

L^AT_EX and Friends

Introduction to L^AT_EX

<http://cswb.ucc.ie/~dongen/LAF/LAF.html>

M. R. C. van Dongen

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Repairing Shoes?

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Working as a Blacksmith?

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Doing Some Carpentry?



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Becoming a Programmer?

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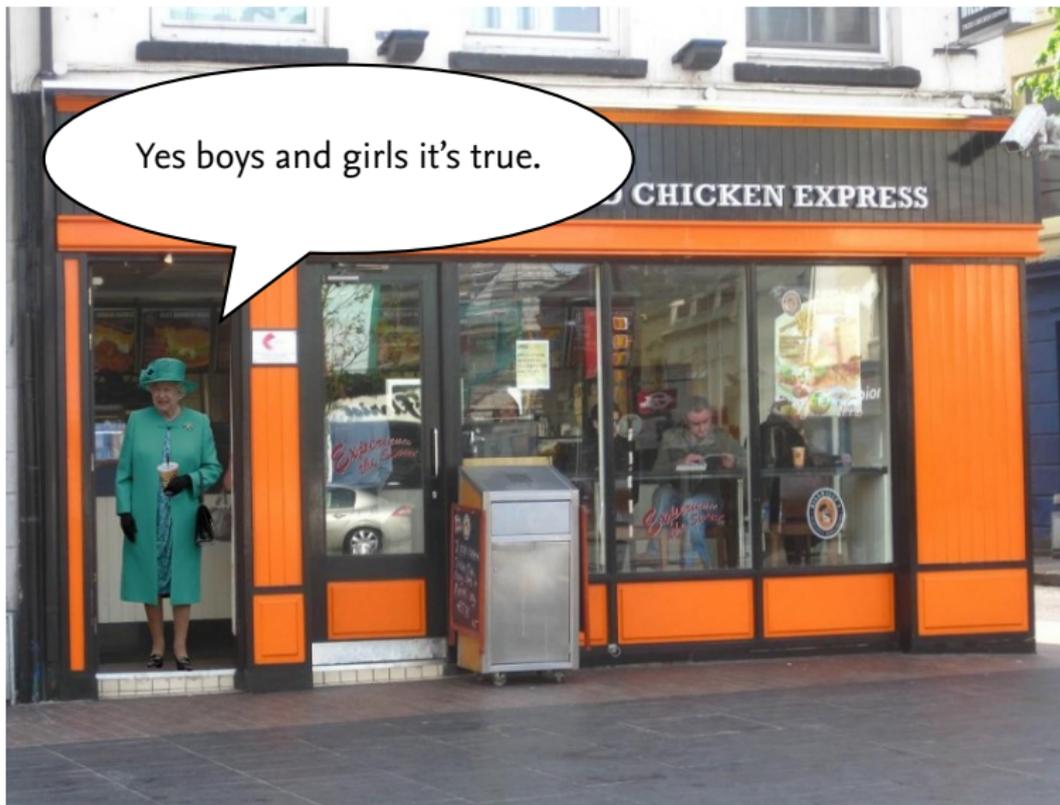
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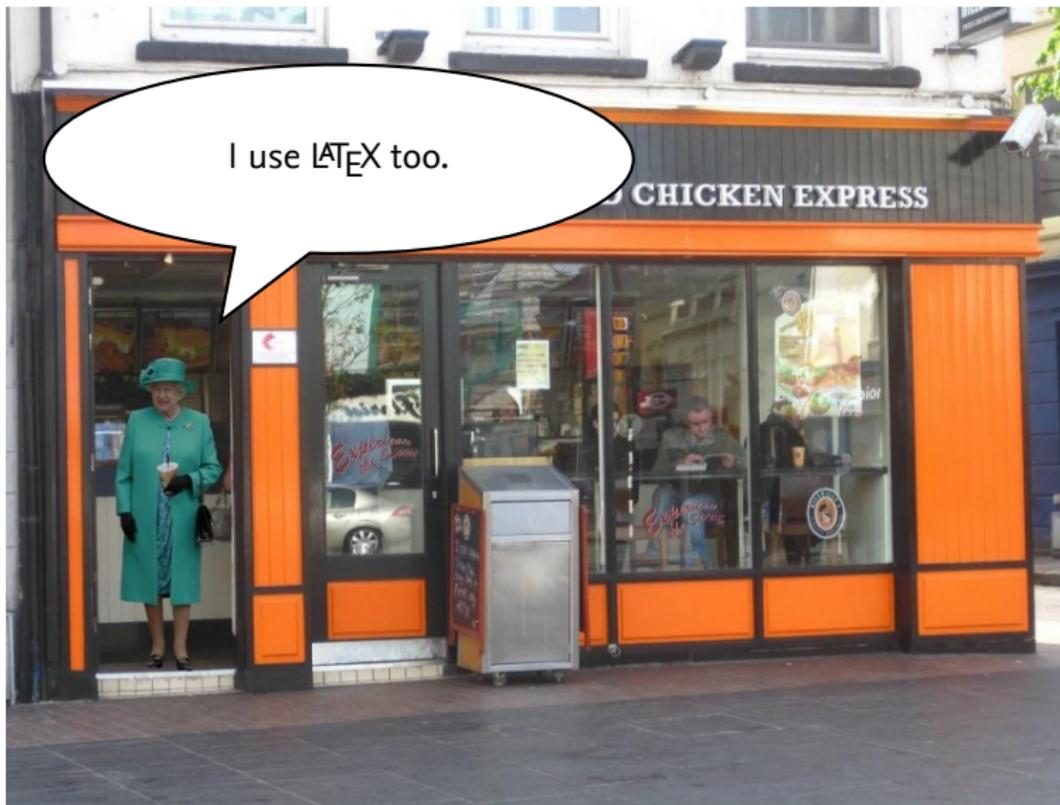
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Where's my hamper?

*Today is not
about fancy
writing.*

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 table of contents with `\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 visual presentation by selecting the right class options.
- ❑ Much, much, more.

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.

Pros

- ❑ 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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- ❑ L^AT_EX has comments.
- ❑ Can produce coffee stains on your papers.

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- ❑ L^AT_EX has comments.
- ❑ Can produce coffee stains on your papers.
- ❑ **Most importantly: L^AT_EX is fun!**

Background

- Written by Lamport as an extension of Knuth's $\text{T}_{\text{E}}\text{X}$.
- Turing-complete (procedural) markup language and typesetting processor.
 - They let you control visual presentation *and* content.

Modern Work Flow

- 1 You write your document in a \LaTeX (.tex) input (source) file.
- 2 You turn it into a *portable document format file* (.pdf).
- 3 You view the .pdf file on your computer.
- 4 You print the .pdf file.

Unix Session

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

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 dvi or pdf file.

Auxiliary Files

- ❑ \LaTeX uses several “aux” files for additional information.
- ❑ Auxiliary files may also be created by external programs.
- ❑ When an auxiliary file changes then \LaTeX 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

```
$ pdflatex 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}
  \subsection{The start.}
  \section{Conclusion}
  \subsection{The end.}
\end{document}
```

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L^AT_EX: \documentclass

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.}}
```

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About this Document

L^AT_EX: The document Environment

L^AT_EX Usage

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

L^AT_EX: The abstract Environment

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 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}
```

Optional Argument

LaTeX Usage

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

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 document and other sources of information:

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

Coarse Document Divisions

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}
```

The Appendix

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L^AT_EX Usage

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

Manage thy Source Files

- \LaTeX 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 Editor with hierarchical folds.

Files The \LaTeX way.

Folding Editor

Closed Fold

We prove the following amazing identity.

```
% A comment.
```

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

```
% Another comment.
```

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Folding Editor

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

LaTeX Input

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

LaTeX 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}
```

- 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: `<citation label> <bibliography content>`.
- 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 ‘`[<number>]`’ in text.
 - names and years Appear as ‘`[<name>, <year>]`’ in text.

...

Example

Citations in the Text

The \LaTeX package was created by Leslie Lamport [Lamport 1994] on top of Donald Knuth's \TeX program [Knuth 1990].

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Example

The Bibliography

[**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/>.

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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

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- 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.

Comparison

- 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.

Example

LaTeX Input

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

LaTeX Output

The LaTeX package was created by Leslie Lamport [Lamport 1994] on top of Donald Knuth's TeX 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].

- Traditionally, bibliographies were created with LaTeX and BibTeX (only).
- There are several problems with this approach.
 - The label/bibliography style is not so easy to change.
 - There's only one kind of citation command.
- Modern solutions are more flexible.
- I recommend you prepare your bibliographies with **biblatex**.

BIBTEX File

```
@Book{Lampport:94,  
  author   = {Lampport, 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.\,B.},  
  title    = {The Elements of Style},  
  publisher = {Macmillan Publishing},  
  year     = {1979},  
}
```

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BIBTEX Database Entry Types

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About this Document

@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.

....

biblatex

Using `bibtex` as Backend

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

Printing the Bibliography

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

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- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your L^AT_EX source file.
- 6 You run `bibtex` on the base name of your L^AT_EX document.
- 7 You run L^AT_EX twice.

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L^AT_EX Usage

```
\usepackage[backend=bibtex,<more options>]{biblatex}
```

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- 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 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your L^AT_EX source file.
- 6 You run `bibtex` on the base name of your L^AT_EX document.
- 7 You run L^AT_EX twice.

Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.

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Creating one Bibliography

Using `bibtex` as Backend

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

L^AT_EX Usage

```
...Donald Knuth's \TeX{} program \cite{Knuth:1990}.
```

- 4 Print the bibliography.
- 5 You run `latex` on your L^AT_EX source file.
- 6 You run `bibtex` on the base name of your L^AT_EX document.
- 7 You run L^AT_EX twice.

Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 **Print the bibliography.**
- 5 You run `latex` on your \LaTeX source file.
- 6 You run `bibtex` on the base name of your \LaTeX document.
- 7 You run \LaTeX twice.

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Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.

L^AT_EX Usage

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

- 5 You run `latex` on your L^AT_EX source file.
- 6 You run `bibtex` on the base name of your L^AT_EX document.
- 7 You run L^AT_EX twice.

Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.

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Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.

Unix Usage

```
$ pdflatex paper
```

- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.

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Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.

Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.

Unix Usage

```
$ bibtex paper
```

- 7 You run `LATEX` twice.

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Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.

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Creating one Bibliography

Using `bibtex` as Backend

- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.

Unix Usage

```
$ pdflatex paper; pdflatex paper
```

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- 1 Import `biblatex` with your favourite options.
- 2 Specify the names of your bibliography database(s).
- 3 Put in your citations.
- 4 Print the bibliography.
- 5 You run `latex` on your `LATEX` source file.
- 6 You run `bibtex` on the base name of your `LATEX` document.
- 7 You run `LATEX` twice.
- 8 You sit down, relax, and admire your bibliography.

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About this Document

biblatex

Has *Parenthetical* and *Textual* Citations

L^AT_EX Input

```
\textcite{Knuth:1990} describes \TeX.  
\TeX{} has four processors~\parencite{Knuth:1990}.
```

L^AT_EX Output

Knuth [1990] describes T_EX. T_EX has four processors [Knuth, 1990].

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About this Document

biblatex

Has Author and Year Commands

L^AT_EX Input

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

L^AT_EX Output

Knuth published T_EX in 1990.

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biblatex

Lets You Capitalise Von-Parts in Surnames

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}.
```

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Unix Usage

```
$ texdoc biblatex
```

Bibliographies at End of Chapter

Using `bibtex` as Backend

- 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.

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About this Document

- 1 Import `biblatex` with your favourite options.

L^AT_EX Usage

```
\usepackage[backend=bibtex,<more 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

Using `bibtex` as Backend

- 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.

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Using `bibtex` as Backend

- 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

Using `bibtex` as Backend

- 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.

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Bibliographies at End of Chapter

Using `bibtex` as Backend

- 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

Using `bibtex` as Backend

- 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.

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- 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.

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Using `bibtex` as Backend

- 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.

Unix Usage

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

- 6 You run \LaTeX twice.

Bibliographies at End of Chapter

Using `bibtex` as Backend

- 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.

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About this Document

- 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.
- 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 LaTeX, run BibTeX, and run LaTeX twice.

Classified Bibliographies

- 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.

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).

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.

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.

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 LaTeX, run BibTeX, and run LaTeX 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 LaTeX, run BibTeX, and run LaTeX twice.

Classified Bibliographies (Continued)

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L^AT_EX Usage

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

Classified Bibliographies (Continued)

B_IB_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)

B_IB_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]
```

Classified Bibliographies (...)

L^AT_EX Usage

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

L^AT_EX Usage

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

Reference Lists

L^AT_EX Usage

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

Creating Indexes and Glossaries

LaTeX Usage

```
% Multiple Indexes
\usepackage{multind}

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

LaTeX Output

Author Index

Knuth, 1
Lamport, 3

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

```
\index{<name>}{<entry>}
```

Creates index entry for <entry>.

```
\index{<name>}{<entry>!<subentry>}
```

Creates subentry.

```
\index{<name>}{<entry>!<subentry>!<subsubentry>}
```

Creates subsubentry.

```
\index{<name>}{<entry>|see{<other entry>}}
```

Creates a cross-reference.

```
\index{<name>}{<sorting entry>@{<printing entry>}}
```

Defines entry and how it should be sorted.

```
■ \index{<name>}{twenty@20};
```

```
■ \index{<name>}{twenty@xx};
```

```
■ \index{<name>}{beta@$\beta$}; or
```

```
■ \index{<name>}{command@&#x2113;{\textbackslash}command}}.
```

Example

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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	examples (
6	examples)
8	salami see{sausages}
8	boerewors see{sausages}
8	boereworst (Dutch) see{boerewors}

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LaTeX Output

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About this Document

- 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}
% Sender details.
\signature{Donal}
\address{Collect Cash\\Dublin}

\begin{document}
% Addressee. A double backslash generates a newline.
\begin{letter}{Donate Cash\\Cork}
  \opening{Dear Sir/Madam:}

  Please make a cash donation to our party.

  We look forward to the money.

  \closing{Yours Faithfully,}
  \ps{P.S. Send it now.}
  \encl{Empty brown envelope.}
  \cc{Paddy.}
\end{letter}
\end{document}
```

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.

Packages

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}
```

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 [Pantieri 2010]. It is based on `classicthesis`.
- `mathtools` Provides better typesetting of mathematical content [Høgholm et al. 2011].

Before We Start

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About this Document

Acronyms and Abbreviations

AMS	American Mathematical Society
API	Application Programming Interface
APL	A Programming Language
CTAN	Comprehensive TeX Archive Network
CD	Compact Disk
FAQ	Frequently Asked Question
GUI	Graphical User Interface
IDE	Integrated Development Environment
ISBN	International Standard Book Number
OS	Operating System
SI	Système International d'Unités/International System of Units
TUG	TeX Users Group
URL	Uniform Resource Locator
WYSIWYG	What You See Is What You Get

About this Document

- This document was created with pdf_lat_ex.
- The L^AT_EX document class is beamer.