, but it does however have disadvantages. In this article, I shall relate some of the pitfalls I fell into, and the way in which I adapted and learnt from my experiences. Some of the tips may seem obvious, but things that seem obvious to one person, may not necessarily be so to another.

2 Target Audience

The participants on my LaTeX courses were composed of university staff (academic, support and administrative), PhD students and also members of the various research institutes which, together with the university, comprise the Norwich

Research Park. So a typical class might contain secretaries, computer scientists, linguists, chemists, biologists, mathematicians, environmental scientists and, on one occasion, a librarian. Some of whom had experimented a little with LaTeX, while the others had only ever used a word processor. Such a wide ranging mix of abilities is, quite frankly, a recipe for disaster!

The computer scientists who were used to the idea of writing source code and then compiling it caught on quickly, whereas some of the others who were used to only using a word processor, by and large struggled to get to grips with the concept of a typesetting language. As a result, during the practical parts of the class, some of the participants would be finished in no time at all, whilst some of the others struggled to understand the very basics. In the end the faster ones would be flicking ahead through the notes, surfing the web or playing computer games, whilst the slower ones had to abandon the exercise because I simply could not give them any more time.

Tip 1: Try to limit your audience to those with roughly similar skill sets. Having said that, this was something over which I had no control, so instead I added optional harder parts to each exercise to occupy the faster ones. Also, bear in mind the fact that some people are very slow typers, so don't expect people to type more than a paragraph for each exercise if you are only allocating, say, ten minutes per exercise.

3 Operating Systems and Editors

In the earlier years in which I taught this course, I think that the most troublesome aspect, which at times drove me frantic, was the way in which the participants had to access LaTeX. The computer labs in which I taught all had computers with Windows installed, but there was no TeX installation. I can't remember the reason why, but it took about three or four years (or possibly more) before I finally taught in a lab with MikTeX installed. In the beginning, it was therefore necessary to remote login to the Unix computers (which had teTeX installed) via Exceed running on Windows. I realised the first time the course ran that in future I would have to give a crash course on Unix before even attempting to explain LaTeX.

The major difficulties I encountered with this setup included network failures (which thankfully didn't happen very often, but even one instance is catastrophic)

and the lack of an easy to use editor (or, at least, one which the participants found easy to use.) Another problem arose from the fact that some of the participants couldn't understand the difference between UNIX and LaTeX commands, which resulted in LaTeX source code which contained lines like `latex mydoc` and `xdvi mydoc.dvi` (followed by puzzled expressions when nothing happened.)

Most of these problems went away when we finally moved over to using local MikTeX installations. I tried out both WinEdt and TeXnicCenter, and we went with TeXnicCenter. I tested all my exercises on those computers a few days before the course started, to ensure that everything was correctly installed, and I made sure that there was a folder available for the participants to use in the event that they were unable to access their own account over the network. This made a considerable improvement to the efficient running of the course, and it gave me more time to cover more detailed LaTeX topics than previously.

Tip 2: Use MikTeX and a front end, unless you are talking to users who you know are all completely familiar with a specific operating system. This recommendation may surprise people who know me, as I am very much a Linux user and command line devotee, however most computer users these days have been brought up in a point and click environment, and they are the ones who are most likely to flounder when you talk about typing the `latex` command at the prompt and typing a LaTeX command in your document.

Tip 3: Always check the software runs without a problem a few days before the course. I was once caught out when I turned up to find that Exceed had been removed from the computers since the previous course and no one had mentioned it to me! Make sure you know in advance who to contact in the event of equipment failure.

4 Presentation

These days I always use the beamer class whenever I create a presentation, but when I started teaching I was using the seminar class, so that's what I used for the course. Initially I used `xdvi` to display the slides on a data projector, which was fine until I used specials that `xdvi` couldn't handle. Initially I just distributed handouts, but I had so many requests to keep flipping back to earlier slides whilst people were doing the exercises, that in the end I decided to put a copy of the slides on the web, so that they could go through them at their leisure. Rather than

relying on the computers to have software that could view PDF or PostScript files, I wrote a script which converted each slide to a bitmap along with HTML files which linked them together, including a table of contents and an index.

In the latter years that the course ran, I moved over to pdfLaTeX, and used Adobe Reader which was becoming more widely available and much more practical. I was then also able to supply the PDF version of the slides on the web, although I still retained the HTML and bitmap version. In fact, even though the course has finished, they are still available at http://theoval.cmp.uea.ac.uk/~nlct/latex/csed/ although they are now dated.

Tip 4: If your participants have Internet access, put your slides on the web where they can access them if they want to go back to material you have already covered. Remember however, to have a local copy of your slides (for example on a USB stick) in case of network failures. You can of course supply printed versions of the slides in 2 or 4 to a page format, but if you have a lot of slides, this might be construed as being environmentally unfriendly.

5 Dealing with Queries

My own knowledge of LaTeX has increased through my teaching simply by being asked how to do something I had never needed to do. I'm not usually worried about being asked how to do something, since if I don't know the answer, it's a good way of teaching people how to look for help. The questions that cause the most problems for me are those that I would never expect to be asked, and the hardest part is not to stare in dumbfounded amazement! If you are planning on teaching LaTeX, you will inevitably be asked what seems a stupid question, but remember that although the question may seem stupid to you, it's usually not stupid from the point of view of the one asking the question.

Most people new to LaTeX are people who have previously used word processors, so don't be surprised when they assume that their word processor's default settings are the correct way of doing things. Instead of rolling your eyes in despair and launching a tirade against word processors and the vendors thereof, be polite and direct them to books such as "The Chicago Manual of Style" [5]. In fact, it's a good idea to bring along some sample documents of good and bad typesetting to use as an illustration.

Tip 5: Bring some text books with you (such as the Companion series [1, 3, 2],

and Kopka and Daly's "A guide to LaTeX" [4]) and view awkward questions as a way of illustrating how to look for information in text books or by searching the web, such as the UKTUG FAQ and the comp.text.tex and texhax archives.

6 Course Contents

Initially I taught two separate LaTeX courses: a beginners and a follow-on or further course. Both courses were two part courses that covered two mornings or afternoons each. The problem with the follow-on course was that I had no way of knowing the actual level of expertise of the participants, as there was no requirement to attend the beginners course. As a result, the participants on the further course ranged from people who already knew everything I was describing to those who had to ask how to create a document. In the end I gave up and combined the two courses into a single four part course which ran two or three times a year depending on demand.

It took me a while to work out which subjects would interest people. Some topics that I covered, such as creating an index and using the picture environment, I dropped because they were unpopular, only to later be requested to include them. This was of course due to the wide ranging background of the participants. Some weren't in the least bit interested in typesetting mathematics, whereas some of the others had specifically enrolled (or been told to enroll) for that very purpose. This is why I decided to create supplementary material on the web. I covered the basics in the class, and was then able to direct the participants to my website for further details. However once I had finally achieved this balance, the course was cancelled due to lack of demand. The supplemental material is still available on the web at `http://theoval.cmp.uea.ac.uk/~nlct/latex/`.

Tip 6: If you are teaching a set of people with wide ranging backgrounds, it is better to briefly introduce topics and give pointers to further information. If you are teaching a set of people with the same background (for example, mathematicians) then you have the luxury to cover the most relevant topics in much more detail.

7 Acknowledgments

Thanks to Paddy Ansty in CSED for all his advice to me while I was finding my feet, and thanks to Dave Knock also in CSED for championing my cause and ensuring that MikTeX and TeXnicCenter were finally installed on the teaching computers.

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THE PracTeX Journal

Brevity is the soul of wit: How LaTeX can help

S. Parthasarathy

Abstract

This essay is about using ``lists'' in \LaTeX\ . Lists are very useful, in presenting material in a crisp and compact form. This makes technical documents, less verbose, and easier to follow. The author hopes that this paper will make \LaTeX\ enjoyable for more people.

Parthasarathy teaches discrete mathematics to undergraduate Computer Science students, at Hyderabad, India. He has branched into full-time teaching after a 25-year stint in the software industry. His association with LaTeX started in 1993, at the United Nations University, International Institute of Software Technology, Macau, where he worked with Prof. Dines Bjorner. His website http://algolog.tripod.com/nupartha.htm will give more specific details about him.

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Brevity is the soul of wit : How LaTeX can help. *

S. Parthasarathy†
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Abstract This essay is about using "lists" in LaTeX . Lists are very useful, in presenting material in a crisp and compact form. This makes technical documents, less verbose, and easier to follow. The author hopes that this paper will make LaTeX enjoyable for more people.

1 Preamble

"Brevity is the soul of wit", said a great author once. Technical documents have to be "to the point", and well focused. Lists provide an excellent artefact for technical writers. Lists help you avoid long, verbose paragraphs. The points in a list, stand out on their own, prominently. They make documents, much more easy to follow. Thus, mastering lists, is an essential activity for anyone who wishes to succeed in technical writing. LaTeX provides you three possible list environments:

Enumerate environment – for producing a "numbered" list

Itemize environment – for producing a "bulleted" list, and

Description environment – for a list of term/description pairs, like the entries you will find in a traditional dictionary. This current list, uses a description environment. You can see, it is so very clean, and easy to follow.

And, of course you can cook up your own list environment too.

A few simple facts :

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

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1. Each list must have at least one item.
2. You can embed lists inside lists, creating a hierarchical structure (nested lists, or multi-level lists).
3. You can mix the above three basic types of lists inside hierarchically structured lists (multi-level, multi-mode lists).
4. You can number lists either in ascending order, or in descending order.
5. You can change the "look-and-feel" of lists
6. As a standard practice, you can go four levels deep, in nested lists. This is much more than necessary, for all practical purposes.

We will see some examples, to illustrate the above facts. We will also see several nested `\itemize` and `\enumerate` lists now. This test document will try out different possibilities with nested `\itemize` and `\enumerate` lists.

2 How to work with nested lists – multi-level lists, multi-mode lists

2.1 Nested itemize – bullets within bullets

- Partha is a great guy
  - But no one knows that.
  - And, even if they know, they don't accept that
- Yet, Partha keeps saying this again and again

2.2 Nested enumerate – numbers within numbers

1. First first-level number
2. Second first level number
   (a) First second level
   (b) Second second level
3. Third first level

When you use multi-level lists, LaTeX numbers each level using a different numbering style : 2aiA (arabic, alpha, roman, Alpha). You can decide to change these numbering styles, by using the `\renewcommand` facility, like this :
`\renewcommand{\theenumi}{Roman{enumi}}`

2.3 Numbers within bullets

- First bullet
- second bullet
    1. First number
    2. Second number
- Bullet again

2.4 Bullets within numbers – why not ?

1. first number
2. second number
    - First bullet
    - Second bullet. Now we will go, one level more, for bullets
        - second level bullet
        - second second level bullet
3. third number – and go one level deeper for numbers
    (a) second level – first item
    (b) secondlevel – second item – this will have two levels of bullets
        - one bullet inside a number which was under another number
            - another level bullet
    (c) and now the next second level number

3 LaTeX magic !

You can decide to get the items numbered in the descending order. Why on earth would you need to do that ? For instance, if you are preparing a list of items,

arranged in the reverse chronological order, you would like the first item to carry the largest number since it was the last to be produced in the chronological order. Confusing ? Imagine having to introduce your children, youngest first, eldest last. Imagine you have four children. You would say "Meet xxx, my fourth child", then "Meet yyyy, my third child" and so on. Got the idea ? We achieve this using the `revnum` package.
And, of course you can mix forward counting with reverse counting, like in the following example:

3. One
2. Two
   (a) Un
   (b) Deux
   (c) Trois
1. Three
   (c) Ein
   (b) Zwei
   (a) Drei

But, how does LaTeX know from where to start numbering ? Do you have to tell LaTeX how many items you have in the list , so it can start counting down from this maximum ? NO, a big NO. LaTeX can find out by itself. To do this, you will have to pass your document through LaTeX two times. In the first pass, LaTeX just makes a count and stores the maximum count, in the aux file. In the second pass, LaTeX will start counting down from this maximum limit which it found out during the first pass. That is pretty smart, isn't it ?

3.1 And some more LaTeX magic !

Actually, you can start numbering down, from any arbitrary maximum value, like this :

17. we can start from any maximum

16. and count down

15. like this

Actually, reverse numbering of lists can also be achieved using the etaremune package (etarenume is enumerate written backwards). They say, etaremune is smarter than revnum. It uses lesser memory.

```
\begin{etaremune}
\item hhh
\item jjj
\item kkk
\end{etaremune}
```

And, how about some personalised numbering scheme for your lists ?

1. First first-level item
2. Second first level item

2++a** First second level item

2++b** Second second level item

3. Third first level item

We used the `\renewcommand` to modify the definition of `\labelenumii`. I decided to have the second level displayed along with the number of the first level, and with some ++ and ** , just for fun. Caution : You must undo this `\renewcommand` by doing a `\renewcommand` again, so that the labels would look normal, like this :

1. First first-level number
2. Second first level number
   a First second level . (Try commenting out the `\renewcommand`, used just before the `\begin{enumerate}` above.)
   b Second second level
3. Third first level

Can you customise the bullets too ? YES, of course. Just redefine the `\labelitem` , and you can get this:

- ◇ how is this ?
    - ◁ or this one ?
    - ◁ or this one ?
- ◇ do you like this ?

You can't ask for more proof about the power of LaTeX , can you ?

4 Closing remarks

LaTeX can be used for producing very elegant looking documents. It gives you tools for making your documents, crisp and compact. The "list" facility of LaTeX is an important feature for creating documents with technical content. LaTeX also gives you many options for using lists, with flexibility and ease. You can personalise these lists, to reflect your own taste and preferences.
This paper, predictably, was made using LaTeX . It used the Kile front-end provided by Suse Linux. It uses the revnum package, downloaded from the CTAN site.
The author of this paper teaches discrete mathematics in an engineering college near Hyderabad, India. When he is not teaching, he preaches Linux and LaTeX to his students. He also runs a specialised enterprise which uses LaTeX extensively. More details can be found in teh author's web site mentioned in the footnote of the title page.

* * * * *

THE PracTeX Journal

Writing your dissertation using LaTeX

Keith Jones

Abstract

The old adage, ``You can lead a horse to water, but you can't make it drink," applies when trying to convince students to change to LaTeX for writing their thesis or dissertation. Students like to stay in their ``comfort" zone and do not look favorably toward the work of learning a new software system. To date I have convinced one professor and two students to using LaTeX as their primary document formatting system.

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Introducing Students to LaTeX for Writing Their Thesis/Dissertation

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Abstract The old adage, "You can lead a horse to water, but you can't make it drink," applies when trying to convince students to change to LaTeX for writing their thesis or dissertation. Students like to stay in their "comfort" zone and do not look favorably toward the work of learning a new software system. To date I have convinced one professor and two students to use LaTeX as their primary document formatting system.

1 Introduction

I was introduced to LaTeX by Dr. Pan at the University of Texas at El Paso in my first semester of graduate school in 2003. I had asked to see his dissertation, and as soon as I saw the equations I knew I had to have that software because I knew I could never get that quality using MS Word®[1]. I was an easy convert.

The great-looking equations is one of the selling points I use when I give my seminar on "Using LaTeX for Writing Your Thesis/Dissertation"; http://www.keithljelp.com/LaTeX/MainLatexClass.pdf. The class is scheduled for two hours with the last twenty to thirty minutes reserved for a free form discussion on topics requested by the audience. The audience consisted mostly of masters students and a few Ph.D's. The people who show up are at least interested in learning about LaTeX.

1. Registered trademark of Microsoft Corp.

2 Discussing The Advantages and Disadvantages of LaTeX

As the attendees are arriving I tell them about the CDs by the sign-in sheet that has the TTU style file and a source/template file that they can load onto their computers. I had sent an E-mail to all the people that had registered for the class a few days before suggesting that they bring their laptops.

After I have introduced myself I tell the audience that the presentation was created using the Beamer class; http://latex-beamer.sourceforge.net/, in LaTeX, and then I point out some of the advantages and disadvantages of using LaTeX to write their thesis/dissertation and beamer to create presentations:

1. It's *free*;
2. It has many professional-looking qualities, such as the headings and subheadings;
3. LaTeX has a long learning curve but the results are worth the effort;
4. It has many useful features, such as an outline Table of Contents on the right of the Beamer slide;
5. By clicking on a entry in the Table of Contents the presentation goes to that slide;
6. The great-looking equations;
7. Automatic numbering of equations and sections;
8. ... and many more.

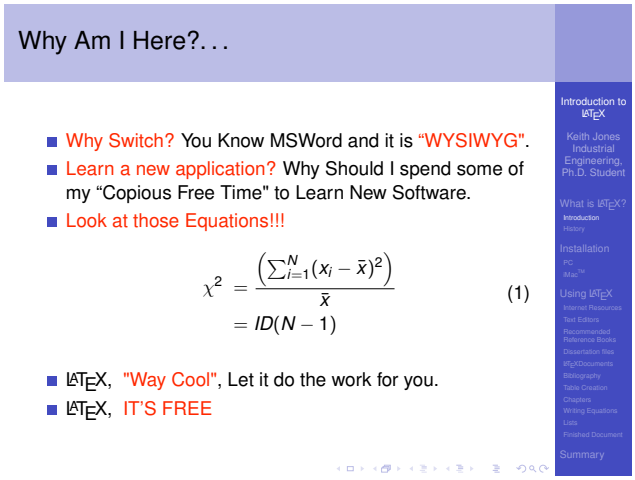


Figure 1: LaTeXAdvantages

At this point in the presentation I discuss the history of LaTeX and why LaTeX is different from other word processing systems. I stress that LaTeX allows the author to concentrate on the content and not on layout. Now it is time to show the audience how to install a LaTeX system on their computer. I cover both PCs and Macs and after each computer type is discussed I ask if there are any questions on how the installation is performed. At this point in the presentations I begin to discuss some the resources that are available on the internet, tutorials [2], and the reference books I would recommend that all LaTeX users have in their library.

I am now getting to the meat of the class. I show a suggested directory structure to help them keep all the different parts organized. The third slide in this section is a seven-line source/template file to introduce the audience to what a basic LaTeX file consists of. I specifically use the word template since 20% of the audience are MS Word® users.

2. The Indian TeX Users Group has an excellent set of Tutorials: http://www.tug.org.in/tutorials.html

3 Thesis/Dissertation

The "Thesis/Dissertation" section of the presentation consists of seven slides[3]. The first slide in the sequence shows the first part of the preamble. I talk about some of the packages that are available for use in a LaTeX document and how a basic source file can be used for not only their thesis or dissertation, but all their research and report papers as well.

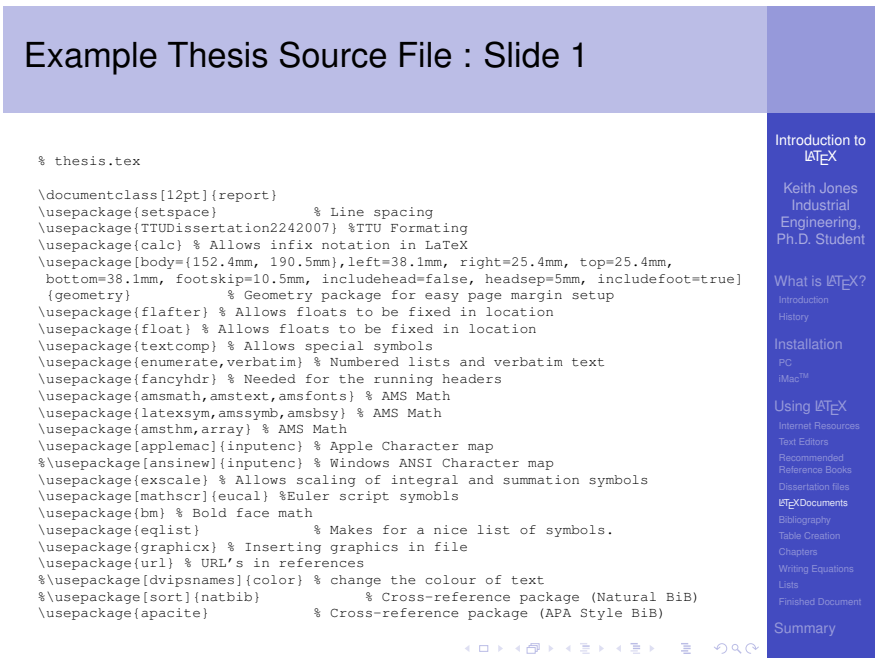
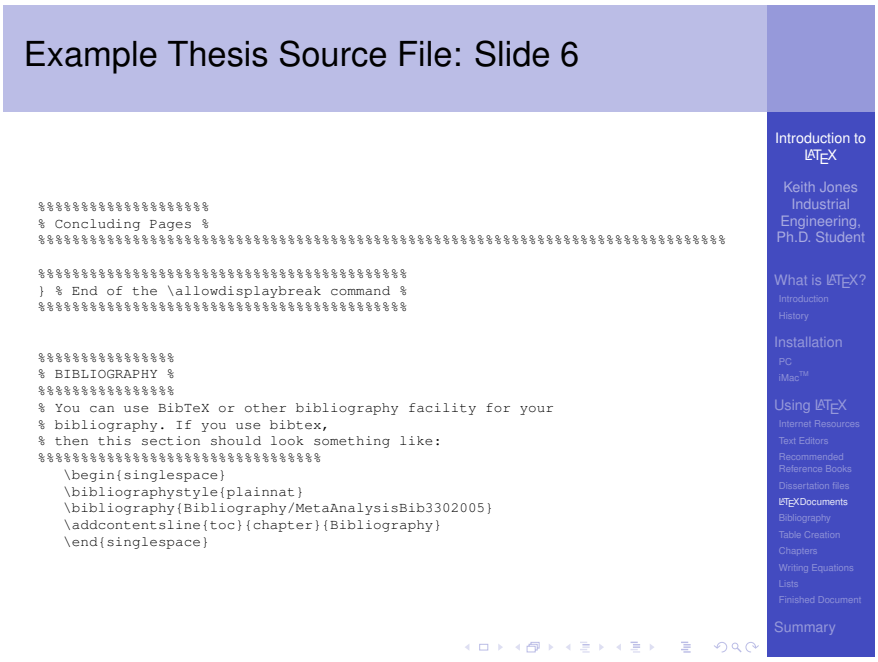


Figure 2: Thesis/Dissertation Source

The second slide in the sequence is where I talk about how in the preamble they can create special commands to speed up the writing and at this point the body of the file starts. The third slide covers the title, author, committee members, Table of Contents, List of Figures, List of Tables, the and Dedication, and other front matter. The fourth and fifth slides are where I talk about how to organize

3. The presentation is available for download at: http://www.keithljelp.com/, LaTeX Seminar

the various thesis/dissertation parts into separate directories on their computer, how to write each chapter of the thesis/dissertation as a separate document, and how to use the input command to include a chapter, appendix, etc. The sixth slide covers the bibliography.



Example Thesis Source File: Slide 6

```
%%%%%%%%%%%%%%%%%%%%
% Concluding Pages %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
} % End of the \allowdisplaybreak command %
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%


%%%%%%%%%%%%%%%%
% BIBLIOGRAPHY %
%%%%%%%%%%%%%%%%
% You can use BibTeX or other bibliography facility for your
% bibliography. If you use bibtex,
% then this section should look something like:
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
   \begin{singlespace}
   \bibliographystyle{plainnat}
   \bibliography{Bibliography/MetaAnalysisBib3302005}
   \addcontentsline{toc}{chapter}{Bibliography}
   \end{singlespace}
```

Figure 3: Thesis/Dissertation: Bibliography

I spend a lot of time here and show them how to create a bibliography database file using BibTeX and I discuss some of the other software packages that can create the database for them by just filing in a form. I stress how this will same them hours of time and that this is where most students have problems getting their thesis/dissertation approved by the graduate school. The seventh slide covers the appendices.

The last four sections consist of how to create tables, chapters, the writing of equations, lists, and how to finish the document. I cover these five sections in about twenty minutes. When I am talking about tables I recommend that they

use Excel® [4]. I cover an add-in for Excel that will convert the selected part of a spreadsheet to a LaTeX tabular format. (This results in 90% of the table converted automatically, and the rest must be cleaned up manually. The add-in file is no longer available for download from the internet, but, I tell them to send me an E-mail and I will sent it to them.)

Just recently I have found a new table generating application available for Apple's OS X®[5] operating system: TeXTable at http://www.twistedtheorysoftware.com/, TeXTable has a spreadsheet like input and it is very easy to use. The latest version (0.2) allows import and export of CSV files so creating large tables from data is now a lot easer. I will be adding TeXTable to my presentation.

4 Conclusion

I enjoy teaching this seminar and spreading the "word" about LaTeX. The graduate school has requested that I repeat the class this spring.

4. Registered trademark of the Microsoft Corp.
5. Registered trademark of the Apple Inc.

THE PracTEX Journal

Interactive TeX training and support

Jonathan Fine

Abstract

It is today practical and helpful to provide TeX as a web service. This allows us a new approach to learning TeX.

Jonathan Fine is a technical developer at The Open University, the UK's leading provider of distance learning. He is responsible for developing and supporting the OU's TeX system, which is used to produce materials for mathematics and upper level physics courses. He is also Chair of the UK TeX Users Group (2006-2008).
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Interactive TEX training and support

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Abstract It is today practical and helpful to provide TEX as a web service. This allows us a new approach to learning TEX.

The website http://www.mathtran.org (developed by the author, with funding from the UK's JISC and Open University) runs TEX as a daemon and provides translation of TEX-notation mathematical formulas into bitmap graphics as a web service. It takes less than 10 milliseconds per image to do this translation (not including time take to serve the image), which is quicker than looking it up on an average hard drive. At present, this site is serving about 30,000 images a day, out of a potential capacity of perhaps 2,000,000.

Troy Henderson's LATEX previewer http://www.tlhiv.org/LaTeXpreviewer/ and the SITMO equation editor http://www.sitmo.com/latex/ both offer LATEX as a web service. Here, they run LATEX once for each request. Although not quick enough to support a public service for web page graphic, they are easily quick enough to process individual user generated requests.

Recently, one of the TEX users I support asked a question about breaking an equation over two lines. Previously it was set page width, and she had to reformat it for double column. The original equation used `\left` and `\right` to give variable size delimiters. When she, in the usual way, used `align` to break the equation, she found that `\left` and `\right` no longer worked.

The solution is to use one of the `\big` family of commands. I looked for a web page that explained this. To my surprise, I did not find one. Worse, there was no easy way I could create one. So instead of doing that, and sending my user a newly created TEX-support URL, I sent an email.

The Django website http://www.djangosnippets.org/ is a modern example of how to store and serve user-contributed content. The code for the site (but not the design) is open-source, and so can be copied. We can follow this example.

It is now time to integrate TEX as a web service into web pages that provide TEX support and training, and to allow users to edit these pages.

THE PracTeX Journal

Writing the curriculum vitæ with LaTeX

Lapo Mori and Maurizio Himmelmann

Abstract

This paper presents the tools that are currently available to prepare a curriculum vitæ with LaTeX, and gives a critical analysis of each tool.

Lapo Mori is a graduate student in Mechanical Engineering at Northwestern University (Evanston, IL, USA). He started using LaTeX in 2003 while working on his B.S. thesis and has been an enthusiastic user since then. He became a member of GuIT (Italian TUG) in 2003, an administrative member in 2003, and the vice president in 2007. He was among the founders of **Ars TeXnica** in 2006, the first Italian journal on TeX and LaTeX, and has served as an editor since then. You can reach Lapo at www.lapomori.com.

Maurizio Himmelmann works as statistician at Sant'Anna School of Advanced Studies in Pisa (Italy). He was one of the charter members of GuIT (Italian TUG) and was its President through 2007. You can reach him at web1.sssup.it/users/himmelmann.

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Writing the curriculum vitæ with LaTeX

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Abstract This paper presents the tools that are currently available to prepare the curriculum vitæ with LaTeX with a critical analysis of packages and classes.

1 Preamble

This article deals with writing the curriculum vitæ both in general and with LaTeX. The first part (par. 2 and 3) analyzes the guidelines on how to write the curriculum vitæ and can be applied to any text editor. The second part (par. 4 and 6) requires an elementary knowledge of LaTeX, which can be obtained from a basic guide [7, 8, 25, 28] or from a more comprehensive book [21, 23].

After analyzing styles and structures (par. 2), the article suggests some effective ways to write a curriculum vitæ (par. 3). Since LaTeX will be used for composing the curriculum vitæ, the main sections review the available classes and packages (par. 4) and give some recommendations on how to customize them (par. 6).

*We would like to thank Claudio Beccari, Lance Carnes and especially Valeria Angeli and Caterina Mori for their suggestions.

2 Introduction

The curriculum vitæ is a document that contains a summary of an individual's business and academic experiences. In most cases its purpose is to present ourselves to a prospective employer in order to obtain a job interview. It is the first source of information about the applicant that the prospective employer sees, and on which he will decide whether to invite the candidate for a job interview.

Many books have been written, both in English and in Italian, about strategies of writing the curriculum vitæ [1–6, 9–14, 16–20, 22, 24, 26, 27, 29]. This article will not be as comprehensive as these books but will review the essential guidelines.

2.1 The name

The curriculum vitæ takes different names in different languages. In Italian the latin word *curriculum* (from *currere* which means "to run") became, in the late nineteenth century, *curriculum vitæ*, which means "course of life".

It is called curriculum vitæ (sometimes abbreviated as "curriculum" or "CV") in Europe, New Zealand, French Canada, and in other British Commonwealth countries. In North America (USA and English Canada) and in the Philippines there is a distinction between résumé,[1] when the document is for the private sector, and curriculum vitæ (sometimes simply *vita*) for academia. In Australia and in India there is no distinction between curriculum vitæ and résumé.

2.2 Contents

2.2.1 Curriculum vitæ

The curriculum vitæ contains a complete list of a person's professional and academic experiences, a list of publications, contributions and achievements. Other personal information, not necessarily pertinent to the professional profile, can be added in order to provide a wider perspective of the person.

1. The word *résumé*, used in several English speaking countries, is the past participle of *résumer* which is the French for "summarize" and derives from the Latin *resumere*. It can be spelled either *resumé* or *resume*.

2.2.2 Résumé

The résumé is usually shorter than the curriculum vitæ. The candidate presents in one or two pages only the experiences and credentials that are relevant to the position for which he is applying. Keywords are often added to the résumé to capture the employer's attention.

2.3 Style

2.3.1 Chronological

With the chronological style, the business and academic experiences are reported in reverse chronological order.[2] It is the most common style and highlights the progress of the candidate's professional career.

2.3.2 Functional

With the functional style, the work experience is grouped into topic areas. It highlights the candidate's experience and expertise in specific areas.

2.3.3 Mixed

There is also a mixed style in which the experiences are grouped into topic areas (functional) and, within each area, they are shown most recent first (chronological).

2.4 Structure

The structure and the contents of the curriculum vitæ can vary a lot in different contexts. It is, however, possible to distinguish between *essential* and *optional* information.

2. Less often the list may be in direct chronological order.

2.4.1 Essential information

- **Personal data**: name, sex, date and place of birth, citizenship, marital status, address, telephone and fax number, email, web site.[3]
- **Education**: includes a list in reverse chronological order of qualifications and titles, including memberships. Sometimes information is added about the classes attended if this is relevant for the application.
- **Work experiences**: includes a list of all work experience, including the current position. The achievements and responsibilities, and not the tasks, should be reported for each position. The most important work experiences should report concept, planning, and results.

2.4.2 Optional information

- **Personal profile**: although it is not common, the curriculum vitæ can include a paragraph which briefly describes the candidate. It can be written either in first or third person and outlines the best qualities and abilities of the candidate. If present, the personal profile is usually at the beginning of the curriculum vitæ.
- **Personal objectives**: sometimes the curriculum vitæ can include a sentence that describes the professional objectives of the candidate.
- **Photo**: the presence of a picture depends a lot on the locality. In Germany the it is usual to provide a photograph. In India the picture is usually required for positions in which there is contact with the public. In the USA it is not common to attach a picture to the curriculum vitæ because it may be a cause of discrimination (based on age, sex, race, etc.). In Italy there are no restrictions regarding pictures and the choice is up to the candidate.
- **Foreign languages**: it is recommended to include a list of languages known, specifying written and oral proficiency, and the results of foreign language exams.

3. Not all this data is usually required. In some cases the applicant is openly required to omit some information (e.g. the sex and the date of birth) in order to avoid discrimination. This applies to most US companies.

- **Computer knowledge**: the list of the known computer applications was very important in the 1980s but was already considered unnecessary by the 1990s. It may be useful to describe proficiency with technical software, programming languages, and other tools that are not considered to be common knowledge.
- **Other activities**: interests, hobbies, sports, etc.

2.4.3 European standard

The European Commission proposed a standard model for the curriculum vitæ which was adopted by the European Parliament on December 15, 2004. This model, called Europass CV, substitutes the European CV, which was introduced in 2002, and provides guidelines both for the style and the contents. The model requires the following sections [15]:

- personal information: name, address, telephone, fax, email, nationality, date and place of birth;
- desired employment/occupational field;
- work experience: dates, occupation or position held, main activities and responsibilities, name and address of employer, type of business or sector;
- personal skills and competencies: mother tongue, other languages; the text provides a grid to self-assess the foreign language level of proficiency in comprehension, speaking and writing;
- education and training: dates, title of qualification awarded, principal subjects/occupational skills covered, principal subjects/occupational skills covered, level in national or international classification;

the following sections are optional:

- social skills and competencies;
- organizational skills and competencies;
- technical skills and competencies;
- computer skills and competencies;
- artistic skills and competencies;

- other skills and competencies;
- drivers license;
- additional information;
- appendices.

2.4.4 Cover letter

The cover letter is usually attached to the curriculum vitæ to present the application. The letter includes a brief description of the candidate and the reason for applying for the position. It makes a good impression if the applicant shows some knowledge of the company and the position for which he is applying. The letter describes the applicant's relevant work experience only, and refers to the curriculum vitæ for further details.

3 How to write a good curriculum vitæ

3.1 Importance of the curriculum vitæ

The curriculum vitæ is often the first contact with the future employer and for this reason it is a crucial step in obtaining an interview and a possible job offer. The curriculum vitæ must be accurate both in *appearance* and *content*. It is always a good idea to ask others to review it before submission to make sure that the content is clear. Attention should be focused on the experiences that are relevant to the position to be sure the employer will not miss them. To best tailor the document to the position requirements, the candidate should obtain information about the company to which he is applying.

3.2 Be concise

A very common mistake of a curriculum vitæ is to be *needlessly long*. Candidates often make the mistake of including everything in the curriculum vitæ, including details that are insignificant from the employer's point of view. The curriculum vitæ should always be as concise as possible and highlight the important aspects.

The best solution is to research the type of curriculum vitæ the employer is expecting. In most cases the document must be under two pages (sometimes only one), and occasionally it must contain complete details. Alternatively, the candidate can prepare two versions of the curriculum vitæ, a concise one and an extensive one.[4] The short one can report a link to the long one so that the employer can examine both as needed.

3.3 Capture the reader's attention

The curriculum vitæ plays an important role at the very beginning of a job application when the employer reviews many applications and spends only a few minutes on each one. For this reason, it is crucial that the curriculum vitæ capture the reader's attention and stand out from the others. There are different ways to be stand out and some are better than others: with an elegant typographic style, with a good selection of content, etc. Being able to present our abilities and knowledge in a clear and orderly fashion is already an advantage over the competing applicants.

3.4 LaTeX

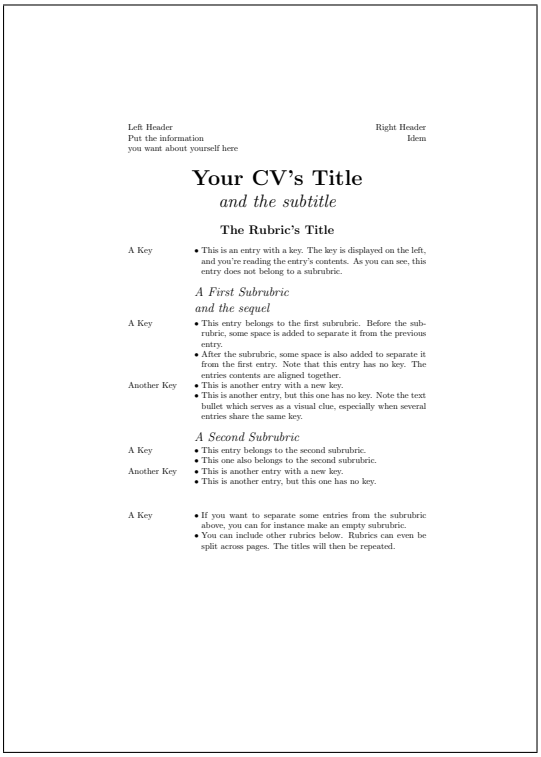
LaTeX, which produces very high quality documents, is an excellent choice to prepare the curriculum vitæ. It allows the candidate to focus on the content and not worry about the format. The following paragraphs (par. 4 and 6) provide the basic techniques for preparing a curriculum vitæ with LaTeX.

4 LaTeX classes and packages

4.1 CurVe

CurVe, written by Didier Verna in 2000, is one of the most flexible classes to write the curriculum vitæ. It allows dividing the curriculum vitæ into different sections, called rubrics. CurVe lets the candidate prepare a modular curriculum vitæ that can be adapted to the specific application with very little work on the code. Each

4. This alternative is adopted even by Donald Knuth (http://www-cs-faculty.stanford.edu/~knuth/vita.html).



Left Header
Put the information
you want about yourself here

Right Header
Idem

Your CV's Title
and the subtitle

The Rubric's Title

A Key
- This is an entry with a key. The key is displayed on the left, and you're reading the entry's contents. As you can see, this entry does not belong to a subrubric.

A First Subrubric
and the sequel

A Key
- This entry belongs to the first subrubric. Before the subrubric, some space is added to separate it from the previous entry.
- After the subrubric, some space is also added to separate it from the first entry. Note that this entry has no key. The entries contents are aligned together.

Another Key
- This is another entry with a new key.
- This is another entry, but this one has no key. Note the text bullet which serves as a visual clue, especially when several entries share the same key.

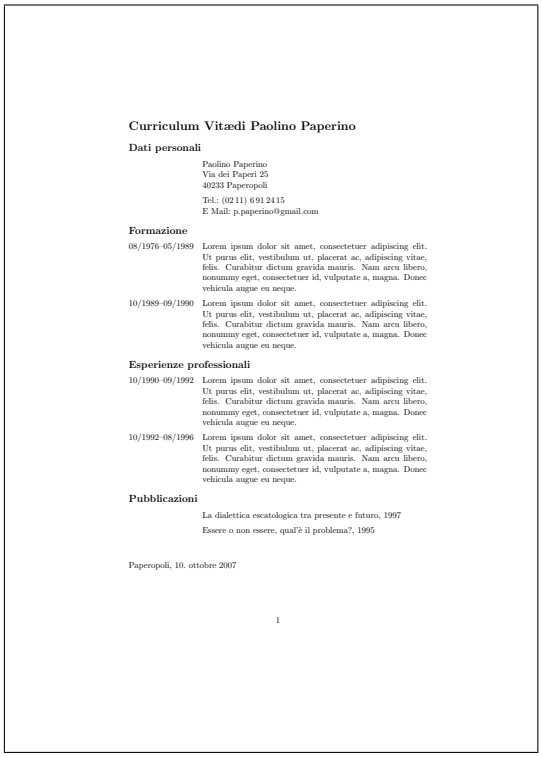
A Second Subrubric

A Key
- This entry belongs to the second subrubric.
- This one also belongs to the second subrubric.

Another Key
- This is another entry with a new key.
- This is another entry, but this one has no key.

A Key
- If you want to separate some entries from the subrubric above, you can for instance make an empty subrubric.
- You can include other rubrics below. Rubrics can even be split across pages. The titles will then be repeated.

Figure 1: CurVe class.



Curriculum Vitædi Paolino Paperino

Dati personali

Paolino Paperino
Via dei Paperi 25
40233 Paperopoli

Tel.: (02 11) 6 91 24 15
E Mail: p.paperino@gmail.com

Formazione

08/1976–05/1989 Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.

10/1989–09/1990 Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.

Esperienze professionali

10/1990–09/1992 Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.

10/1992–08/1996 Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque.

Pubblicazioni

La dialettica escatologica tra presente e futuro, 1997

Essere o non essere, qual'è il problema?, 1995

Paperopoli, 10. ottobre 2007

1

Figure 2: currvita package.

rubric has a main topic (e.g. "education" or "work experience"); two rubrics may even have the same topic and be written in two different ways. The candidate may then easily decide which rubrics to include in the output with no need to change the LaTeX code. The rubrics (or sub-rubrics) can be included in the main file with the `\makerubric{rubric}` command.

The syntax is very simple and can be learned easily from the manual. The manual also describes many ways to customize the output. The class allows inclusion of a photograph and has templates that can be customized.

Drawbacks. Curve is based on the longtable package and inherits its drawbacks. The layout is clean but not captivating (see fig. 1).

4.2 currvita

currvita is a package written by Axel Reichert in 1999 and was presented as an alternative to the packages available at that time (vita, resumee, and tabularx). currvita is the recommended curriculum vitæ package for the classicthesis class. It allows the author to write the curriculum vitæ with a very simple and essential structure (see fig. 2). It does not allow any customization, apart from the position of the date and the spacing between sections. The documentation is complete and includes some useful notes on how to write a curriculum vitæ.

4.3 ESIEEcv

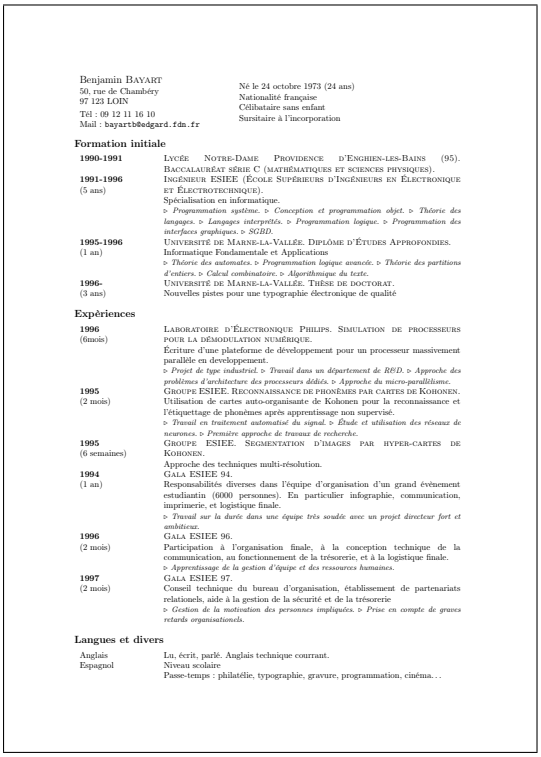
Created in 1997 by Benjamin Bayart for his personal use and later released on CTAN, ESIEEcv (see fig. 3) is a package written entirely in French (including the documentation and the command names) and does not support other languages. To use it with another language, the user needs to modify the source code of the package. The template is quite intuitive and shows how to use the dedicated environments (rubrique and sousrubrique) and commands (`\Titre`, `\Lieu`, ecc.).

4.4 europecv

In March 2002 the European Commission created and released on the web a template to write the curriculum vitæ, in order to set a standard for European citizens. Unfortunately, they released it only in `.doc` format. Nicola Vitacolonna wrote the europecv LaTeX class that reproduces the European Commission template and at the same time allows some flexibility.

The layout is clear and pleasant (see fig. 5) and provides a table to indicate the proficiency in foreign languages according to the Common European Framework of Reference (CEFR). Some bugs in earlier versions of europecv have been corrected and the code is now stable. The class allows addition of a photograph and customization of the layout, while maintaining the Europass CV standard.

The documentation is clear and also includes a description of the skill levels in foreign languages that follows the CEFR. The class has multilingual support and allows a choice between a color or gray scale logo. The publications can be included with a `.bib` file. The class comes with source code and several templates which are useful for learning how to use it.



Benjamin BAYART
50, rue de Chambéry
97 123 LOIN
Tél : 09 12 11 16 10
Mail : bayartb@edgard.fdn.fr

Né le 24 octobre 1973 (24 ans)
Nationalité française
Célibataire sans enfant
Sursitaire à l'incorporation

Formation initiale

1990-1991 LYCÉE NOTRE-DAME PROVIDENCE D'ENGHIEN-LES-BAINS (95). BACCALAURÉAT SÉRIE C (MATHÉMATIQUES ET SCIENCES PHYSIQUES).

1991-1996 (5 ans) INGÉNIEUR ESIEE (ÉCOLE SUPÉRIEURS D'INGÉNIEURS EN ÉLECTRONIQUE ET ÉLECTROTECHNIQUE).
Spécialisation en informatique.
▷ *Programmation système.* ▷ *Conception et programmation objet.* ▷ *Théorie des langages.* ▷ *Langages interprétés.* ▷ *Programmation logique.* ▷ *Programmation des interfaces graphiques.* ▷ *SGBD.*

1995-1996 (1 an) UNIVERSITÉ DE MARNE-LA-VALLÉE. DIPLÔME D'ÉTUDES APPROFONDIES.
Informatique Fondamentale et Applications
▷ *Théorie des automates.* ▷ *Programmation logique avancée.* ▷ *Théorie des partitions d'entiers.* ▷ *Calcul combinatoire.* ▷ *Algorithmique du texte.*

1996- (3 ans) UNIVERSITÉ DE MARNE-LA-VALLÉE. THÈSE DE DOCTORAT.
Nouvelles pistes pour une typographie électronique de qualité

Expèriences

1996 (6mois) LABORATOIRE D'ÉLECTRONIQUE PHILIPS. SIMULATION DE PROCESSEURS POUR LA DÉMODULATION NUMÉRIQUE.
Écriture d'une plateforme de développement pour un processeur massivement parallèle en developpement.
▷ *Projet de type industriel.* ▷ *Travail dans un département de RéD.* ▷ *Approche des problèmes d'architecture des processeurs dédiés.* ▷ *Approche du micro-parallélisme.*

1995 (2 mois) GROUPE ESIEE. RECONNAISSANCE DE PHONÈMES PAR CARTES DE KOHONEN.
Utilisation de cartes auto-organisante de Kohonen pour la reconnaissance et l'étiquettage de phonèmes après apprentissage non supervisé.
▷ *Travail en traitement automatisé du signal.* ▷ *Étude et utilisation des réseaux de neurones.* ▷ *Première approche de travaux de recherche.*

1995 (6 semaines) GROUPE ESIEE. SEGMENTATION D'IMAGES PAR HYPER-CARTES DE KOHONEN.
Approche des techniques multi-résolution.

1994 (1 an) GALA ESIEE 94.
Responsabilités diverses dans l'équipe d'organisation d'un grand évènement estudiantin (6000 personnes). En particulier infographie, communication, imprimerie, et logistique finale.
▷ *Travail sur la durée dans une équipe très soudée avec un projet directeur fort et ambitieux.*

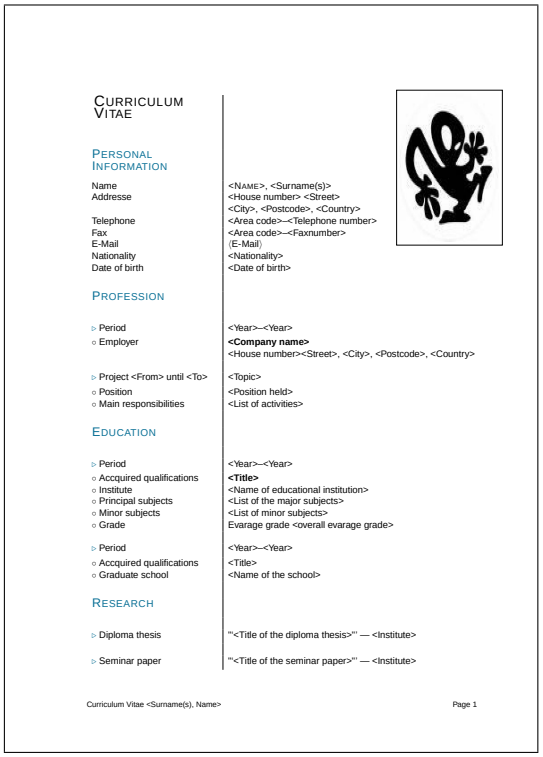
1996 (2 mois) GALA ESIEE 96.
Participation à l'organisation finale, à la conception technique de la communication, au fonctionnement de la trésorerie, et à la logistique finale.
▷ *Apprentissage de la gestion d'équipe et des ressources humaines.*

1997 (2 mois) GALA ESIEE 97.
Conseil technique du bureau d'organisation, établissement de partenariats relationels, aide à la gestion de la sécurité et de la trésorerie
▷ *Gestion de la motivation des personnes impliquées.* ▷ *Prise en compte de graves retards organisationels.*

Langues et divers

Anglais — Lu, écrit, parlé. Anglais technique courrant.
Espagnol — Niveau scolaire
Passe-temps : philatélie, typographie, gravure, programmation, cinéma...

Figure 3: ESIEEcv package.



CURRICULUM VITAE

PERSONAL INFORMATION

Name	<NAME>, <Surname(s)>
Addresse	<House number> <Street> <City>, <Postcode>, <Country>
Telephone	<Area code>–<Telephone number>
Fax	<Area code>–<Faxnumber>
E-Mail	(E-Mail)
Nationality	<Nationality>
Date of birth	<Date of birth>

PROFESSION

▷ Period	<Year>–<Year>
◦ Employer	**<Company name>** <House number><Street>, <City>, <Postcode>, <Country>
▷ Project <From> until <To>	<Topic>
◦ Position	<Position held>
◦ Main responsibilities	<List of activities>

EDUCATION

▷ Period	<Year>–<Year>
◦ Accquired qualifications	**<Title>**
◦ Institute	<Name of educational institution>
◦ Principal subjects	<List of the major subjects>
◦ Minor subjects	<List of minor subjects>
◦ Grade	Evarage grade <overall evarage grade>
▷ Period	<Year>–<Year>
◦ Accquired qualifications	<Title>
◦ Graduate school	<Name of the school>

RESEARCH

▷ Diploma thesis	"<Title of the diploma thesis>" — <Institute>
▷ Seminar paper	"<Title of the seminar paper>" — <Institute>

Curriculum Vitae <Surname(s), Name> Page 1

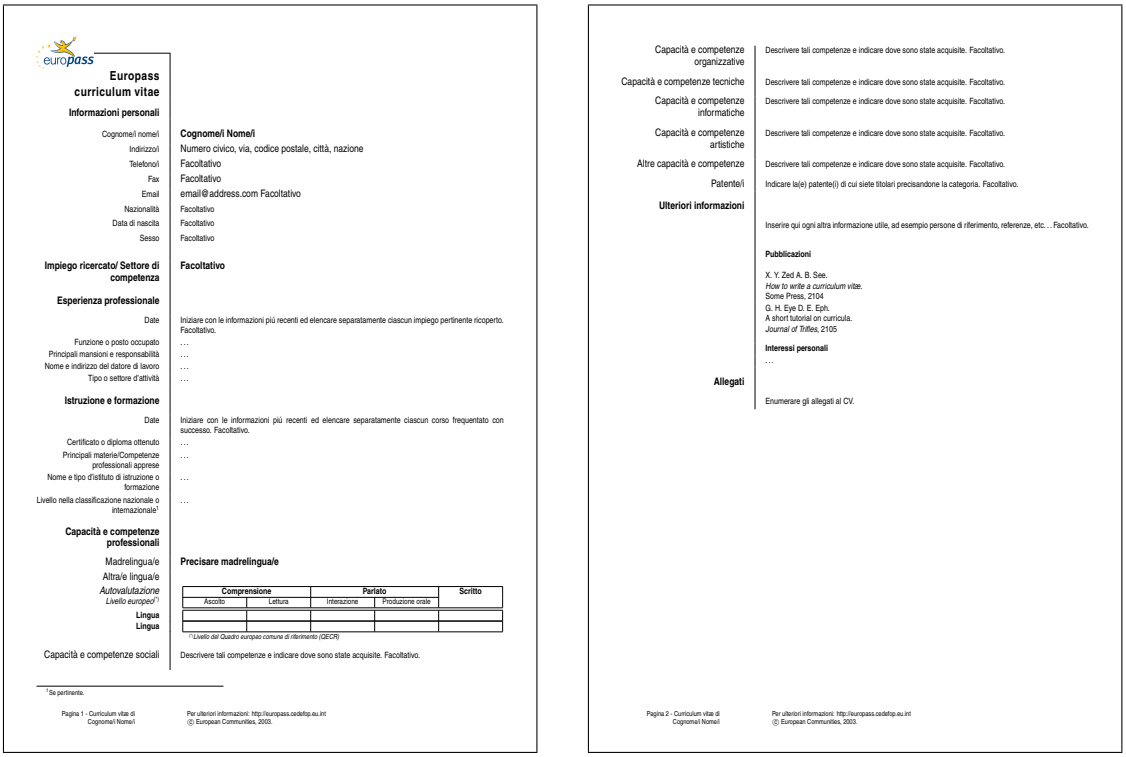
Figure 4: ecv package.

4.5 ecv

ecv, written by Christoph Neumann and Bernd Haberstrumpf in 2007, is a package based on the tabular environment. It is meant to reproduce the Europass CV format but the output (see fig. 4) is not as pleasant as that of the europecv class.

4.6 moderncv

moderncv, written by Xavier Danaux in 2007, is one of the best classes for writing a curriculum vitæ with LaTeX. With a very nice layout (see fig. 6) and many dedicated commands, it can satisfy even demanding users. The templates provided with the class are very clear and contain many useful comments. Beginners can fill in the template with their data and have a curriculum vitæ in a few minutes. The class offers two options, casual and classic, to change the position of the photograph and the personal information. A `.bib` file is provided with the template in



europass

Europass curriculum vitae

Informazioni personali

Cognome/i nome/i	**Cognome/i Nome/i**
Indirizzo/i	Numero civico, via, codice postale, città, nazione
Telefono/i	Facoltativo
Fax	Facoltativo
Email	email@address.com Facoltativo
Nazionalità	Facoltativo
Data di nascita	Facoltativo
Sesso	Facoltativo

Impiego ricercato/ Settore di competenza — **Facoltativo**

Esperienza professionale

Date	Iniziare con le informazioni più recenti ed elencare separatamente ciascun impiego pertinente ricoperto. Facoltativo.
Funzione o posto occupato	...
Principali mansioni e responsabilità	...
Nome e indirizzo del datore di lavoro	...
Tipo o settore d'attività	...

Istruzione e formazione

Date	Iniziare con le informazioni più recenti ed elencare separatamente ciascun corso frequentato con successo. Facoltativo.
Certificato o diploma ottenuto	...
Principali materie/Competenze professionali apprese	...
Nome e tipo d'istituto di istruzione o formazione	...
Livello nella classificazione nazionale o internazionale[1]	...

Capacità e competenze professionali

Madrelingua/e — **Precisare madrelingua/e**

Altra/e lingua/e

Autovalutazione

Livello europeo[(*)]	Comprensione		Parlato		Scritto
	Ascolto	Lettura	Interazione	Produzione orale	
Lingua					
Lingua					

(*) *Livello del Quadro europeo comune di riferimento (GECR)*

Capacità e competenze sociali	Descrivere tali competenze e indicare dove sono state acquisite. Facoltativo.
Capacità e competenze organizzative	Descrivere tali competenze e indicare dove sono state acquisite. Facoltativo.
Capacità e competenze tecniche	Descrivere tali competenze e indicare dove sono state acquisite. Facoltativo.
Capacità e competenze informatiche	Descrivere tali competenze e indicare dove sono state acquisite. Facoltativo.
Capacità e competenze artistiche	Descrivere tali competenze e indicare dove sono state acquisite. Facoltativo.
Altre capacità e competenze	Descrivere tali competenze e indicare dove sono state acquisite. Facoltativo.
Patente/i	Indicare la(e) patente(i) di cui siete titolari precisandone la categoria. Facoltativo.

Ulteriori informazioni

Inserire qui ogni altra informazione utile, ad esempio persone di riferimento, referenze, etc. .. Facoltativo.

Pubblicazioni

X. Y. Zed A. B. See.
How to write a curriculum vitæ.
Some Press, 2104.
G. H. Eye D. E. Eph.
A short tutorial on curricula.
Journal of Trifles, 2105

Interessi personali

...

Allegati

Enumerare gli allegati al CV.

[1] Se pertinente.

Pagina 1 - Curriculum vitae di Cognome/i Nome/i — Per ulteriori informazioni: http://europass.cedefop.eu.int — © European Communities, 2003.

Pagina 2 - Curriculum vitae di Cognome/i Nome/i — Per ulteriori informazioni: http://europass.cedefop.eu.int — © European Communities, 2003.

Figure 5: europecv class.

order to add the list of the publications. moderncv is the only class that provides a template to prepare a cover letter in the same style as the curriculum vitæ.

5 Outdated solutions

5.1 vita

Written by Andrej Brodnik in 1995, vita (see fig. 7) is a very simple but and now obsolete class. The structure is built from customized itemized lists (Degrees, Publications, etc.) which cover the main fields of scientific activity. Very few customization options are available and no guide comes with the package: some instructions and a template can be found directly in the `.cls` file.

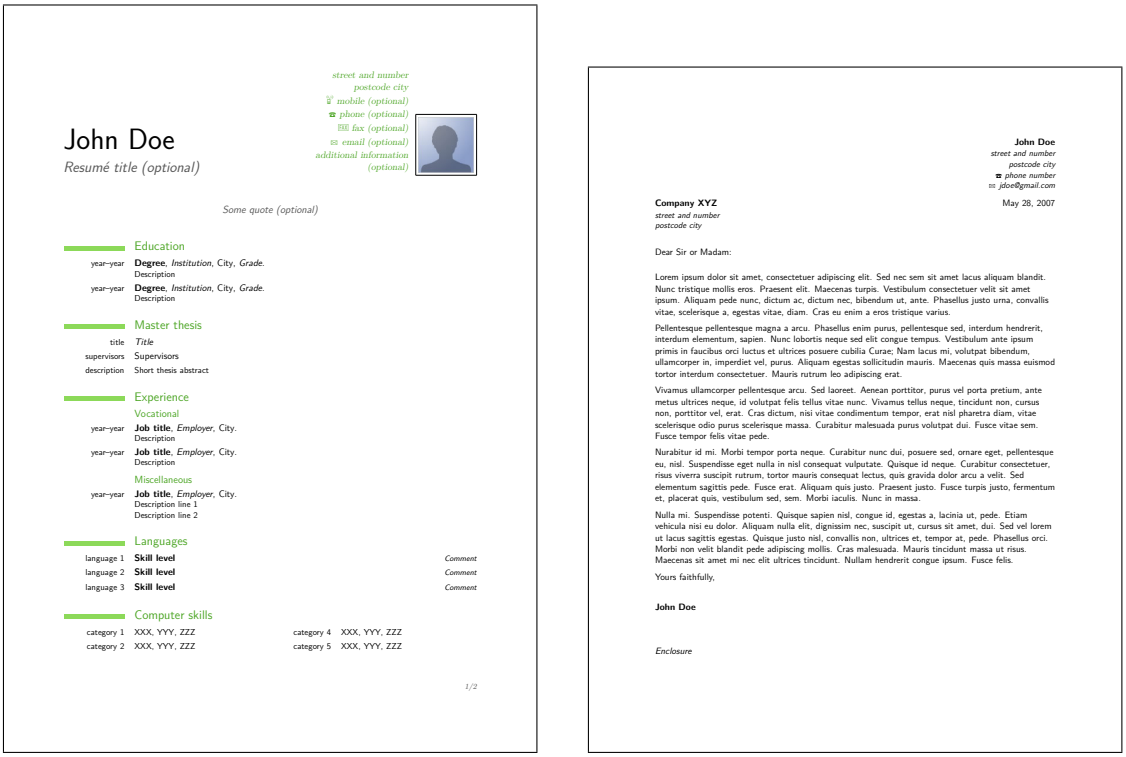
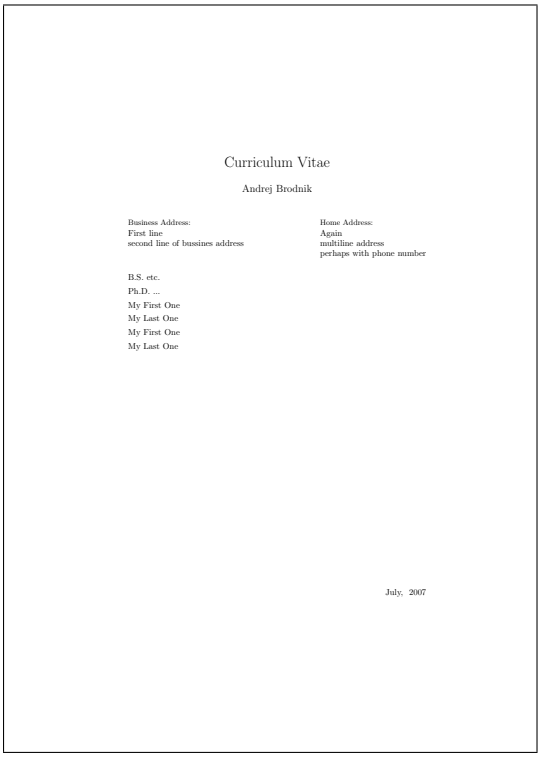


Figure 6: moderncv class.

5.2 CV

Written by Gilles Marcou and Antonio Pereira in 2004, CV (see fig. 8) is a package that modifies the article class with some non-standard code. The code required to write a curriculum vitæ with CV is complicated because the package does not provide many commands oriented to this task. Many regular environments, such as itemize, table, and minipage, are required to structure the document. This *de facto* solution eliminates any advantage in using a dedicated package. Moreover, the template that is provided with the package contains some elementary errors (the symbol _ is not preceded by the necessary \, LaTeX instead of LaTeX and so on). The final result is a good example of how *not* to write a curriculum vitæ (see fig. 8).



Curriculum Vitae

Andrej Brodnik

Business Address:
First line
second line of bussines address

Home Address:
Again
multiline address
perhaps with phone number

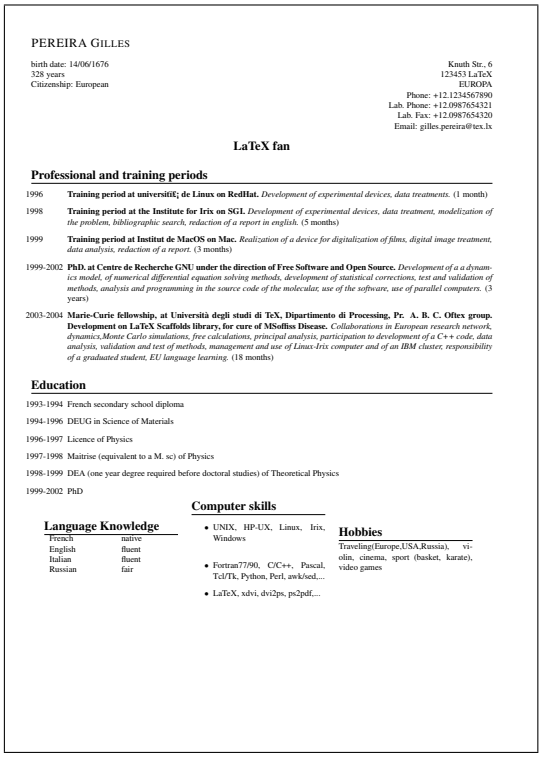
B.S. etc.

Ph.D. ...

My First One
My Last One
My First One
My Last One

July, 2007

Figure 7: vita class.



PEREIRA GILLES

birth date: 14/06/1676
328 years
Citizenship: European

Knuth Str., 6
123453 LaTeX
EUROPA
Phone: +12.1234567890
Lab. Phone: +12.0987654321
Lab. Fax: +12.0987654320
Email: gilles.pereira@tex.lx

LaTeX fan

Professional and training periods

1996 **Training period at universitiÏ; de Linux on RedHat.** *Development of experimental devices, data treatments.* (1 month)

1998 **Training period at the Institute for Irix on SGI.** *Development of experimental devices, data treatment, modelization of the problem, bibliographic search, redaction of a report in english.* (5 months)

1999 **Training period at Institut de MacOS on Mac.** *Realization of a device for digitalization of films, digital image treatment, data analysis, redaction of a report.* (3 months)

1999-2002 **PhD. at Centre de Recherche GNU under the direction of Free Software and Open Source.** *Development of a a dynamics model, of numerical differential equation solving methods, development of statistical corrections, test and validation of methods, analysis and programming in the source code of the molecular, use of the software, use of parallel computers.* (3 years)

2003-2004 **Marie-Curie fellowship, at Università degli studi di TeX, Dipartimento di Processing, Pr. A. B. C. Oftex group. Development on LaTeX Scaffolds library, for cure of MSoffiss Disease.** *Collaborations in European research network, dynamics,Monte Carlo simulations, free calculations, principal analysis, participation to development of a C++ code, data analysis, validation and test of methods, management and use of Linux-Irix computer and of an IBM cluster, responsibility of a graduated student, EU language learning.* (18 months)

Education

1993-1994 French secondary school diploma

1994-1996 DEUG in Science of Materials

1996-1997 Licence of Physics

1997-1998 Maitrise (equivalent to a M. sc) of Physics

1998-1999 DEA (one year degree required before doctoral studies) of Theoretical Physics

1999-2002 PhD

Computer skills

- UNIX, HP-UX, Linux, Irix, Windows
- Fortran77/90, C/C++, Pascal, Tcl/TK, Python, Perl, awk/sed,...
- LaTeX, xdvi, dvi2ps, ps2pdf,...

Language Knowledge

French	native
English	fluent
Italian	fluent
Russian	fair

Hobbies

Traveling(Europe,USA,Russia), violin, cinema, sport (basket, karate), video games

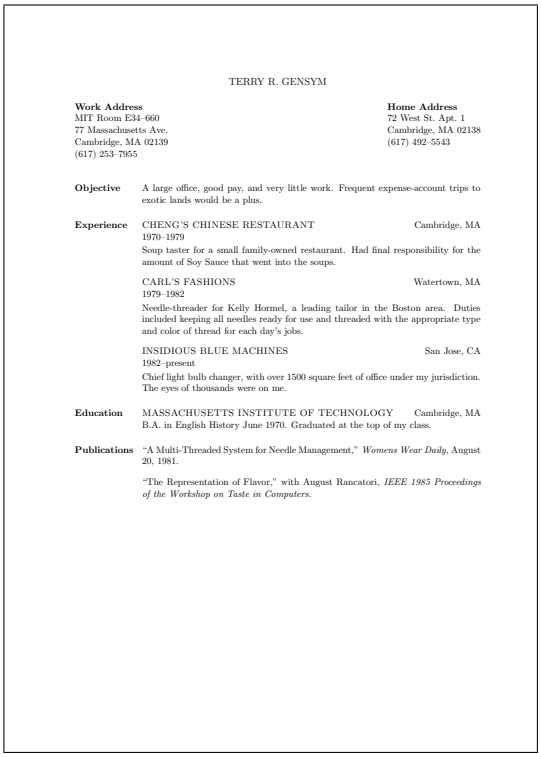
Figure 8: CV package.

5.3 resume

resume is a small package written in 1987 by Stephen Gildea. It can be used to write a résumé with a simple and clear layout (see fig. 9). The package works as an extension to the article class providing many commands that are intuitive to use. Despite the presence of some obsolete commands (e.g. `\bf` instead of `\textbf`) and some esthetic limits, the package is still a good option.

5.4 res

res (see fig. 10) is a LaTeX2$_\varepsilon$ class written by Michael DeCorte in 1988 and is designed to prepare a résumé. It has non-standard code, its use is not advised.



TERRY R. GENSYM

Work Address
MIT Room E34–660
77 Massachusetts Ave.
Cambridge, MA 02139
(617) 253–7955

Home Address
72 West St. Apt. 1
Cambridge, MA 02138
(617) 492–5543

Objective A large office, good pay, and very little work. Frequent expense-account trips to exotic lands would be a plus.

Experience CHENG'S CHINESE RESTAURANT Cambridge, MA
1970–1979
Soup taster for a small family-owned restaurant. Had final responsibility for the amount of Soy Sauce that went into the soups.

CARL'S FASHIONS Watertown, MA
1979–1982
Needle-threader for Kelly Hormel, a leading tailor in the Boston area. Duties included keeping all needles ready for use and threaded with the appropriate type and color of thread for each day's jobs.

INSIDIOUS BLUE MACHINES San Jose, CA
1982–present
Chief light bulb changer, with over 1500 square feet of office under my jurisdiction. The eyes of thousands were on me.

Education MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA
B.A. in English History June 1970. Graduated at the top of my class.

Publications "A Multi-Threaded System for Needle Management," *Womens Wear Daily*, August 20, 1981.

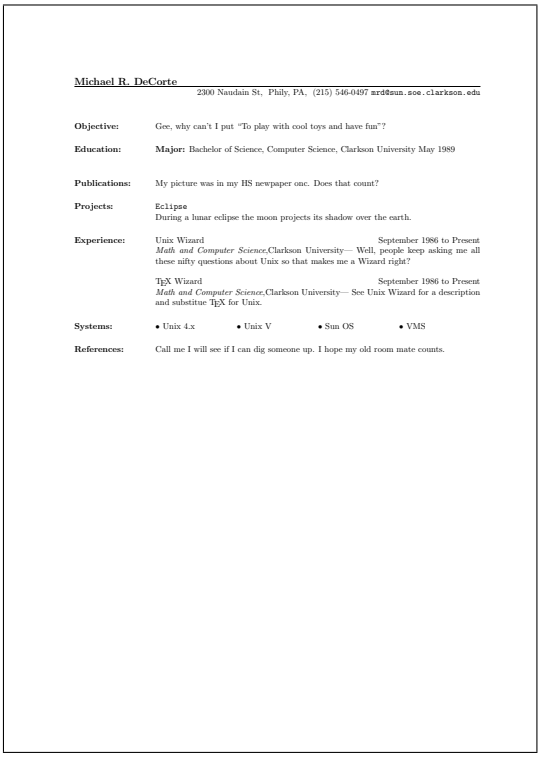
"The Representation of Flavor," with August Rancatori, *IEEE 1985 Proceedings of the Workshop on Taste in Computers*.

Figure 9: resume package.

6 Customizing the style

Most of the available classes and packages have rigid logical structure and graphics which are sometimes inadequate for the user. The curriculum vitæ, unlike a journal paper or a technical report, is a document in which customized layout is often important.

Customization can be done by redefining the commands and adding packages to one of the available classes. The code of most classes and packages is not very complicated and their customization does not require LaTeX and TeX experts. If you have good programming skills and a clear idea of the layout you want, the best solution is to start from scratch and create a package or a class (and contribute it to CTAN).



Michael R. DeCorte
2300 Naudain St, Phily, PA, (215) 546-0497 mrd@sun.soe.clarkson.edu

Objective: Gee, why can't I put "To play with cool toys and have fun"?

Education: **Major:** Bachelor of Science, Computer Science, Clarkson University May 1989

Publications: My picture was in my HS newpaper onc. Does that count?

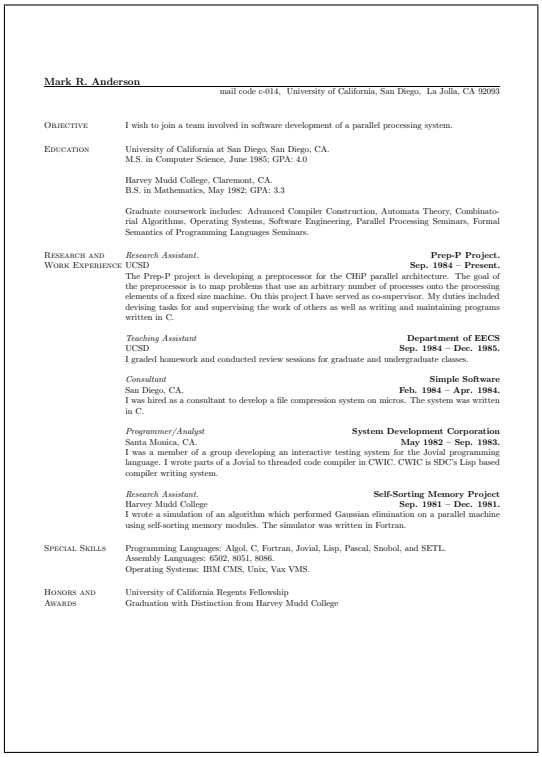
Projects: `Eclipse`
During a lunar eclipse the moon projects its shadow over the earth.

Experience: Unix Wizard — September 1986 to Present
Math and Computer Science,Clarkson University— Well, people keep asking me all these nifty questions about Unix so that makes me a Wizard right?

TEX Wizard — September 1986 to Present
Math and Computer Science,Clarkson University— See Unix Wizard for a description and substitue TEX for Unix.

Systems: • Unix 4.x • Unix V • Sun OS • VMS

References: Call me I will see if I can dig someone up. I hope my old room mate counts.



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mail code c-014, University of California, San Diego, La Jolla, CA 92093

OBJECTIVE — I wish to join a team involved in software development of a parallel processing system.

EDUCATION — University of California at San Diego, San Diego, CA.
M.S. in Computer Science, June 1985; GPA: 4.0

Harvey Mudd College, Claremont, CA.
B.S. in Mathematics, May 1982; GPA: 3.3

Graduate coursework includes: Advanced Compiler Construction, Automata Theory, Combinatorial Algorithms, Operating Systems, Software Engineering, Parallel Processing Seminars, Formal Semantics of Programming Languages Seminars.

RESEARCH AND WORK EXPERIENCE — *Research Assistant.* — **Prep-P Project.**
UCSD — **Sep. 1984 – Present.**
The Prep-P project is developing a preprocessor for the CHiP parallel architecture. The goal of the preprocessor is to map problems that use an arbitrary number of processes onto the processing elements of a fixed size machine. On this project I have served as co-supervisor. My duties included devising tasks for and supervising the work of others as well as writing and maintaining programs written in C.

Teaching Assistant — **Department of EECS**
UCSD — **Sep. 1984 – Dec. 1985.**
I graded homework and conducted review sessions for graduate and undergraduate classes.

Consultant — **Simple Software**
San Diego, CA. — **Feb. 1984 – Apr. 1984.**
I was hired as a consultant to develop a file compression system on micros. The system was written in C.

Programmer/Analyst — **System Development Corporation**
Santa Monica, CA. — **May 1982 – Sep. 1983.**
I was a member of a group developing an interactive testing system for the Jovial programming language. I wrote parts of a Jovial to threaded code compiler in CWIC. CWIC is SDC's Lisp based compiler writing system.

Research Assistant. — **Self-Sorting Memory Project**
Harvey Mudd College — **Sep. 1981 – Dec. 1981.**
I wrote a simulation of an algorithm which performed Gaussian elimination on a parallel machine using self-sorting memory modules. The simulator was written in Fortran.

SPECIAL SKILLS — Programming Languages: Algol, C, Fortran, Jovial, Lisp, Pascal, Snobol, and SETL.
Assembly Languages: 6502, 8051, 8086.
Operating Systems: IBM CMS, Unix, Vax VMS.

HONORS AND AWARDS — University of California Regents Fellowship
Graduation with Distinction from Harvey Mudd College

Figure 10: res class.

7 Conclusions

LaTeX offers many good alternatives for composing a curriculum vitæ easily accessible even by beginners. In particular moderncv and eurocv use a modern syntax and are easily customizable. In addition they have a code structure which is completely compatible with LaTeX2$_\varepsilon$.

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THE PracTEX Journal

Travels in TeX Land: Benefits of thinking a little bit like a programmer

David Walden

Abstract

In this column in each issue I muse on my wanderings around the TeX world. Section 1 of this column provides another illustration of the benefit of defining a few simple macros for a particular TeX project. Section 2 gives another example of using an external processor in combination with TeX. Section 3 gives another example.

David Walden is retired after a career as an engineer, engineering manager, and general manager involved with research and development of computer and other high tech systems. More information is available at www.walden-family-com. He may be contacted at dave@walden-family.com

- PDF version of paper
- gen-color.pl
- colors.tex
- color.tex
- color.pdf
- gen-color-r.pl
- colors-r.pdf
- addresses.txt
- label.pl
- test.txt
- labels.tex
- Comment on this paper
- Send submission idea to editor

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Article revision 2007/10/15

Travels in TEX Land: Benefits of thinking a little bit like a programmer

David Walden

Abstract In this column in each issue I muse on my wanderings around the TEX world. Section 1 of this column provides another illustration of the benefit of defining a few simple macros for a particular TEX project. Section 2 gives another example of using an external processor in combination with TEX. Section 3 gives another example.

1 A subtle (to me) issue with LATEX macros

I will be republishing an oral history of my mother-in-law that was originally typed on a typewriter, printed at Kinko's, and bound by a thesis binding company. I want it to continue to have the "look and feel" of a typed book, while still using some of TEX's capabilities. For instance, I am using a proportional typewriter font rather than a non-proportional font such as the original book had.

The book has section titles for its many short sections and no chapter titles. Thus, I want each section title in the Table of Contents, and I want running heads on the pages for the section titles. The only running heads will be these section titles at the left side of even numbered pages and at the right side of odd numbered pages. However, when the section title is the first line on a page, I don't want the section title to also be in the running head; in this case I want the running head to be blank.

I first used the following commands to try to get what I wanted.

```
\RequirePackage{fancyhdr}
\renewcommand{\headrule}{}  %don't want a line below the running head
\pagestyle{fancy} \fancyhead{} %copied from the LaTeX Companion 2
\newcommand{\mysectionname}{}  %the section name for the running head
                               %  is initially blank
```

```
\fancyhead[RO,LE]{\mysectionname} %use the current section name in
                                  %  in the right odd and left even positions

    %the \mysection{title} command is used to define my section commands
\newcommand{\mysection}[1]{
\noindent\uline{#1}                 %insert the section heading in-line
\addcontentsline{toc}{section}{#1}  %add it to the TOC
\renewcommand{\mysectionname}{#1}   %redefine what is used for the running head
}
```

The above worked except for the obvious problem that it would also place the same text in the running head immediately above a section title on the first line of text of a page.

Rather than trying make `\mysection` a lot more complicated so it automatically handled the above mentioned condition, I defined a new command (`mysectionN`) that I would manually insert when I found a situation where `\mysection` didn't do what I wanted it to do:

```
\newcommand{\NewSectName}{}  %need a place to save the section name

\RequirePackage{afterpage}
\newcommand{\mysectionN}[1]{ %delay running head until the Next page
\noindent\uline{#1}
\addcontentsline{toc}{section}{#1}
\renewcommand{\mysectionname}{}  %don't want a section head on this page
\renewcommand{\NewSectName}{#1}  %save section name for later
     %the following makes it take effect after the page change
\afterpage{\renewcommand{\mysectionname}{\NewSectName}}
}
```

Unfortunately, that didn't work. I debugged a while and eventually it dawned on me that maybe the renewed definition the `NewSectName` parameter wasn't available by the time the next page came.[1] So I tried using `\gdef` to force a change to a global version of `NewSectName`, as follows:

1. Actually, I tried looking at this casually for a minute or two several times over several months before deciding finally one day that I had to get serious and really think this through once and for all.

```
\newcommand{\mysectionN}[1]{ %delay running head until Next page
\noindent\uline{#1}
\addcontentsline{toc}{section}{#1}
\renewcommand{\mysectionname}{}
\gdef\NewSectName{#1} %change the *global* version of NewSectName
\afterpage{\gdef\mysectionname{\NewSectName}}
}
```

This sort of worked, except the correct running head did not always appear on the page immediately following the page with the new section title. If there was more than one following page before a new section title was specified, things worked OK. However, in the case where there was one page after the page with the section title that should have had a running head and then it was appropriate to put in another `mysectionN` command, the was no running head on the in-between page and the running head on the page with the second section title was not delayed until the following page. The latter suggested to me that I needed to do a `\clearpage` to get the page without a running head output before a new delayed running head was output. So I added a `\clearpage` as follows

```
\newcommand{\mysectionN}[1]{ %delay running head until Next page
\clearpage    %  new command added
\noindent\uline{#1}
\addcontentsline{toc}{section}{#1}
\renewcommand{\mysectionname}{}
\gdef\NewSectName{#1}
\afterpage{\gdef\mysectionname{\NewSectName}}
}
```

and the right thing also happened then with the missing running head on the page after the first section title.

With that working, I worried about it being poor form to use `\gdef` in LaTeX and searched around for an equivalent in LaTeX. When I couldn't find an equivalent command in my books, I asked the `comp.text.tex` list (on September 9, 2007) whether an equivalent command exists in LaTeX. Will Robertson responded *immediately* (12 minutes later — love that `comp.text.tex` list) saying that there was no equivalent and, while he noted that I could just use `\gdef`, he also suggested another option. (There were also a couple of additional responses on `comp.text.tex`

discussing various related complication.) I decided to just stick with `gdef` since there was not much chance of confusing myself by using `\gdef` in this limited situation.

2 Using TEX to help investigate colors

I became interested in specifying color within LATEX. I looked up the `color` package in *The LATEX Graphics Companion*, second edition, which was just published. (The book is so new it has a 2008 publication date on the back of the title page. It has about 925 pages on graphics capabilities that can be used with LATEX, something approaching 400 more pages than the first edition that was published a decade ago. The extensive indexes for the book are on-line at www.latex-project.org/guides/lgc2-ap3.pdf.)

From the book, it appeared that the following commands were relevant to me thinking about color:

```
\usepackage{xcolor}
\setlength{\fboxsep}{10pt}
\colorbox[rgb]{1,0,0}{}
```

For instance, the above creates a red colored square 10 points on a side, e.g.,

```
\colorbox[rgb]{1,0,0}{}
```

I quickly decided that I'd like to see a spectrum of little boxes showing various color combinations — perhaps all the combinations of single decimal digits of specifications of red, green, and blue in their 0–1 intervals. However, that would be about 1,000 little colored squares, and I certainly did not want to type in all those lines of LATEX. I also did not want to take the time, at the moment, to find and dig into the LATEX/TEX graphics packages that might be able to show me color spectrums.

So, I wrote a little Perl program: `gen-color.pl` on the HTML page for this paper. This program generated a TEX file: `colors.tex` on the HTML page. The this file was input into a little LATEX file: `color.tex` on the HTML page. (In section 2 of my previous column (starting on page 9 at http://www.tug.org/pracjourn/2007-3/walden/), I previously touted the benefit of being able to generate a TEX

(or LaTeX) file with another program before typesetting it with TeX. This is something one cannot do as easily with text processing or typesetting systems with embedded markup (for example, Word).)

The LaTeXthat, in effect, was compiled was as follows:

```
\documentclass{article}

\usepackage{geometry}
\geometry{paper=letterpaper, lmargin=.5in, rmargin=.5in}

\usepackage{xcolor}

\title{RGB Color Examples}

\author{} \date{}

\begin{document}

\maketitle

\setlength{\fboxsep}{10pt}
\def\Model{rgb}

\def\Red{0}
\def\Green{0}
\def\Blue{0}
\colorbox[\Model]{\Red,\Green,\Blue}{}\quad%
   \hbox to .75in{\Red/\Green/\Blue}\quad
\def\Red{0}
\def\Green{0}
\def\Blue{0.1}
\colorbox[\Model]{\Red,\Green,\Blue}{}\quad%
   \hbox to .75in{\Red/\Green/\Blue}\quad
\def\Red{0}
\def\Green{0}
\def\Blue{0.2}
```

```
\colorbox[\Model]{\Red,\Green,\Blue}{}\quad%
   \hbox to .75in{\Red/\Green/\Blue}\quad
\def\Red{0}
\def\Green{0}
\def\Blue{0.3}
\colorbox[\Model]{\Red,\Green,\Blue}{}\quad%
   \hbox to .75in{\Red/\Green/\Blue}\quad
\def\Red{0}
\def\Green{0}
\def\Blue{0.4}
\colorbox[\Model]{\Red,\Green,\Blue}{}\quad%
   \hbox to .75in{\Red/\Green/\Blue}\quad

%another 95 instances of the above code with varying values
%   of red, green and blue go here
```

That in turn resulted in the PDF file `color.pdf` on the HTML page of this paper.

Notice that I defined `\def\Model{rgb}` in my little LaTeX program, which might seem unnecessary. However, by using `\Model` (for color model) in the `colorbox` commands generated by the Perl program, I can more easily change to using another color model in generating my example, for example `\def\Model{cmy}` for use of the cyan, magenta, and yellow color model.

Obviously, the left-to-right, top-to-bottom order of the color boxes in the PDF file in the above example is quite fragmented in terms of a continuous color spectrum. Therefore, to better understand how the RGB color model works, I dipped into chapter 5 of *Grokking the GIMP* (by Carey Bunks, New Riders Publisher, Indianapolis, IN, 2000); the book is also available on the Internet at http://gimp-savvy.com/BOOK/).[2]

It obvious that values of red, green, and blue, each running from 0 to 1 (or from 0 to 256 or whatever scaling is used) is the set of all points in a cube, as shown in Figure 1. And, of course, I also have long known that other colors can be created from combinations or red, green, and blue, or from combinations of cyan,

2. It's beside the point of this column, but I will mention that Carey Bunks is an old friend from the MIT Juggling Club.

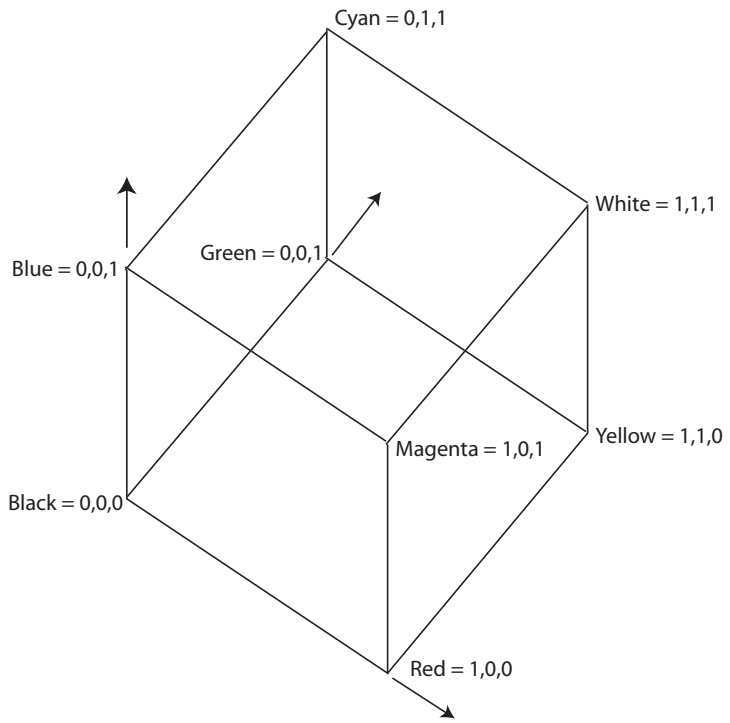


Figure 1: RGB color cube, derived from page 149 of *Grokking the GIMP*

yellow, and magenta if that color model is used. What I never comprehended before was how all of these points are part of the same cube, as shown by the following figure drawn from page 149 of Bunks' book:

As I understand Bunks' explanation, the points on the diagonal of the cube from 0,0,0=Black to 1,1,1=White are the gray scale.

Thus, I modified my Perl program to shown the faces of the RGB cube and the gray diagonal; see `gen-color-r.pl` on the HTML page for this paper[3] and see the resulting PDF in `colors-r.pdf`.

Having seen what surfaces of the cube and the Black-White diagonal looked like, I wondered how to think about the rest of the points inside the cube. Carey's book helped by providing a explanation of the translation between the RGB and HSV models. HSV is the hue-saturation-value model (where value is a measure

3. I kept the program simple for you to read by just straight lining the code to generate the various views of the color cube, rather than calling a subroutine with various values of $r. $g. amd $b/.

of brightness). V is a position along the Black-White diagonal where 0,0,0 is completely dark and 1,1,1, is completely light. One then imagines a plane extending perpendicular from the Black-White diagonal at point V. On this plane one draws a circle of radius S around the Black-White diagonal. This circle is a set of points more or less close to the Black-White diagonal. Close (small value of S) is very unsaturated (not very colorful — close to gray); far (large value of S) is very saturated (very colorful). Finally, one imagines an angle H from the Red axis, with its origin at the Black-White diagonal. The point on the circle at angle H is a point of color in the RGB cube.

The technique described above was pretty easy and didn't require me to learn much new about LaTeX. However, I probably should also learn to do what I have done in this section using in LaTeXonly `xcolor` or only PSTRICKS. Maybe that can be something I try for my next column.

3 Another example of using LaTeX with an external processor

My wife and I had long maintained a hard copy address book in which we (mostly she) wrote the addresses of people on our Christmas card list and addresses of other people. Several times the book has had to be rewritten when it ran out of pages, there were too many strikeouts, or the pages were simply falling out from long use. The last time the address book was in need of replacement — a couple of years ago — I convinced my wife (or at least she grudgingly agreed) that we should maintain the address list on-line going forward.

So we retyped our address book as a plain text computer file using a format I made up; see the file named `addresses.txt` on the HTML page for this paper for an example page from the on-line address book. The Perl program `label.pl` (see HTML page) converts the address book into a `.tex` file, e.g., `test.tex`, that is input into `labels.tex` which processes it into the format for adhesive backed address labels bought from the Avery company. (I found the `labels.tex` file somewhere on the Internet. Probably for this Christmas I will write my own version of this LaTeX program so it will be easier for me to tweak it to do what I want it to do for different size labels.)

Biographical note

David Walden is retired after a career as an engineer, engineering manager, and general manager involved with research and development of computer and other high tech systems. He holds an undergraduate math degree and completed a graduate school sequence of courses in computer science. More history is at www.walden-family.com/dave.

THE PracTEX Journal

Ask Nelly:
How do I combine tabularx with longtable?
How do I write matrices in the text?

The Editors

- Comment on this paper
- Send submission idea to editor

TPJ

Q: Dear Nelly: I often use the packages **tabularx** to produce tables with a specified width, and **longtable** to make tables spanning several pages. I wonder whether it is possible to combine the two packages, to produce long tables with a given width.

A: The answer is Yes. **It is** possible, by using a package named **ltxtable,** which is not so well known, at least not as well known as its author, David Carlisle himself. The package can be downloaded from CTAN, from the address http://www.ctan.org/tex-archive/macros/latex/contrib/carlisle/ltxtable.tex. By processing this file with LaTeX, you will get both the documentation and the style file, **ltxtable.sty**.

A table produced with ltxtable is essentially a **longtable**, and in the preamble you must give both the usual column specifiers and the X specifiers from **tabularx**. Keep in mind the following:

- ltxtable has to be loaded by a \usepackage command.
- The table should be put in a separate file. Let's call it **ltable.tex**.
- The preamble of the longtable should be something of the form **\begin {longtable}{|c|X|r|X|}** (there should be at least an X-column).
- When you want to include the table in the main file, if you want to produce a table of a certain **width**, use the command **\LTXtable{width}{ltable.tex}.**
- Don't forget to indicate the width. Also be sure that the first three letters of the

command are uppercase.
- There are some subtleties related to the implementation of the \multicolumn command, so read the documentation, as well.

The above question was answered by **Paul Blaga**, a production editor of this journal. He can be reached at pablaga@cs.ubbcluj.ro

TpJ

Q: Dear Nelly: I want to introduce a 2x3 matrix in the text, but the matrices produced by the environments **pmatrix** and others of this sort are too big. What can I do?

A: You should use the **smallmatrix** environment. The syntax is completely similar to that of any matrix-like environment. It is provided by the package **amsmath.** Please note that by default it doesn't add any delimiters, so you have to add them by hand.

The above question was answered by **Paul Blaga**, a production editor of this journal. He can be reached at pablaga@cs.ubbcluj.ro

TpJ

THE PracTeX Journal

Distractions — Music scores with LaTeX

The Editors

- Comment on this paper
- Send submission idea to editor

Greensleeves with LaTeX

Daniel Taupin, a physicist and also a musician and TeX expert, created an excellent package for typesetting polyphonic music with TeX (and later LaTeX). The project was begun in the 1990's and Daniel and others have continued to develop it. The result is the package known as MusiXTeX, available from CTAN. Daniel Taupin died tragically, in an accident, several years ago, and, to our knowledge, the development of the software was stopped afterwards. Unfortunately, the package is not as well known as it deserves to be, in spite of the very fine results it produces. We decided, therefore, to choose this package for our Distractions column in the hopes of generating interest. For an example we chose one of the best known pieces of Renaissance music, the English traditional **Greensleeves,** which is presented here in the guitar transcription.
Here is the pdf version of the song: Greensleeves.

... and the source.

There are three steps when using MusiXTeX:

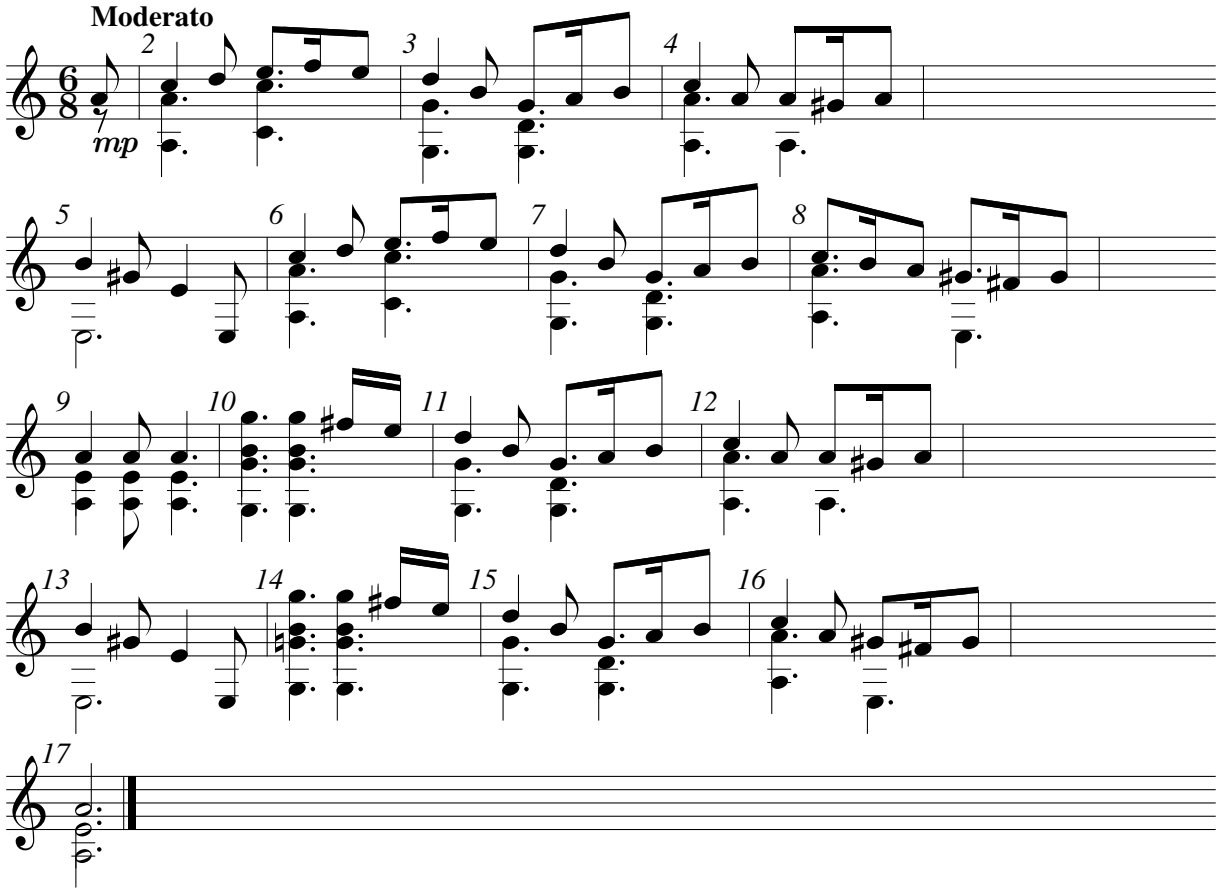
- The source file is processed first with LaTeX;
- The program `musixflx` is run (this program is in the same directory as MusiXTeX and takes one argument, the name of the file without extension);
- The source is processed once more with LaTeX.

Enjoy!

Page generated January 18, 2008 ;TUG home page; search; contact webmaster.

Greensleeves (Guitar Version)

Traditional English Song (XVIth century)



```
\documentclass[11pt]{article}
\usepackage{musixtex}
\usepackage{geometry,times}
\geometry{width=16cm}

\setlength{\parindent}{0pt}\begin{document}
\title{Greensleeves (Guitar Version)}
\author{Traditional English Song (XVIth century)}
\date{}
\maketitle \startmuflex \generalmeter{\meterfrac68}
%
\nostartrule \startpiece
%1
\Notes\zcharnote s{\textbf{Moderato}}\zcharnote N{\mp}\zcu h\raise
-2\Interligne \ds\enotes\bar
%2
\Notes \zqu j\zqlp h\lpt a\ql a\cu k\pt j\zql j\lpt c\zql
c\ibu0l{-1}\qbp0l\tbbu0\qb0m\tbu0\qb0l\enotes\bar
%3
\Notes\pt N\zql N\lpt g\zql g\qu k\cu i\pt N\zql N\lpt d\zql d\ibu0l3\lpt
g\qb0g\tbbu0\qb0h\tbu0\qb0i\enotes\bar
%4
\Notes\lpt O\zql O\zqlp h\qu j\cu h\lpt O\zql O\ibu0l0\qb0h\tbbu0\sh
g\qb0g\tbu0\qb0h\enotes\bar
%5
\Notes \pt L\zhl L\qu i\sh g\cu g\qu e\cu L\enotes\bar
%6
\Notes \zqu j\zqlp h\lpt a\ql a\cu k\pt j\zql j\lpt c\zql
c\ibu0l1\qbp0l\tbbu0\qb0m\tbu0\qb0l\enotes\bar
%7
\Notes \pt N\zql N\lpt g\zql g\qu k\cu i\pt N\zql N\pt R\zql R\ibu0l3\lpt
g\qb0g\tbbu0\qb0h\tbu0\qb0i\enotes\bar
%8
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%9
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h\enotes\bar
%10
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n\ibbu0m{-3}\sh m\qb0m\tbu0\qb0l\enotes\bar
%11
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%12
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\Notes \pt L\zhl L\qu i\sh g\cu g\qu e\cu L\enotes\bar
%14
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i\ql n\ibbu0m{-3}\sh m\qb0m\tbu0\qb0l\enotes\bar
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\endpiece
\endmuflex
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