Document Preparation with LaTeX

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Outline

- Basic elements of document preparation
- The LaTeX approach to document preparation
- Basic concepts of LaTeX
- Bibliography, pictures, and slides

Document Preparation

- Typesetting = Text (To Be Typeset) + Typesetting Commands
- Document Structure : Position, size, shape of entities etc.
  - Visual Structure : Governed by visual aesthetics
  - Logical Structure : Governed by the meaning (List, Table, Chapter, Section, etc.)

WYSIWYG Preparation

- What You See Is What You Get (E.g. MS Word.)
- Interactive : Interleaved typing and typesetting.
  - As you type the text, the resulting formatting is shown immediately and automatically.
  - Visual structure is more prominent.

Non-WYSIWYG Preparation

- Execution of formatting commands separate from keying in the text.

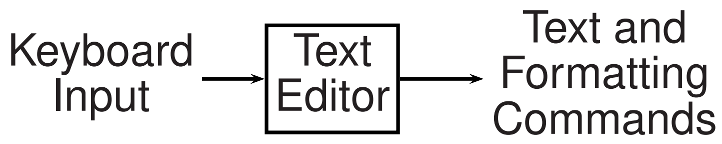
  E.g. LaTeX.

- Multi-step batch mode process
  - Type the text
  - Execute the formatting commands
  - View the resulting document

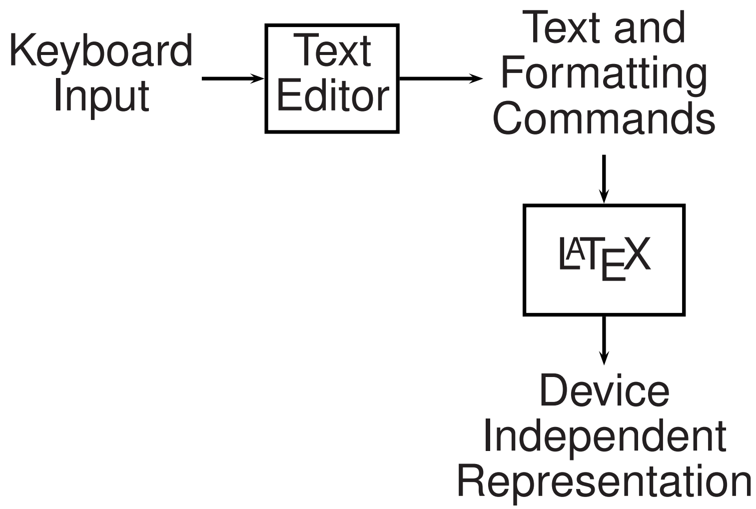
- Visual structure de-emphasized :

  Can't see immediately and automatically.

Document Preparation with LaTeX



Document Preparation with LaTeX



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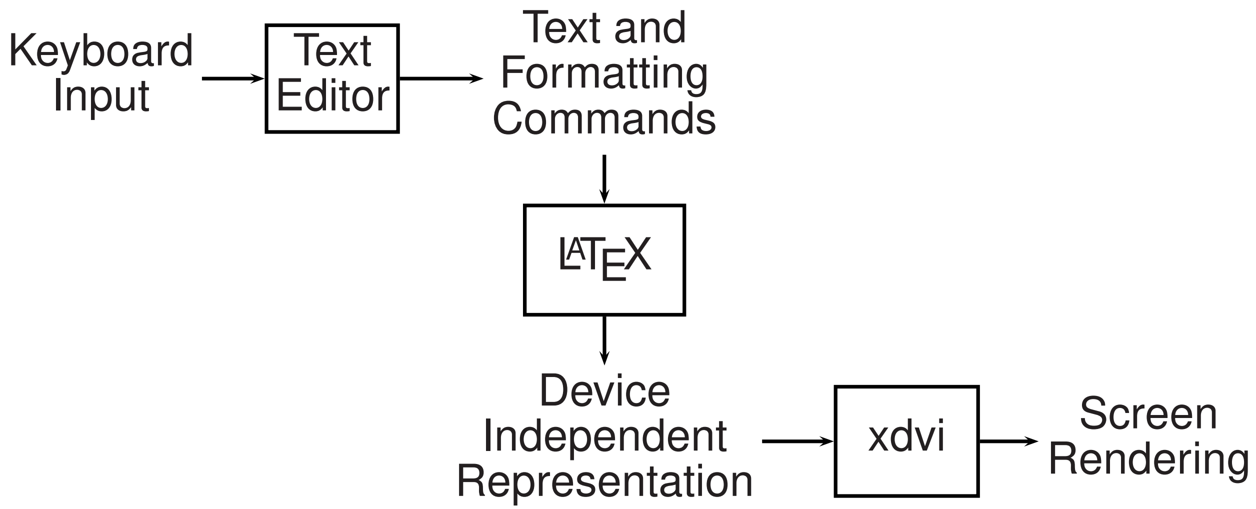

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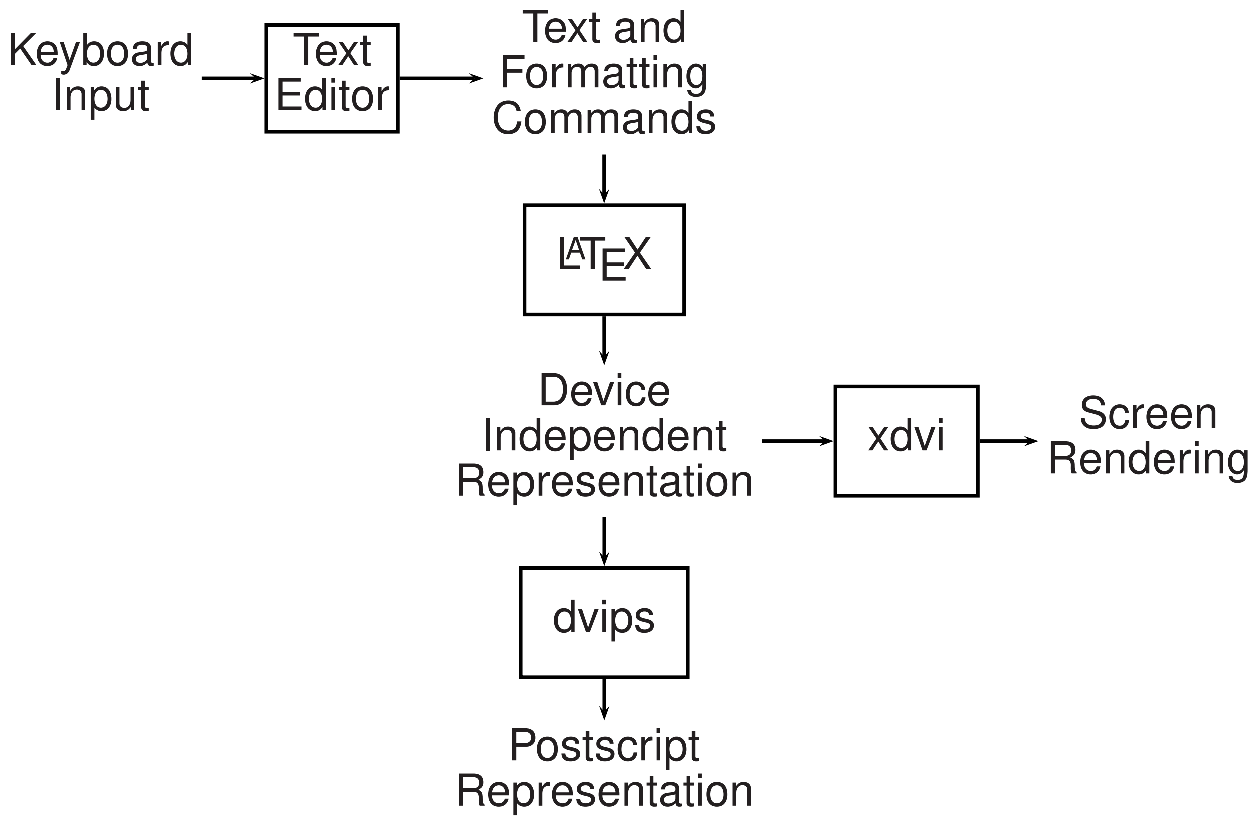

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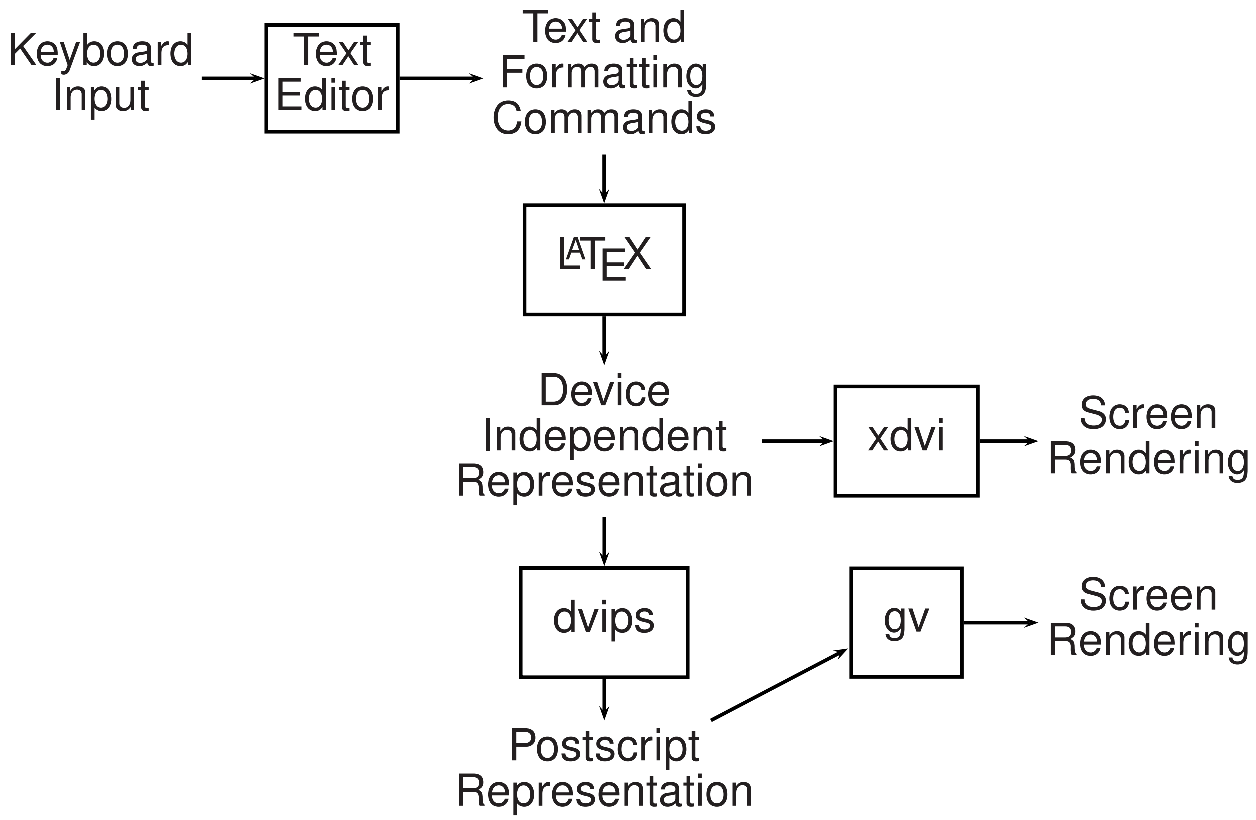

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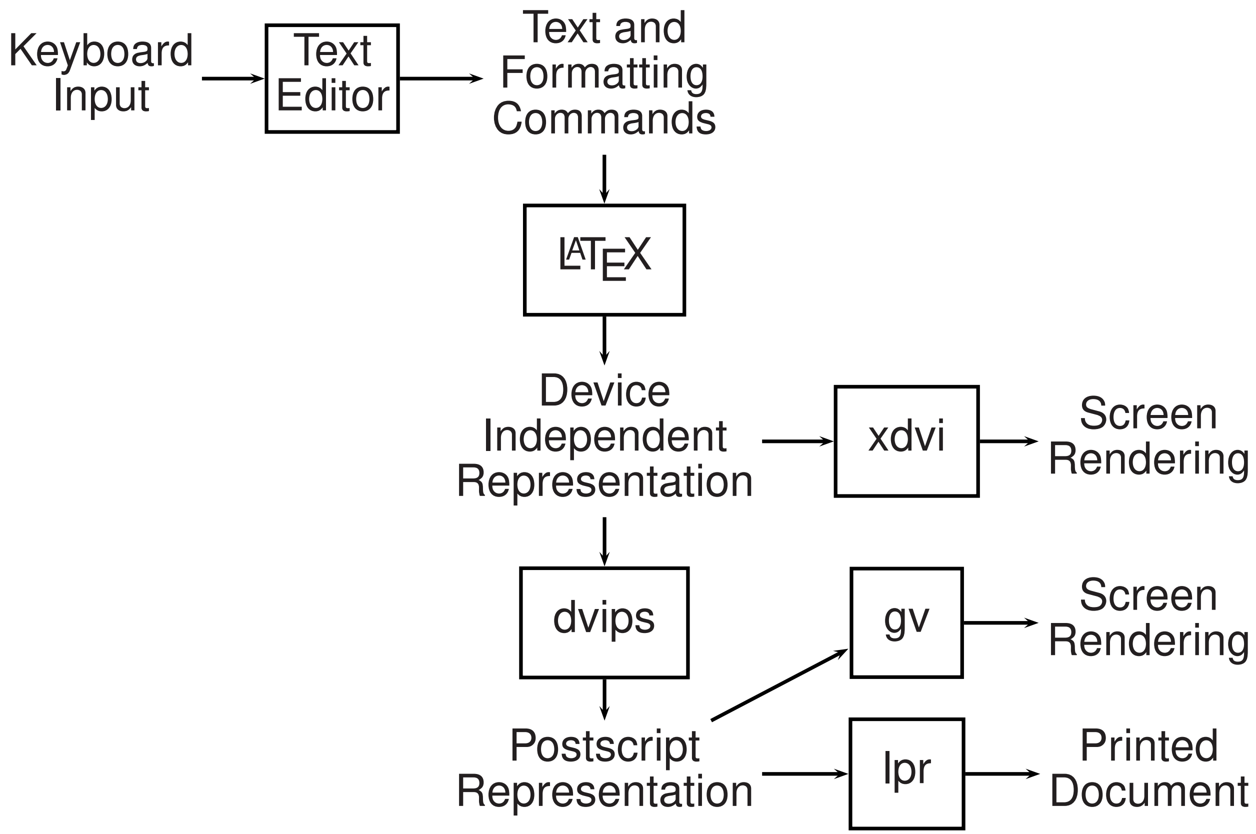

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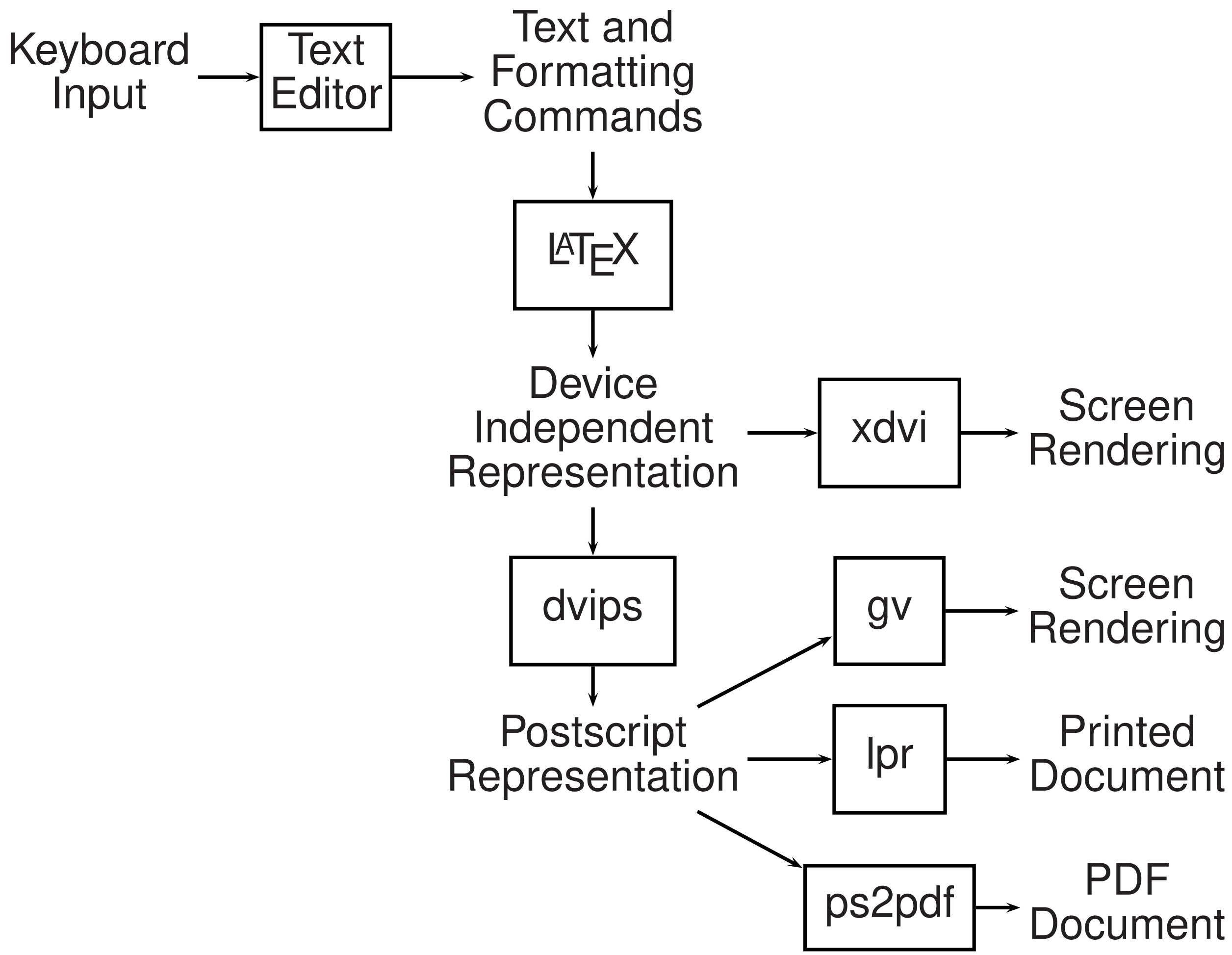

Using LaTeX

- Create **`file.tex`**
- "**`latex file.tex`**" produces **`file.dvi`**
- "**`dvips -o file.ps file`**" produces **`file.ps`**
- Can be viewed using "**`gv file.ps`**"
- Practical tips for Linux users
  - Use of makefile, simultaneous editing and background viewing.
  - Almost interactive

Types of Formatting Commands

- Environment : Contains text to be typeset with a specific logical structure.

  Figures, tables, lists, equations, etc.

- Command : Produces some text in a specific way

  Section headings, footnotes etc.

- Declaration : Customizes the formatting of the text in the scope

Environments

- Environments explicate a logical structure

  Figures, tables, lists, equations, etc.

  - Names : **`document, itemize, tabular, table, figure, ...`**
  - Scope : **`begin`**{env } ... **`end`**{env }

  Example **`begin`**{**`document`**} `...` **`end`**{**`document`**}

Commands

- Commands carry out a certain formatting

  (May have side effects)

  - `\chapter{Introduction}`
    Begins a new page.
    Changes the numbering of sections, figures, equations etc.
  - `\foilhead{Commands}`
  - `\textbf{Text to be typeset in bold face}`
  - `\texttt{Text to be typeset in typewrite font}`
  - `\footnote{Text to be typeset as a footnote}`

Types of Formatting Commands

- Declarations
  - Customization of fonts, shape, thickness, numbering, etc.

    `\tt` indicates `typewriter` font

    `\bf` indicates **boldface** letter

    `\em` indicates *emphasized* letters
  - Scope

    Delimited by "{" and "}", "`\begin`" and "`\end`" pairs, or . . .

LaTeX: Basic Concepts

- Document Classes (`article, report, book` etc)
- Use of packages
- Fonts and Colors
- Sectioning: Chapters, sections, appendix etc
- Lists and enumerations

LaTeX: Basic Concepts

- Paragraphs
- Formatting of Math formulae
- Tables and Figures
- Page formatting
- Footnotes

LaTeX: Basic Concepts

- Multiple input files
- Defining new commands
- Importing files
- Citations and references

LaTeX: Advanced Concepts

- Formatting programs/algorithms
- Bibtex
- Pictures
- Slides

Formatting Programs

- Default option : environment `tabbing`. Very crude.
- Package `program` from CTAN.

  Optimised for Pascal kind of programs. No control over indentation.
- My recommendation : `flexiprogram` package from

  `http://www.cse.iitb.ac.in/uday/latex`.
  - Allows indentation to be specified.
  - Designed for delimeters “{” and “}”. Can be customised for other delimeters.
  - Allows line numbers from any (positive) integer.

Using Bibtex

- Separate bibliography database
- Selecive inclusion of entries
- Various types of entries
  - books, papers in journals, papers in proceedings, theses, etc.
  - attributes like author, title, publisher, volume, issue, year etc.

Using Bibtex

- "**`latex file.tex`**" produces **`file.dvi`** and **`file.aux`**
- "**`bibtex file`**" reads **`file.aux`** and **`references.bib`**

  Produces **`file.bbl`**
- "**`latex file.tex`**" includes **`file.bbl`** and assigns numbers/names to references and writes them into **`file.aux`**
- "**`latex file.tex`**" reads numbers/names from **`file.aux`** and inserts them in the place of \cite commands and produces **`file.dvi`**

Preparing Pictures

- LaTeX environment **`picture`**
- Use of **xfig**

  The resulting picture can be included using **`epsfig`**
- Personal recommendation : Package **`pstricks`**

Preparing Pictures using `pstricks`

- Environment **`pspicture`**
- Line and curve drawings
- Frames, circles, ovals,
- Nodes and Node connectors

  Relative to the placement of nodes
- Labeling node connectors

The Power of `pstricks`

- Logical components of pictures and relationships bewtween them.
  - **`xfig`** does not recognise node-connectors.
    $\Rightarrow$ If you move a node, a node connector does not move with it.
  - **`dia`** recognises node-connectors but not the relationship between nodes.
    $\Rightarrow$ A node connector moves with a node but positioning of two nodes remains independent.
- Very good quality of pictures.

Adding to the Power of `pstricks`

- A limitation of **`pstricks`**

  Absolute coordinates have to be calculated by the user.

- Solution : package **`pst-rel-points`** available at

  `http://www.cse.iitb.ac.in/uday/latex`.

  - Defines declaration

    `psrelpoint`{Point 1 name }{Point 2 name }{ΔX }{ΔY }
  - Defines commands

    `x`{name of a point } and **`y`**{name of a point }

Preparing Slides

- Slitex : Didn't like the effect
- Document class seminar : Not experimented with
- **`pdflatex`** : Accepts (specific) kind of latex specification and produces **`pdf`** files.

  What about pictures ?
- Personal recommendation : Document class **`foils`**

  Need a better proof?

Preparing Slides Using **`foils`**

- A customised version (used for these slides) available at package **`custom-foils`**

  `http://www.cse.iitb.ac.in/uday/latex`.

- Basic Command in class **`foils`**

  `foilhead`{ Heading of the slide }

Package `custom-foils`

- Customises the command `\foilhead` and defines `\titlefoil`

- Provides the following declarations
  - `\speaker{...}`
  - `\email{...}`
  - `\abbvspeaker{...}`
  - `\monthandyear{...}`
  - `\forum{...}`
  - `\affiliation{...}`
  - `\subject{...}{...}`
  - `\markcopyright{...}`

Resources

- LaTeX User's Guide and Reference Manual : Leslie Lamport
- The LaTeX Companion : Goosens, Mittelbach, and Samarin
- The LaTeX Graphics Companion : Goosens, Rahtz, and Mittelbach
- The Comprehensive TeX Archive Network (CTAN) : Internet
- Almost all packages available in common Linux distributions
- Example files, slides, additional packages used in today's lecture :
  `http://www.cse.iitb.ac.in/uday/latex`