

# L<sup>A</sup>T<sub>E</sub>X Tips

## Common Errors, How to Debug, and How to Correct

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# Outline

- 1 Introduction
- 2 Compilation Errors
- 3 Bad Outputs
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- L<sup>A</sup>T<sub>E</sub>X: A Document Preparation System
  - Created by Leslie Lamport in early 1980s
  - Based on T<sub>E</sub>X 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<sub>Y</sub>T<sub>E</sub>X, 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 [CJKchecksingle]{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`



# TeX Errors

- ! 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<sub>E</sub>X 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<sub>E</sub>X 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: `multline`, `split`, `array`
  - Match bracket size: `\vphantom`
  - Details: `mathmode` documentation

# Write numbers with units.

- `siunitx` package:
  - `\SI{9.8}{m/s^2}` 9.8 m/s<sup>2</sup>
  - `\SI{6.02e-23}{mol^{-1}}` 6.02 × 10<sup>-23</sup> mol<sup>-1</sup>
- 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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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}  
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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?

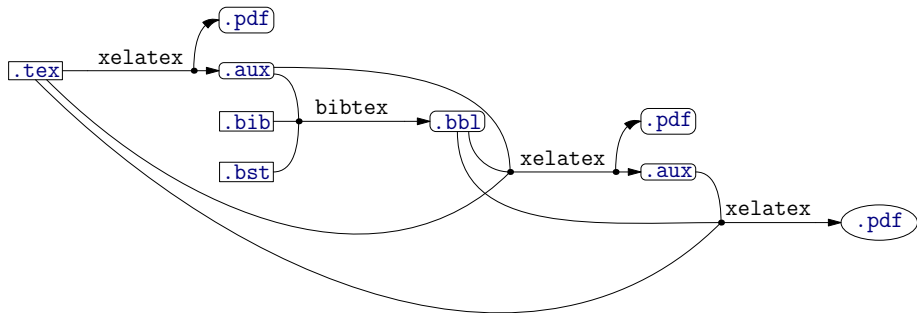


Figure: BibTeX compilation process.

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

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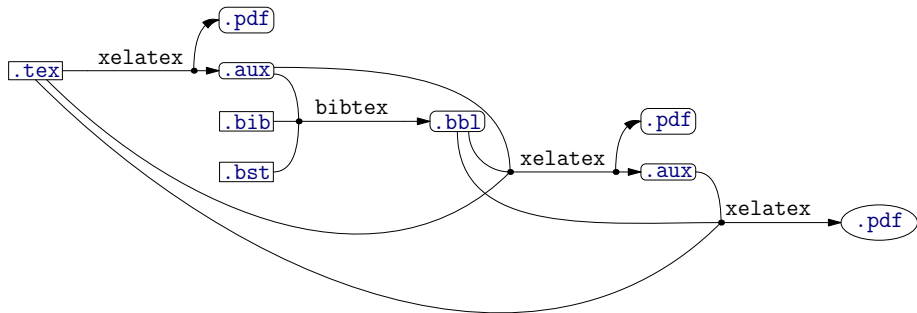


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# Fonts in Slides

- 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 Lipsum+, verbatim`
- `\lstinline+Lorem Lipsum+, 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. *L<sup>A</sup>T<sub>E</sub>X* 入门. 电子工业出版社, 2013.

 Klaus Höppner. “Strategies for including graphics in *L<sup>A</sup>T<sub>E</sub>X* documents”. In: *TUGboat* 26.1 (2005). A talk at the Practical T<sub>E</sub>X 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>

