

L^AT_EX Tips

Common Errors, How to Debug, and How to Correct

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Outline

- 1 Introduction
- 2 Compilation Errors
- 3 Bad Outputs
- 4 Summary

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- L^AT_EX: A Document Preparation System
 - Created by Leslie Lamport in early 1980s
 - Based on T_EX by Donald E. Knuth
 - Not word processor, not WYSIWYG, compilation
 - Free and open source (LPPL)
- Concepts and Terms
 - Document class: generic template (article, book, report)
 - Packages: add-ons (graphicx, listings)
 - Environment: `\begin{abstract}... \end{abstract}`
 - Command: `\section{Introduction}`
 - Engine: X_YT_EX, xelatex
 - Format: LaTeX, Plain TeX, ConTeXt

Separation of Presentation and Content

```
\documentclass{article}
% Preamble: style configurations
\usepackage{hyperref}
\hypersetup{breaklinks=false}
\begin{document}
% Content:
My masterpiece.
\end{document}
```

Chinese 中文支持

```
\documentclass [CJKchecksingel]{beamer}
\usepackage [UTF8,nofonts]{ctex}
\renewcommand\familydefault{\sfdefault}

\setCJKmainfont [BoldFont={WenQuanYi Micro Hei},
ItalicFont={AR PL UKai CN}]{AR PL UMinG CN}
\setCJKsansfont{WenQuanYi Micro Hei}
\setCJKmonofont{WenQuanYi Micro Hei Mono}

\setCJKfamilyfont{zhsong}{AR PL UMinG CN}
\setCJKfamilyfont{zhhei}{WenQuanYi Zen Hei}
\setCJKfamilyfont{zhkai}{AR PL UKai CN}
```



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Log is your friend.

- Log

- On screen & in `.log` file
- engine/document class/package version
- Error messages

```
! Undefined control sequence.  
1.3 \secton  
           {Start}  
?
```

- Interactive: `?`, `H`, `X`, `I`

- ! Undefined control sequence.
 - Typo
 - Forget to `\usepackage{...}`
 - Misremember the command
- ! Double subscript.
 - `a_b_c` → `a_{b_c}` or `a_{bc}`
- ! Extra alignment tab has been changed to `\cr`.
 - Write too many `&s`
 - Forget add trailing `\\`
- !TeX capacity exceeded, sorry [...].
 - Recursive macro definition
 - Tune memory setting

- Command ... already defined
 - `\newcommand` → `\renewcommand`
- Unknown graphics extension ... or Cannot determine size of graphic in ... (no BoundingBox).
 - Use EPS figure with pdfT_EX without automatic epstopdf support
 - Bad EPS figure generated by some tools
- There's no line here to end.
 - Extra `\\` or `\newline` → `\vspace`

- Overfull/Underfull `\hbox/\vbox`
 - Unreasonable use of `\newline`
 - Not for new paragraph. Use blank lines instead.
 - Not commonly used for newline in paragraph. Let T_EX hyphen (`\-`, `\hyphenation`).
 - Adjust content
 - Use floating env for figures/tables
 - Insert `\newpage` to tune manually

- Citation/Reference ``...'` on page ... undefined.
 - Normal if compilation is not final
 - Error otherwise
- Label ``...'` multiply defined.
 - Fix label definition.

More Debugging Tips

- Complex document: bisect
 - `\includeonly`
 - Post-amble
 - Block comment or `comment` from `verbatim`
- Show definition
 - `\show`
 - `show2e`

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Be careful with punctuations.

- Quotation: `` `` and `' '`
- Period:
 - `Dr.~Zhou`
 - `Li et al.\ proposed ...`
 - `... GNOME\@. New ...`
- Dash: `-`, `--`, and `---`
- Serial comma: `... foo, bar, and baz ...`

- Positioning
 - `[!h]`, `[H]` → `[hbtpt]`
- Bitmap figures
 - The whole figure file will be swallowed in the PDF.
 - DPI mismatch leads to blurring.
 - Solutions [2, 3, 4]:
 - Line drawings: **vector graphics**, high dpi PNG
 - Photos: (high resolution) JPEG should be OK
 - Screenshots: zoom in first

More Figure Tips

- Specify figure/table/minipage size
 - Prefer relative length to absolute length.
 - Prefer `.45\textwidth` to `2in`, `3cm`.
 - `\textheight`, `\paperheight`, `\paperwidth`
- Subfigures
 - Prefer subcaption package.
 - Use subfig with IEEEtran articles.
 - Do not use deprecated subfigure package.

Math Formulas

- Non-variables should **not** be *italic*:
 - `R_{\max}` R_{\max}
 - `\text{SINR}` SINR
 - `\mathrm{e}^{\mathrm{i}\pi}+1=0` $e^{i\pi} + 1 = 0$
- Proper bracket size: `\left(\sum ... \right)`

Long Math Formulas

- Define intermediate variables/functions to rephrase.
- Divide it into multiple lines.
 - Environments: `multiline`, `split`, `array`
 - Match bracket size: `\vphantom`
 - Details: `mathmode` documentation

Write numbers with units.

- `siunitx` package:
 - `\SI{9.8}{m/s^2}` 9.8 m/s²
 - `\SI{6.02e-23}{mol^{-1}}` 6.02 × 10⁻²³ mol⁻¹
- If `siunitx` is not possible:
 - Write 5~km, not 5km.

Common Bib Errors [6]

- Author names: Owens, J.D. John D. Owens

- Title case of title, booktitle

```
booktitle = {Proceedings of the second workshop  
on Software radio implementation forum},
```

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- Booktitle word order

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Common Bib Errors Continued

- Month, pages

```
month={june},  
pages={195 -200},
```

```
month=jun,  
pages={195--200},
```

- DOI, URL

```
url = {http://doi.acm.org/10.1145/1964179.1964185}  
doi = {http://doi.acm.org/10.1145/1964179.1964185}  
  
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- Auto fix: FixBib for Greasemonkey

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Citation

- Use tie (tilde, nbsp): `Text goes~\cite{texbook}`.
- Cite multiple references: `\cite{ref1,ref2,ref3}`
- Citations are **not** text words: `in [1]` →
`in Author Foo's work [1]`

How many times to run?

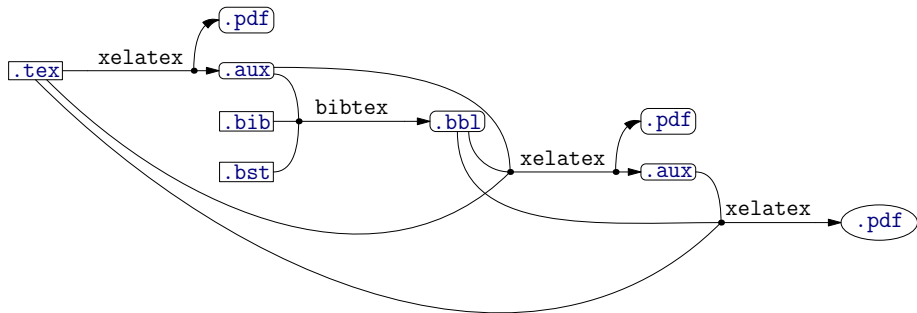


Figure: BibTeX compilation process.

- Automatic compilation:
 - `latexmk`, `texify`
 - Makefile

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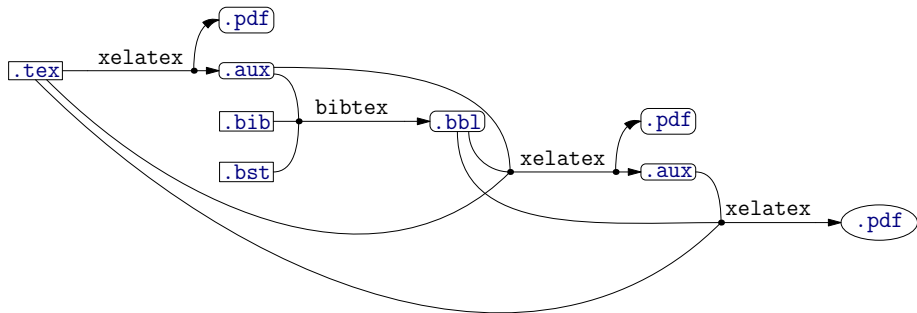


Figure: BibTeX compilation process.

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Fonts in Slides

- Font family [7]: serif or sans-serif?
 - Sans is preferred today.
 - Serif may be used in conservative scenario.
 - Math texts might be better in serif.

```
\usefonttheme[onlymath]{serif}
```

- Prefer colored to italic texts.
 - `\alert{dangerous}` *dangerous*
 - `\emph{dangerous}` *dangerous*

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Slides with Code Snippets

- `\verb+Lorem Ipsum+, verbatim`
- `\lstinline+Lorem Ipsum+, lstlisting`
- Fragile frames
- `\begin{frame}[fragile] ... \end{frame}`


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Summary

- Log is your friend while debugging.
- Details matter for aesthetic and high quality documents.
- Some work is tedious. Try to automate it!

More readings. I

 刘海洋. \LaTeX 入门. 电子工业出版社, 2013.

 Klaus Höppner. “Strategies for including graphics in \LaTeX documents”. In: *TUGboat* 26.1 (2005). A talk at the Practical \TeX 2005 Conference., pp. 59–62. URL:
<http://www.tug.org/TUGboat/tb26-1/hoeppler.pdf>.

 URL:
<http://tex.stackexchange.com/questions/1162/included-png-appears-blurry-in-pdf>.

More readings. II



URL:

<http://tex.stackexchange.com/questions/10975/my-pixel-perfect-picture-gets-blurry-when-compiled-in-latex>.



John Owens. *Common Errors in Technical Writing*. URL:

<http://www.ece.ucdavis.edu/~jowens/commonerrors.html>.



John Owens. *Common Errors in Bibliographies*. URL:

<http://www.ece.ucdavis.edu/~jowens/biberrors.html>.



Till Tantau, Joseph Wright, and Vedran Miletić. *The BEAMER class User Guide for version 3.30*. English translation of the original German version. Available by the command `texdoc beamer`. URL:

<http://www.ctan.org/tex-archive/info/l2tabu/english>



More readings. III



William Strunk Jr. *The Elements of Style*. First. URL:
<http://www.bartleby.com/br/141.html>.

- Where to ask?
 - <http://tex.stackexchange.com>
 - <http://www.latex-community.org/>
- How to ask?
 - Describe your environment, setup
 - Minimal Working Example (MWE)

Join

- ThuThesis: <https://github.com/xueruini/thuthesis>
- TUNA: <http://tuna.tsinghua.edu.cn/>
- Fedora: <http://fedoraproject.org/join-fedora>

