LaTeXfor Beginners (PIASTA)

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Let us know each other

- Name, Surname
- Country of origin
- Faculty, Department
- "I like ..."
- " I do not like ..."

PIASTA - Intercultural Living and Learning

PIASTA - Next Activities

- Halloween Night! (PIASTA-Cafe, 2.11.2011, 18:00-21:00)
- Christmas Walking Tour of Luneburg (04.12.2011)
- Intercultural Competence for Everyday, University, and Career (13-14.01.2012)
- All You Need to Know About the Doctorate (17.11.2011, 18:00-20:00)

Program – Day 1

10:00–11:00	Organizational, Let us know each other
11:00–12:00	Introduction to LaTeX, Logging in
12:00–12:30	Break
12:30–13:00	First steps
13:00–14:15	DO IT YOURSELF: Exercises
14:15–14:30	Discussions, Feedback

Program – Day 2

10:00–10:30	Organizational
10:30–11:00	LaTeX– Figures, Tables
11:00–12:00	DO IT YOURSELF
12:00–12:30	BREAK
12:30–13:00	LaTeX– References, JabRef, Other types of documents
13:00–14:00	DO IT YOURSELF
14:00–14:30	Discussions and Feedback

Expectations and Worries, Rules

2 Expectations
2 Worries
1 Rule

Previous Knowledge

Previous Knowledge

Goals

- Get to know the structure of a LaTeX document
- Get your first practical experience with LaTeX and the correspondent Software
- Be able to understand LaTeX and continue to learn with it on your own after the seminar
- Be able to write a scientific article with LaTeX
- Get ideas on how larger documents work

After the seminar you MUST exercise. DO NOT GIVE UP!!!!
Materials: Hand-out
Links and Materials uploaded on: `https://nats-www.informatik.uni-hamburg.de/view/User/LaTeXNovember`

Outline

Article

What is an article?
Which elements are included in an article?

Article – 1

A Sample *ACM* SIG Proceedings Paper in LaTeX Format*

[Extended Abstract] †

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ABSTRACT

This paper provides a sample of a LaTeX document which conforms to the formatting guidelines for ACM SIG Proceedings. It complements the document *Author's Guide to Preparing ACM SIG Proceedings Using LaTeX2, and BibTeX*. This source file has been written with the intention of being compiled under LaTeX2, and BibTeX.

The developers have tried to include every imaginable sort of "bells and whistles", such as a subtitle, footnotes on title, subtitle and authors, as well as in the text, and every optional component (e.g. Acknowledgments, Additional Authors, Appendices), not to mention examples of equations, theorems, tables and figures.

To make best use of this sample document, run it through LaTeX and BibTeX, and compare this source code with the printed output produced by the dvi file.

Categories and Subject Descriptors

H.4 [**Information Systems Applications**]: Miscellaneous; D.2.8 [**Software Engineering**]: Metrics—*complexity measures, performance measures*

General Terms

Theory

Keywords

ACM proceedings, LaTeX, text tagging

1. INTRODUCTION

The *proceedings* are the records of a conference. ACM seeks to give these conference by-products a uniform, high-quality appearance. To do this, ACM has some rigid requirements for the format of the proceedings documents: there is a specified format (balanced double columns), a specified set of fonts (Arial or Helvetica and Times Roman) in certain specified sizes (for instance, 9 point for body copy), a specified live area (18 × 23.5 cm [7" × 9.25"]) centered on the page, specified size of margins (2.54cm [1"] top and bottom and 1.9cm [.75"] left and right; specified column width (8.45cm [3.33"]) and gutter size (.083cm [.33"]).

*(Does NOT produce the permission block, copyright information nor page numbering). For use with ACM_PROC_ARTICLE-SP.CLS. Supported by ACM.

†A full version of this paper is available as *Author's Guide to Preparing ACM SIG Proceedings Using LaTeX2, and BibTeX* at www.acm.org/eaddress.htm

Article – 2

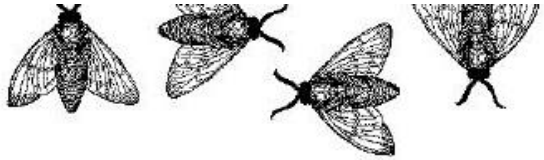


Figure 4: A sample black and white graphic (.eps format) that needs to span two columns of text.

A *Caveat* for the TEX Expert

Because you have just been given permission to use the `\newdef` command to create a new form, you might think you can use TEX's `\def` to create a new command: *Please refrain from doing this!* Remember that your LATEX source code is primarily intended to create camera-ready copy, but may be converted to other forms – e.g. HTML. If you inadvertently omit some or all of the `\def`s recompilation will be, to say the least, problematic.

3. CONCLUSIONS

This paragraph will end the body of this sample document. Remember that you might still have Acknowledgments or Appendices; brief samples of these follow. There is still the Bibliography to deal with; and we will make a disclaimer about that here: with the exception of the reference to the LATEX book, the citations in this paper are to articles which have nothing to do with the present subject and are used as examples only.

4. ACKNOWLEDGMENTS

This section is optional; it is a location for you to acknowledge grants, funding, editing assistance and what have you. In the present case, for example, the authors would like to thank Gerald Murray of ACM for his help in codifying this *Author's Guide* and the **.cls** and **.tex** files that it describes.

5. ADDITIONAL AUTHORS

Additional authors: John Smith (The Thørväld Group, email: `jsmith@affiliation.org`) and Julius P. Kumquat (The Kumquat Consortium, email: `jpkumquat@consortium.net`).

6. REFERENCES

[1] M. Bowman, S. K. Debray, and L. L. Peterson. Reasoning about naming systems. *ACM Trans. Program. Lang. Syst.*, 15(5):795–825, November 1993.

[2] J. Braams. Babel, a multilingual style-option system for use with latex's standard document styles.

[3] M. Clark. Post congress tristesse. In *TeX90 Conference Proceedings*, pages 84–89. TeX Users Group, March 1991.

[4] M. Herlihy. A methodology for implementing highly concurrent data objects. *ACM Trans. Program. Lang. Syst.*, 15(5):745–770, November 1993.

[5] L. Lamport. *LaTeX User's Guide and Document Reference Manual*. Addison-Wesley Publishing Company, Reading, Massachusetts, 1986.

[6] S. Salas and E. Hille. *Calculus: One and Several Variable*. John Wiley and Sons, New York, 1978.

APPENDIX

A. HEADINGS IN APPENDICES

The rules about hierarchical headings discussed above for the body of the article are different in the appendices. In the **appendix** environment, the command **section** is used to indicate the start of each Appendix, with alphabetic order designation (i.e. the first is A, the second B, etc.) and a title (if you include one). So, if you need hierarchical structure *within* an Appendix, start with **subsection** as the highest level. Here is an outline of the body of this document in Appendix-appropriate form:

A.1 Introduction

A.2 The Body of the Paper

A.2.1 Type Changes and Special Characters

A.2.2 Math Equations

Inline (In-text) Equations

Display Equations

A.2.3 Citations

A.2.4 Tables

History

- Donald E Knuth
- Leslie Lamport

What is LaTeX

- TeXis a typesetting system
- Creating documents with TeX is easy to learn, but to learn how to program TeX is more difficult
- TeXoperates differently, when comparing to other word processing systems
- TeXis often used for mathematical texts
- TeXis ideal for scientific documents (eg articles, thesis, dissertation, etc), but TeX can also be used for other documents (curriculum vitae, presentations, POSTERS, etc.)
- TeXsupports more than 50 languages in almost all the writing systems of the world
- LaTeXis a part of TeX

LaTeX, TeX

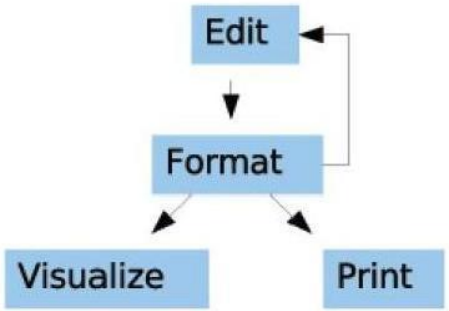
- TeXdocuments are portable
- TeXis available everywhere; TEX is freely available and costs nothing.
- The typographical quality of the output is very good
- TeXis multilingual
- TeXis extensible and there are large collections of such extensions
- TeXprovides structural markup, TeX is a formatting program (a typesetting system)
- TeXis freely available
- Platform independent (all operation systems: Windows, Linux, MAC)
- It is a WYSIWYM, not a WYSIWYG system

LaTeX vs. Word

Characteristics	LaTeX	Word
Short Documents	-	++
Longer Documents	++	-
Ease of use	-	++
Layout Quality	++	+
Mathematical Formulas	++	-
Formatting	++	-
Price, Availability	++	-
Compatibility	+	-

The Working Principle

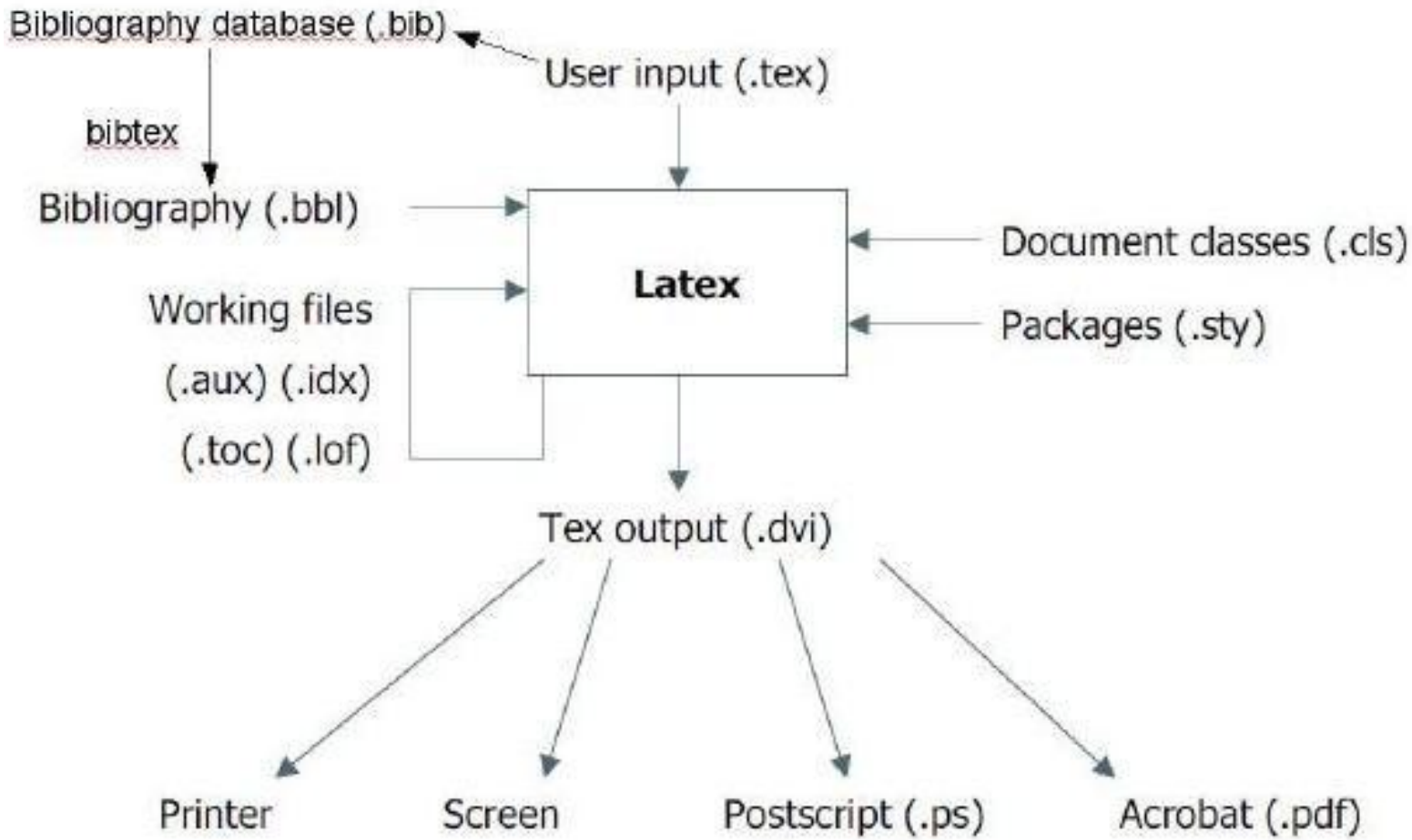
Step I: Edit the document with an editor
Step II: Then arrange for the formatting of the document
Step III: You can display the result on the screen or print it.



The Working Principle – 2

- The Editor: TexnicCenter
- The Formatter: Miktex (the program that does the formatting)
- The Preview: Acrobat Reader (for PDF Files)
- The Print Driver: Program for the output of your printer
- The Reference Manager: JabRef

The Working Principle – 3



Software

- **UNIX / LINUX:** Kile, emacs+auctex (frontend), Normalerweise als engine - teTeX
- **Windows:** MikTeX,proTeXt, Personal TeX, BaKoMa, TeXlive (engine), TeXnic Center, WinEDT (frontend).
- **MAC OS:** gwTeX, teTeX, CMacTeX, MacTex, OzTeX, Textures (engine), TexShop, TexMaker, Aquamacs, AlphaX (frontend)

Other Programs: JabRef, LeD, WinShell etc. WYSIWYG tools: Lyx. MAC OS: also Textres, TeXniscope

Software used in the Seminar

- Engine: MikTex (`http://miktex.org/`)
- Editor: TexnicCenter (`http://www.texniccenter.org/`)
- Bibliography: JabRef (`http://jabref.sourceforge.net/`)

Hint: Connection TexnicCenter to MikTex
(PATH_TO_PROGRAM/Miktex.../bin/miktex)

Logging in

- Logging in
- The Programs:
  - Miktex (only seldom)
  - TexnicCenter (often)
  - JabRef (in the second day) - P:\Pool \Jabref-2.7
- Create a folder on the desktop for the seminar: "LatexIntroPaper"

BREAK

BREAK

A Document

```
%Preamble
\documentclass{article}
\usepackage{NAME}
%Frontmatter
\title{Test document}
\author{Name Surname}
\begin{document}
\maketitle
%Body
...
%Backmatter
...
```

A Document

```
%Body
\begin{abstract}
Here is the abstract
\end{abstract}
\section{Test 1}
....
%Backmatter
\bibliography{BIB_FILE}
\bibliographystyle{NAME}
\end{document}
```

The Document Structure

- The document class: \documentclass{CLASS}: \documentclass{article}
- Commands: \NAME[OPTIONAL]{PARAMETERS}: \section{Test 1}
- Environments: \begin{NAME} Text \end{NAME}: \begin{abstract}
  Here is the abstract
  \end{abstract}
- Packages: \usepackage{NAME}. \usepackage{graphicx}

German

\usepackage[german]{babel} oder \usepackage[ngerman]{babel} – activates, among other things, the German syllable separation
\usepackage[latin1]{inputenc} – allows the use of "Umlaute"
\"a - for ä

Further Rules

It does not matter if you separate the words by one, two or more spaces. In the output the correct space is used.
Paragraphs are separated by blank lines. Again, the number of line breaks is not important. The line break is calculated only by LaTeX. How the text in the editor is arranged it does not matter.
"%" character used for a comment. Everything after this sign (in a row) is omitted.
LaTeX is case-sensitive. For example, the following commands: \Textit and \textit are different.

Line Breaks

- \par or a blank line: indicates a paragraph
- \newline or \\cause a line break without starting a new paragraph and that without the line is set flush on both sides.
- \linebreak – almost the same, the line is set flush.
- \nolinebreak prevents the line break.

Page Breaks

- \samepage or as environment: \begin{samepage} and \end{samepage} – a paragraph or a text part does not break between pages.
- \pagebreak – page break, where the lower edge is held constant.
- \nopagebreak prevents the page break.
- \newpage – new page without compensating the bottom.

Commands for the Title-Page

- \title{Title} Here, the title information is defined.
- \date{Date} It is responsible for specifying the date of publication. With the command \today you can output the current date. When no date is needed, use \date{}
- \author{Author} The command is self-explanatory. For several authors, the names separated by \and
- \maketitle At the point where this command is used, all the title page commands are shown.

Sectioning Commands

\LEVEL[Short form]{Title}
Possible LEVELS:

- \part
- \chapter
- \section
- \subsection
- \subsubsection
- \paragraph
- \subparagraph

Other Commands and Formatting

Formatting

See Handout

Lists

Lists are ENVIRONMENTS Main types:

1. Enumeration - enumerate
2. List with bullets - itemize
3. Concept explanation, definition - description

Each point / item in a list is marked with \item. For description you have to use the form: \item[NAME:] Explanation / Definition

Lists -2

Extend the TEXfile, so that you have the text only with one column. Build a section Lists, which contains the following list:

1. Item 1
2. Item 2
   - Item a
   - Item b
   - Item c
3. Item 3
   - Item a
   - Item b

     Text A: Item A

     Text B: Item B
   - Item c
4. Item 4

More on Abstract

```
\twocolumn[
\begin{@twocolumnfalse}
\maketitle
\begin{abstract} ...
\end{abstract}
\end{@twocolumnfalse}
]
```

More on Subsection Renaming

More on http://help-csli.stanford.edu/tex/latex-sections.shtml
No numbers: \section*{TITLE}

More on Fonts

Different sizes - Problems? - It can be used: 10pt, 11pt and 12pt.
Different fonts: http://franz.kollmann.in/latex/latex.html#tab

Discussions and Feedback

See you tomorrow :)!
(At **10:00** o'clock!!!!)

Attention: Hour is changing!

Program – Day 2

10:00–10:30	Organizational
10:30–11:00	LaTeX– Figures, Tables
11:00–12:00	DO IT YOURSELF
12:00–12:30	BREAK
12:30–13:00	LaTeX– References, JabRef, Other types of documents
13:00–14:00	DO IT YOURSELF
14:00–14:30	Discussions and Feedback

We know.....

- General format of a document
- Text formatting
- Lists

We will learn.....

- Pictures
- Tables
- References
- Writing Maths
- ....

Questions

- Headers / Footers: package fancyhdr
- Converters: s. Handout list of references and... `http://www.grindeq.com/index.php?p=overview`
- Chemical Formulas: different packages (XyMTeX, chemstyle, mhchem, etc.) Search on `www.ctan.org`.
- Mathematical Formulas: s. Webpage
- Diagrams - PSTricks

PSTricks

PSTricks (`http://www.tug.org/PSTricks/main.cgi/`) is a collection of PostScript-based TEX macros that is compatible with most TEX macro packages. PSTricks provides functionality for color, graphics, rotation, trees and overlays.
To combine pstricks and pdflatex one could use one of the following packages pdftricks or pst-pdf (previously: ps4pdf)- see `www.ctan.org`.
LaTeXDraw, a graphical drawing editor for LaTeX, can be used to 1) generate PSTricks code; 2) directly create PDF or PS pictures. (`http://latexdraw.sourceforge.net/`)

Elements that can move – Floats

FLOAT = *figure* oder *tabel*

```
\begin{FLOAT_NAME}[htbp]
\centering
.....
\caption{Name}
\label{float:Name}
\end{FLOAT_NAME}
```

- h: Hier
- t: Top
- b: Bottom
- p: Page (new page)
- !: more place

Tables

```
\begin{table}[htbp]
\centering
\begin{tabular}{c| c}
Column 1 & Column 2 \\\hline
Value 1 & Value 2 \\
\end{tabular} \caption{Test}
\label{tab:Test}
\end{table}
```

c=center, l=left, r=right

Column 1	Column 2
Value 1	Value 2

Table: Test

More on Tables

- Distance caption - tabular
  \setlength{\abovecaptionskip}{NOpt}
  \setlength{\belowcaptionskip}{NOpt}
- Multi-columns: \multicolumn{no}{c or l or r}{NAME}
- Long titles - More lines:
  \usepackage{multirow}
  \multirow{No}{*}{TEXT}

More on http://en.wikibooks.org/wiki/LaTeX/Tables

Figures

Needed: package \usepackage{graphicx}
\includegraphics[options]{NAME}
More parameters: height=\textheight, scale=1.5,
width=\linewidth or textwidth, angle = -90
Just a part of the picture: [bb=30 30 120 150, clip] (left down, right up)

Figures

```
\begin{figure}[htbp]
\centering
\includegraphics[width=3cm]{Tree.jpg}
\caption{A Tree}
\label{fig:Tree}
\end{figure}
```

Figure: A Tree

Pictures & LaTeX

	TeX and dvisps	pdfLaTeX
Best format	eps	pdf
Other formats	ps	jpg / jpeg, png

Floats... more

\renewcommand {\figurename}{NAME}
\renewcommand {\tablename}{NAME}
\renewcommand \textfraction {0.x}
More space: !: \begin {figure}[!t]
Still problems: use the package *float*

Cross-References

You can make references to elements that are associated with \label{LABEL_NAME}. You use the command: \ref{LABEL_NAME}. You can make references to tables, images, chapters, sections, etc.
You can create links with \url{LINK}. You will need the package **url** (\usepackage{url}).

Bibliography

\bibligraphy{BIB_FILE}
\bibliographystyle{NAME}
Citing: \cite{LABEL}
Possible styles: alpha, abbrv, plain, acm, apalike, usw.
Differences appear in:

- the order (alphabetically or as cited in the text)
- the way the citation is done (number, author+year, etc.)

Use a reference manager program (e.g. JabRef), which can save / export as BibTeX. Attention at the bibtexkeys!

Bibliography

\bibligraphy{BIB_FILE}
\bibliographystyle{NAME}
You can cite using the command: \cite{LABEL}
JabRef: P:\Pool \Jabref-2.7
The entries in the BIB File are of this form:
@ REFERENCE_TYPE {LABEL,
FIELD1={Value},
FIELD2={Value},
...
}
See Handout

Formulas

Sometimes new packages are needed: *amssymb*,*amsmath*, *theorem*
Environments:

- \$ . . . \$ or \(. . . \) or the environment *math* (inline)
- \$\$ . . . \$\$ or \[...\] or the environment *displaymath* - unnumbered, newline
- \begin{equation*} . . . \end{equation*} Unnumbered
- \begin{equation} . . . \end{equation} Automatically numbered

Formulas

- Matrices: Environment *array* (it behaves as tabular); Parenthesis: \left(and \right). It can be used also [,], {, }. Another solution is to use the package *amsmath* and matrix, vmatrix, pmatrix or bmatrix
- Spaces: \, or \: or \; or \quad or \qquad
- Other environments: *eqnarray*

Other Documents

Other Documents:

- Class **beamer** - Slides
- Class **book** or **report** - Diploma thesis, PhD thesis, Master thesis etc.
- Class **a0poster** - Poster

For a larger work you should separated the text in several files and use the command \include {FILE_NAME}

Discussions and Feedback

- Discussions
- Feedback
- ....

Materials uploaded on:`https://nats-www.informatik.uni-hamburg.de/view/User/LaTeXNovember`

Seminar: LaTeXfor Advanced (5.11.2011, 10:00-17:00)