

L^AT_EX and Friends

Introduction to L^AT_EX

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UCC

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What will You Learn?

- Write simple \LaTeX input document based on `article` class.
- Turn input into pdf with `pdflatex`.
- Define *labels* and use them to create consistent cross-references.
- Create a table of contents with the `\tableofcontents` command.
- Cite the literature with the aid of the `\cite` command.
- Generate one or several bibliographies with the `bibtex` program.
- Manage the structure and writing with the `\include` command.
- Control the visual presentation by selecting the right class options.
- Much, much, more.

Introduction to \LaTeX

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Document Management

Labels and Cross-references

The Style of the References

The Bibliography

TOC and Lists of Things

Class Files

Packages

Useful Classes and Packages

Beamer Presentations

Callout Shapes

Bibliography

Acronyms & Abbreviations

About this Document

Cons

- ❑ Difficult to learn and use.
- ❑ Not WYSIWYG.
- ❑ Little support for physical markup.
- ❑ Using non-standard fonts is difficult.
- ❑ It takes some practice to let text flow around pictures.
- ❑ No spell checking.
- ❑ Too many packages.
- ❑ Encourages structured writing.

- ❑ High-quality typesetting and good automatic hyphenation.
- ❑ Many conferences and publishers accept \LaTeX .
- ❑ Turing-complete programming language!
- ❑ Write notes/book/presentation in same source file.
- ❑ \LaTeX is highly configurable.
- ❑ You can translate \LaTeX to `html/ps/pdf/DocBook...`
- ❑ Automatic numbering of sections, figures,
 - ❑ Easy cross-referencing.
- ❑ Bibliography management.
- ❑ Some support for WYSIWYG document preparation.
- ❑ *Very* stable, free, and available on many platforms.
- ❑ Large and active, friendly, and helpful user-base.
- ❑ \LaTeX has comments.

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- ❑ \LaTeX has comments.
- ❑ Can produce coffee stains on your papers.

Pros

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Pros

- ❑ High-quality typesetting and good automatic hyphenation.
- ❑ Many conferences and publishers accept L^AT_EX.
- ❑ Turing-complete programming language!
- ❑ Write notes/book/presentation in same source file.
- ❑ L^AT_EX is easily configurable.
- ❑ You can translate L^AT_EX to html/ps/pdf/DocBook....
- ❑ Automatic numbering of sections, figures,
 - ❑ Easy cross-referencing.
- ❑ Bibliography management.
- ❑ Some support for WYSIWYG document preparation.
- ❑ Very stable, free, and available on many platforms.
- ❑ Large and active, friendly, and helpful user-base.
- ❑ L^AT_EX has comments.
- ❑ Can produce coffee stains on your papers.

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- ❑ You can translate \LaTeX to `html/ps/pdf/DocBook...`
- ❑ Automatic numbering of sections, figures,
 - ❑ Easy cross-referencing.
- ❑ Bibliography management.
- ❑ Some support for WYSIWYG document preparation.
- ❑ *Very* stable, free, and available on many platforms.
- ❑ Large and active, friendly, and helpful user-base.
- ❑ \LaTeX has comments.
- ❑ Can produce coffee stains on your papers.
- ❑ **Most importantly: \LaTeX is fun!**

- Written by Lamport as an extension of Knuth's T_EX.
- Turing-complete (procedural) markup language and typesetting processor.
 - They let you control visual presentation *and* content.

- 1 You write your document in a L^AT_EX (`.tex`) input (source) file.
- 2 Source file is turned into a *portable document format* (`.pdf`) file.
- 3 The `.pdf` file can be viewed and printed on your computer.

- Input Processor** Turns the source file into a token stream.
- Expansion Processor** Turns the token stream into token stream.
- Execution Processor** Executes executable control sequences.
- Visual Processor** Creates the pdf file.

Creating and Viewing the .pdf Output

Unix Session

```
$ pdflatex <base name>.tex
```

Unix Session

```
$ acroread <base name>.pdf &
```

Auxiliary Files

- L^AT_EX uses several “aux” files for additional information.
- Auxiliary files may also be created by external programs.
- When an auxiliary file changes then L^AT_EX may be out of sync.
- You should rerun `latex` when this happens.
- Normally, `latex` outputs a warning when it suspects this is required:

Unix Session

```
$ latex document.tex
... LaTeX Warning: Label(s) may have changed. ...
Rerun to get cross-references right.
$
```

Writing a Basic Document

- L^AT_EX: markup language and document preparation system.
- Forces you to focus on content and *not* on presentation.

A Typical L^AT_EX Program

L^AT_EX Program

```
\documentclass[a4paper,11pt]{article}

%_Use_the_mathptmx_package.
\usepackage{mathptmx}

\author{A.\,U.\,Thor}
\title{Introduction_to_\LaTeX}
\date{\today}

\begin{document}_%_Here_we_go.
  \maketitle
  \section{Introduction}
  \text{The_start.}
  \section{Conclusion}
  \text{The_end.}
\end{document}
```


L^AT_EX Usage

```
\documentclass[a4paper,11pt]{article}
```

L^AT_EX Usage

```
\usepackage{mathptmx}
```

- The `mathptmx` package sets the default font to *Times Roman*.
- Compact font.
- May save many precious pages.

L^AT_EX: \author, \title, and \date

L^AT_EX Usage

```
\author{A.,U. Thor}  
\title{Introduction to \LaTeX}  
\date{\today}
```

L^AT_EX Usage

```
\author{Donald E. Knuth \and Peter B. Bendix}
```

L^AT_EX Usage

```
\author{Sinead\thanks{You're a lovely audience.}}
```

L^AT_EX: Building your own Titlepage

L^AT_EX Usage

```
\begin{document}
  \begin{titlepage}
    ...
  \end{titlepage}
  :
\end{document}
```

L^AT_EX Usage

```
\begin{document} % Here we go.  
  \maketitle  
  \section{Introduction}  
    The start.  
  \section{Conclusion}  
    The end.  
\end{document}
```

L^AT_EX Usage

```
\begin{abstract}
  This document is an introduction to \LaTeX. ...
\end{abstract}
```

Spaces, Comments, and Paragraphs

- One or more space character is the same as a single space.
- The end of the line is the same as a space.
- However:
 - An empty line signals the end of the current paragraph.
 - Percentage sign (%) starts comment. Lasts until end of line.
 - Spaces at the start of lines following comments are ignored.

Spaces, Newlines, Comments, and Paragraphs

L^AT_EX Input

```
This is the _____first sentence
of the first paragraph.
The second sentence of this
paragraph ends in the word
‘elephant.’
```

```
This is the first sentence
of the second pa%comment
ragraph.
The second sentence of this
paragraph
ends in the word ‘%eleph
ant.’
```

L^AT_EX Output

This is the `_`first sentence of the first paragraph.
The second sentence of this paragraph ends in
the word ‘elephant.’

This is the first sentence of the second
paragraph. The second sentence of this
paragraph ends in the word ‘ant.’

Spaces, Newlines, Comments, and Paragraphs

L^AT_EX Input

```
This is the first first sentence
of the first paragraph.
The second sentence of this
paragraph ends in the word
'elephant.'
```

```
This is the first sentence
of the second pa%comment
ragraph.
The second sentence of this
paragraph
ends in the word '%eleph
ant.'
```

L^AT_EX Output

This is the first sentence of the first paragraph.
The second sentence of this paragraph ends in
the word 'elephant.'

This is the first sentence of the second
paragraph. The second sentence of this
paragraph ends in the word '**ant**.'

Minor document Divisions

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

L^AT_EX Usage

```
\chapter{Foundations}  
  \section{Notation}
```

L^AT_EX Usage

```
\chapter*{Main Theorems}  
  \section*{A Useful Lemma}
```

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Optional Argument

L^AT_EX Usage

```
\chapter[Wales]%  
  {My Amazingly Amusing Adventures in  
   Llanfairpwllgwyngyllgogerychw%  
   yrndrobwllllantysiliogogoch}
```

Coarse Document Divisions

front matter Main information about the document:

- A half and main title page,
- Copyright page,
- Preface or foreword,
- Table of contents,

main matter The main body of the document.

back matter Further information about the document and other sources of information:

- Index,
- Afterword,
- Bibliography,
- Acknowledgements,
- Colophon,

L^AT_EX Usage

```
\documentclass[12pt,a4paper]{book}
\begin{document}
  \frontmatter
    \maketitle
    \tableofcontents
  \mainmatter
    \chapter{Introduction}
    \chapter{Conclusion}
  \backmatter
    \chapter*{Acknowledgement}
    \addcontentsline{toc}{chapter}{\bibname}
    \bibliography{db}
\end{document}
```

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L^AT_EX Usage

```
\appendix
\chapter{Proof of Main Theorem}
  \section{A Useful Lemma}
```

Manage thy Source Files

- L^AT_EX input files have a tendency to grow rapidly.
- Without extra structure you'll lose control over content.
- Solutions:

IDE Use integrated development environment.

folding editor Lets you to define folds.

files The L^AT_EX way.

Folding Editor

Closed Fold

We prove the following amazing identity.

% A comment.

+--- 3 lines: equation () : $A = B \setminus, .$ -----

% Another comment.

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About this Document

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Open Fold

We prove the following amazing identity.

```
% A comment.  
\begin{equation}  
  A = B\,,.  
\end{equation}  
% Another comment.
```

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L^AT_EX Usage

```
\includeonly{Abstract.tex,MainResults.tex}
\begin{document}
  \include{Abstract.tex}
  \include{Introduction.tex}
  \include{Notation.tex}
  \include{MainResults.tex}
  \include{Conclusion.tex}
\end{document}
```

Labels and Cross-References

L^AT_EX Input

```
\chapter{Introduction}
A short conclusion is presented
in Chapter~\ref{TheEnd}.
\chapter{Conclusion}
\label{TheEnd}
```

L^AT_EX Output

1 Introduction

A short conclusion is presented in Chapter 2.

2 Conclusion

Labels and Cross-References

L^AT_EX Input

```

\chapter{Introduction}
A short conclusion is presented
in Chapter~\ref{TheEnd}.
The conclusion starts on
Page~\pageref{TheEnd}.
\chapter{Conclusion}
\label{TheEnd}

```

L^AT_EX Output

1 Introduction

A short conclusion is presented in Chapter 2. The conclusion starts on Page 1.

2 Conclusion

The prettyref Package

- 1 Introduce element classes: figures, chapters,
- 2 Associate logical element classes with labels.
- 3 Tell `prettyref` how to refer to the elements.
- 4 Use the `\prettyref` command.

L^AT_EX Usage

```

\usepackage{prettyref}
\newreformat{ch}{Chapter~\ref{#1}}
\newreformat{sec}{Section~\ref{#1}}
\newreformat{fig}{Figure~\ref{#1}}
\begin{document}
  \chapter{Introduction}
  In \prettyref{ch:Main@Results}
  we present the main results.
  \chapter{Main Results}
  \label{ch:Main@Results}
  ...
\end{document}

```

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About this Document



- Most scholarly works have citations and a bibliography.
- Details about works cited (referenced) in the text.
- In cs the bibliography is usually at the end of the work.
- Entries are of the form: \langle citation label \rangle \langle bibliography content \rangle .
- Entries in same bibliography may have different bibliography content.
- Bibliographies in different works may also differ.
- In L^AT_EX the style of the bibliography and labels is configurable.
- Labels may appear as:

numbers Appear as ‘ $[\langle$ number $\rangle]$ ’ in text.

names and years Appear as ‘ $[\langle$ name \rangle, \langle year $\rangle]$ ’ in text.

...

Bibliography Example

[**Lamport, 1994**] L. Lamport. \LaTeX : A Document Preparation System. Addison–Wesley, 1994.

[**Knuth, 1990**] D. E. Knuth. The \TeX book. Addison–Wesley, 1990. The source of this book is freely available from <http://www.ctan.org/tex-archive/systems/knuth/tex/>.

Comparison: Labels as Numbers

- Labels as numbers are very compact.
 - They don't disrupt the "flow of reading:" they're easy to skip.
- Labels as numbers are not very informative.
 - You have to go to the bibliography to look up the label.
 - Hyperlinks in electronic documents reduce the interruption.

Comparison: Labels as Names and Year

- Labels as names and year are longer than labels as numbers.
 - They are more disruptive to the reading process:
 - They are more difficult to “skip.”
- Labels as names and years are more informative.
 - No need to look up label if you’re familiar with literature.

- Traditionally, labels appeared as numbers in the text.
 - Probably to keep printing costs low.
- Nowadays, printing costs are not always relevant.
 - Printing is cheaper.
 - Many documents are published electronically.
- Some journals/universities require specific bibliography styles.
 - For ucc there are no bibliography style requirements.

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L^AT_EX Usage

```
\bibliographystyle{named}  
\usepackage{named}
```

Existing Bibliography Styles

plain Entries are sorted alphabetically.

- Labels appear as numbers in the text.

alpha Entries are sorted alphabetically.

- Labels formed from surnames and year of publication:
 - Knut66

abbrv Entries are very compact and sorted alphabetically.

- Labels appear as numbers in the text.

Example

L^AT_EX Input

```
The \LaTeX{} package was
created by Leslie Lamport%
~\cite{Lamport:94}
on top of Donald Knuth's
\TeX{} program%
~\cite{Knuth:1990}.
```

L^AT_EX Output

The L^AT_EX package was created by Leslie Lamport [Lamport 1994] on top of Donald Knuth's T_EX program [Knuth 1990].

Example (Continued)

L^AT_EX Input

More information about the
bibliography database
may be found in%
`~\cite[Appendix~B]{Lampport:94}`.

L^AT_EX Output

More information about the bibliography database may be found in [Lampport
1994, Appendix B].

```
\refname
```

This results in the name of the bibliography section.

```
\renewcommand\refname{<other name>}
```

Changes the default name of the bibliography to `<other name>`.

```
\nocite{<list>}
```

Add `<list>` to bibliography without citing in text.

Managing your Citations with B_IB_TE_X

- 1 You specify reference section with `\bibliography{<db>}`.
- 2 You `\cite` works in your L^AT_EX program.
 - ▣ Your logical labels should be defined by some B_IB_TE_X record.
- 3 You run `latex`.
 - ▣ This writes the logical labels to an auxiliary file.
- 4 You run `bibtex` as follows:

Unix Usage

```
$ bibtex <document>
```

- 5 You run `latex` twice and Bob's your uncle.

Example

L^AT_EX Usage

```
\documentclass[11pt]{article}
% Use bibliography style named.
% Requires the file named.bst.
\bibliographystyle{named}
% Requires the package named.sty.
\usepackage{named}
\begin{document}
  % Put in a citation.
  This cites~\cite{Knuth:1990}.
  % Put the reference section here.
  % It is in the file db.bib.
  \bibliography{db}
\end{document}
```

BIBTEX File

```
@Book{Lamport:94,  
  author   = {Lamport, Leslie},  
  title    = {\LaTeX: A Document Preparation System},  
  year     = {1994},  
  isbn     = {0-021-52983-1},  
  publisher = {Addison\, \endash\, Wesley},  
}  
  
@Book{Strunk:White,  
  author   = {Strunk, W. and  
             White, E.{\thinspace}B.},  
  title    = {The Elements of Style},  
  publisher = {Macmillan Publishing},  
  year     = {1979},  
}
```

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BibTeX Database Entry Types

@Article An article from a journal or magazine.

required entries author, title, journal, and year.

optional entries volume, number, pages, month, and note.

@Book A book with an explicit publisher.

required entries author or editor, title, publisher, and year.

optional entries volume, number, series, ...

@InProceedings A paper in a conference proceedings.

required entries author, title, booktitle, publisher, and year.

optional entries pages, editor, volume, number, series, ...

@Proceedings The proceedings of a conference.

required entries title and year.

optional entries editor, volume, number, series, organisation, ...

@MastersThesis A Master's thesis.

required entries author, title, school, and year.

optional entries type, address, month, and note.

@PhDThesis A Ph.D. thesis.

required entries author, title, school, and year.

optional entries type, address, month, and note.

....

L^AT_EX Usage

```
\usepackage[style=authoryear,  
            block=space,  
            language=british]{biblatex}  
  
\renewcommand*\bibopenparen{[}  
\renewcommand*\bibcloseparen{]}  
  
\renewcommand*\bibnamedash  
            {\rule[0.48ex]{3em}{0.14ex}\space}  
  
\addbibresource{LAF}
```

Printing the Bibliography

L^AT_EX Usage

```
\printbibliography[title=References]
```

L^AT_EX Input

```
\textcite{Knuth:1990} describes \TeX.  
The ultimate guide to~\TeX{  
is~\parencite{Knuth:1990}.
```

L^AT_EX Output

Knuth [1990] describes T_EX. The ultimate guide to T_EX is [Knuth, 1990].

L^AT_EX Input

```
\citeauthor{Knuth:1990} wrote {\TeX}  
in~\citeyear{Knuth:1990}.
```

L^AT_EX Output

Knuth wrote T_EX in 1990.

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L^AT_EX Usage

```
\Citeauthor{Beethoven:ninth} is most famous  
for his Ninth Symphony%
```

```
~\Parencite{Beethoven:ninth}.
```

Personally, I prefer

```
his Sixth Symphony%
```

```
~\Parencite{Beethoven:sixth}.
```


Unix Usage

```
$ texdoc biblatex
```

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Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.

L^AT_EX Usage

```
\usepackage[<options>]{biblatex}
```

- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).

L^AT_EX Usage

```
\addbibresource{<your .bib file names>}
```

- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
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Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.

L^AT_EX Usage

```
\chapter{From K\"onigsberg to G\"ottingen}
\begin{refsection}
... % Lots of text and citations omitted.
\printbibliography[heading=subbibliography]
\end{refsection}
```

- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
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- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.

Unix Usage

```
$ for f in *[0-9]-blx.aux; do biblatex $f; done
```

- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your L^AT_EX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run L^AT_EX twice.

Bibliographies at End of Chapter

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Add `refsection` for each chapter and print the bibliography.
- 4 You run `latex` on your \LaTeX source file.
- 5 You run `bibtex` on each auxiliary file.
- 6 You run \LaTeX twice.
- 7 You sit down, relax, and admire your end-of-chapter bibliographies.

Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

- 1 Add `refsection` environments to your chapters.

L^AT_EX Usage

```
\chapter{Philip Glass}
\begin{refsection}
... % lots of text and citations omitted.
\end{refsection}
% Steve Reich, John Adams and Arvo Pärt omitted.
```

- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

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Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).

L^AT_EX Usage

```
\printbibheading
```

- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

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Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it:

L^AT_EX Usage

```
\defbibheading[heading=bibliography,  
                title=Classified Discographies]
```

- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.

L^AT_EX Usage

```
\printbibliography[section=1,title=Glass Discography]
\printbibliography[section=2,title=Reich Discography]
```

- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

Classified Bibliographies

- 1 Add `refsection` environments to your chapters.
- 2 Print title for the collected subbibliographies (optional).
- 3 If you don't like the collected subbibliographies title, redefine it.
- 4 Print the subbibliographies.
- 5 Run L^AT_EX, run B_IB_TE_X, and run L^AT_EX twice.

Classified Bibliographies (Continued)

L^AT_EX Usage

```
\printbibliography[type=book,title=Books]  
\printbibliography[type=article,title=Journal Articles]
```

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Classified Bibliographies (Continued)

BIB_TE_X File

```
@Misc{Akhnaten,  
  title    = {Akhnaten},  
  author   = {Glass, Philip},  
  keywords = {glass,opera,minimal},  
  year     = {1983},  
}
```

L^AT_EX Usage

```
\printbibliography[heading=subbibliography,  
                  title=Opera References,  
                  keyword=opera]
```

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Classified Bibliographies (Continued)

BIB_TE_X File

```
@Misc{Akhnaten,  
  title      = {Akhnaten},  
  author     = {Glass, Philip},  
  keywords   = {glass,opera,minimal},  
  year       = {1983},  
}
```

L^AT_EX Usage

```
\printbibliography[heading=subbibliography,  
                  title=Opera References,  
                  keyword=opera]
```

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Classified Bibliographies (...)

L^AT_EX Usage

```
\DeclareBibliographyCategory{trilogy}  
\addtocategory{trilogy}{Akhnaten,Einstein,Satyagraha}
```

L^AT_EX Usage

```
\printbibliography[heading=subbibliography,  
title=Trilogy References,  
category=trilogy]
```

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Classified Bibliographies (...)

L^AT_EX Usage

```
\DeclareBibliographyCategory{trilogy}  
\addtocategory{trilogy}{Akhnaten,Einstein,Satyagraha}
```

L^AT_EX Usage

```
\printbibliography[heading=subbibliography,  
title=Trilogy References,  
category=trilogy]
```

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L^AT_EX Usage

```
\begin{document}
  \maketitle
  \include{Abstract.tex}
  \clearpage
  \tableofcontents
  \listoffigures
  \listoftables
  :
\end{document}
```

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L^AT_EX Usage

```
\makeindex{programs}  
\makeindex{authors}  
\begin{document}  
Knuth\index{authors}{Knuth}  
  is the author of \TeX\index{programs}{TeX}.
```

Indexes and Glossaries (Continued)

Unix Session

```
$ makeindex authors  
$ makeindex programs
```

L^AT_EX Input

```
\printindex{programs}{Index of Programs}  
\printindex{authors}{Index of Authors}
```

Controlling the Index Entries (Explained by Example)

Page	Last argument of <code>\index</code> command
1	lecture notes
2	programs
4	lard
2	latex@ <code>\LaTeX</code>
3	lambda@ <code>\lambda</code>
5	sausages!boerewors
6	sausages!salami
2	programs!latex
6	programs!bibtex
2	index (
6	index)
8	salami see{sausages}
8	boerewors see{sausages}
8	boereworst (Dutch) see{boerewors}

L^AT_EX Output

Index

boerewors, *see* sausages
boereworst (Dutch), *see* boerewors

index, 2–6

λ, 3

lard, 4

L^AT_EX, 2

lecture notes, 1

programs, 2

 bibtex, 6

 latex, 2

salami, *see* sausages

sausages

 boerewors, 5

 salami, 6

- Each L^AT_EX document corresponds to a *document class*.

L^AT_EX Usage

```
\documentclass{<document class name>}
```

- Each document class is defined in a class file.
- Class files define general rules for typesetting the document.
- The extension of class files is `cls`.
- Examples of some standard class files:

`article` The basic article class.

`book` The basic book class.

`report` The basic report class.

`letter` The basic class for letters.

The letter Class

L^AT_EX Usage

```
\documentclass{letter}
\signature{Michael Noonan}
\address{Department of Finance\\
         Government Buildings\\
         Upper Merrion Street\\
         Dublin 2}

\begin{document}
  \begin{letter}{Paddy and Mary, \textsc{oap}s\\
               2 Prosperity Square\\
               off Barrack Street\\
               Cork, Co Cork}
    \opening{Dear Sir/Madam:}

    We have reason to believe you haven't payed your taxes in full.

    Please pay your taxes now! (Or else.)

    We look forward to the money.

    \closing{Yours Faithfully,}
    \ps{P.S. Send it now.}
    \encl{Further instructions.}
    \cc{Enda.}
  \end{letter}
\end{document}
```

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Typical Class Options

`11pt` Use an 11 point font size (default is 10 point).

`12pt` Use a 12 point font size.

`twoside` Output a document that is printed on both sides of the paper.

`twocolumn` Output a document that has two columns.

`draft` Used for draft versions.

Indicate hyphenation/justification problems by putting little square in the margin.

`final` Used for the final version.

provide commands Provide new useful commands.

- Usually, this adds some extra functionality.

change commands Tweak some existing commands. This may change the default document settings.

- Usually, this affects the layout.

Packages

The extension of packages is `sty`.

L^AT_EX Usage

```
\usepackage{<style>}
```

L^AT_EX Usage

```
\usepackage[draft,colorlinks]{hyperref}
```

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Useful Packages

- `url` Typesets URLs [Arseneau 2010] with automatic line breaking.
- `fourier` Sets the text font to *Utopia Regular* and the math font to *Fourier* [Bovani 2005].
- `coverpage` Facilitates user-defined coverpages [Mühlich 2006].
- `fancyhdr` Facilitates user-defined headers and footers [van Oostrum 2004].
- `lastpage` Defines command for last page number.
- `mathdesign` Sets up math font.
- `memoir` This class provides support for writing books.
- `todonotes` Supports todo notes in the margin and a list of todo notes.
- `classicthesis` Nice package for theses [Miede 2010].
- `arsclassica` Another nice package for theses [Patieri 2010]. It is based on `classicthesis`.
- `mathtools` Provides better typesetting of mathematical content [Høgholm et al. 2011].

```
\begin{frame}[options] <frame material> \end{frame}
```

Creates frame.

```
\frametitle{<frame title>}
```

Defines title of the frame.

```
\framesubtitle{<frame subtitle>}
```

Defines frame subtitle.

Creating a Titlepage

L^AT_EX Input

```
\documentclass{beamer}

\title{{\LaTeX} and Friends}
\author{M. \,R. \,C.
        van Dongen}
\date{September 16, 2011}

\begin{document}
\begin{frame}[fragile]
  \maketitle
\end{frame}
\end{document}
```


Creating a Titlepage (Output)

L^AT_EX and Friends

M. R. C. van Dongen

September 16, 2011

Creating Frame Titles

L^AT_EX Input

```
\begin{frame}[fragile]
  \frametitle{A Slide}
  \framesubtitle{An Example}

  \begin{itemize}
    \item Hello world.
    \item Bonjour monde.
  \end{itemize}
\end{frame}
```

Creating Frame Titles (Output)

A Slide

An Example

- ▶ Hello world.
- ▶ Bonjour monde.

- Using `beamer` may lead to nasty errors.
- Know thine manual.
- For example, environments may not work.

Don't Try This at Home

```
\newenvironment{myframe}[0]  
  {\begin{frame}[fragile]}  
  {\end{frame}}
```

- `beamer` Default mode. Frame results in one or several screens.
- `second` Mode for second output screen.
- `handout` Mode for handouts. Frame results in one slide.
- `trans` Mode for transparencies.
- `article` Typeset using other existing style.

The beamerarticle Package

L^AT_EX Usage

```
\documentclass{book}
\usepackage{beamerarticle}
\makeatletter
\def\frametitle{%
  \@ifnextchar<%
    {\@frametitle@lt}%
    {\@frametitle@lt<>}%
}
\def\@frametitle@lt<#1>#2{}
\makeatother
```

Auxiliary Modes

`all` Guess?

`presentation` All, except `article`.

Overlay Specifications

```
\begin{frame}<<overlay specs>>[<options>] <frame  
material> \end{frame}
```

- `<overlay specs>` determines mode.
- You may combine modes using the pipe symbol (`|`) as a separator.
 - `beamer|handout`.

Example (Input)

L^AT_EX Input

```
\documentclass[handout]{beamer}

\begin{document}
\begin{frame}<handout|beamer>[fragile]
  Handout or beamer mode.
\end{frame}
\begin{frame}<beamer>[fragile]
  Beamer mode.
\end{frame}
\end{document}
```

Example (Output)

Handout or beamer mode.

Explicit Mode Transitions

```
\mode<mode spec>{<text>}
```

Inserts `<text>` if `beamer` is in `<mode spec>` mode.

```
\mode<mode spec>>
```

Leaves out text not corresponding to `<mode spec>`.

```
\mode*
```

Ignore text outside `frame` in `presentation` mode.

Incremental Presentations

`\pause`

Insert a pause.

`\pause[<number>]`

Display text following the command from Slide `<number>` and further.

Example (Input)

L^AT_EX Input

```
\begin{frame}[fragile]
\begin{itemize}
\item First. \pause
\item Second.
\item Third. \pause
\item Last.
\end{itemize}
\end{frame}
```

Example (Third Slide of Output)

- ▶ First.
- ▶ Second.
- ▶ Third.

Additional Commands

`\item<overlay spec>>`

Display item on slides corresponding to `<overlay spec>`.

Overlay specifications

`<number>`

`<number>-`

`-<number>`

`<number1>-<number2>`

`<overlay spec1>, <overlay spec2>`

Example (Input)

L^AT_EX Input

```
\begin{frame}[fragile]
\begin{itemize}
\item<1-2> First.
\item<3,4> Second.
\item<2> Third.
\item Last.
\end{itemize}
```

Example (Second Slide of Output)

- ▶ First.
- ▶ Third.
- ▶ Last.

```
\alert<<overlay spec>>{<text>}
```

```
\item<alert@<overlay spec>>
```

```
\item<<overlay spec1>|alert@<overlay spec2>>
```

Example

L^AT_EX Input

```
\begin{frame}[fragile]
\frametitle{Visual Alerts}
\begin{itemize}
\item<alert@2> First.
\item<alert@3> Second.
\item<alert@4> Third.
\end{itemize}
\end{frame}
```

Example (Third Slide of Output)

Visual Alerts

- ▶ First.
- ▶ **Second.**
- ▶ Third.

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There is No Largest Prime Number

The Proof Uses *Reductio ad Absurdum*

Proof.

1. Suppose the number of primes is finite.
2. Let p be the product of all primes.
3. Then $p + 1$ is not divisible by any prime.
4. Therefore, $p + 1$ is also a prime. □

There is No Largest Prime Number

The Proof Uses *Reductio ad Absurdum*

Proof.

- 1 Suppose the number of primes is finite.
- 2 Let p be the product of all primes.
- 3 Then $p + 1$ is not divisible by any prime.
- 4 Therefore, $p + 1$ is also a prime. □

Prime Number Presentation

└ Main Result

There is No Largest Prime Number

The Proof Uses *Reductio ad Absurdum*

Proof.

- 1 Suppose the number of primes is finite.
- 2 Let p be the product of all primes.
- 3 Then $p + 1$ is not divisible by any prime.
- 4 Therefore, $p + 1$ is also a prime. □

Outer Themes: Goettingen

There is No Largest Prime Number

The Proof Uses *Reductio ad Absurdum*

Prime Number
Presentation

Euclid

Main Result

Conclusion

Proof.

1. Suppose the number of primes is finite.
2. Let p be the product of all primes.
3. Then $p + 1$ is not divisible by any prime.
4. Therefore, $p + 1$ is also a prime. □

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About this Document

- The `tikz` package provides a “callouts” library:
 - `\usetikzlibrary{shapes.callouts}`.
- The shapes it defines are useful for presentations.

- `rectangle callout`



Hello!

- `ellipse callout`



Bonjour!

- `cloud callout`



Zzzzz!

The Callout Pointer

- The *callout pointer* is a coordinate.
- The coordinate may be inside/outside the `tikzpicture`.
 - We shall only use coordinates inside the `tikzpicture`.

- There are two kinds of callout pointers:

absolute An absolute coordinate in the `tikzpicture`.

relative A coordinate, relative to the callout shape.

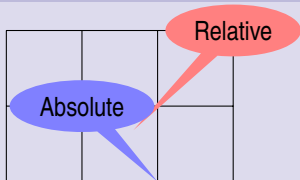
- 1 First `tikz` computes the angle of the specified coordinate relative to the shape's center;
- 2 Next it locates the point on the border to which this angle corresponds;
- 3 Finally, it adds the relative coordinate to this point.

Example

L^AT_EX Input

```
\tikzset{note/.style=ellipse callout, fill={#1},
         abs/.style=callout absolute pointer={#1},
         rel/.style=callout relative pointer={#1}}
\begin{tikzpicture}
\draw[help lines] (0,0) grid (3,2);
\node[note=red!50, rel={{(-1,-1)}}] at (3,2) {Relative};
\node[note=blue!50, abs={{(2,0)}}] at (1,1) {Absolute};
\end{tikzpicture}
```

L^AT_EX Output



Arseneau, Donald [20th Jan. 2010]. *url.sty*. Version 3.3. Edited as a L^AT_EX document by Robin Fairbairns.

Bovani, Michel [30th Jan. 2005]. *Fourier GUTenberg*.

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<http://www.ctan.org/tex-archive/systems/knuth/tex/>.

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Acronyms and Abbreviations

AMS American Mathematical Society

API Application Programming Interface

APL A Programming Language

CTAN Comprehensive T_EX Archive Network

CD Compact Disk

FAQ Frequently Asked Question

GUI Graphical User Interface

IDE Integrated Development Environment

ISBN International Standard Book Number

SI Système International d'Unités/International System of Units

OS Operating System

TUG T_EX Users Group

URL Uniform Resource Locator

WYSIWYG What You See is What You Get

About this Document

- This document was created with `pdflatex`.
- The L^AT_EX document class is `beamer`.
- The main font is *T_EX Gyre Heros Condensed*.
 - You may obtain the font from <http://www.gust.org.pl>.