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# Typesetting with T<sub>E</sub>X / L<sup>A</sup>T<sub>E</sub>X

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## Part VII: Useful Things...

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# Overview

- Part I: basic components and essential  $\text{\LaTeX}$
- Part II: formatting and layout
- Part III: figures and tables
- Part IV: basic mathematics and  $\text{AMS}\text{\LaTeX}$
- Part V:  $\text{PDF}\text{\LaTeX}$  and slides
- Part VI:  $\text{BIB}\text{\TeX}$  and  $\text{MakeIndex}$
- **Part VII**: useful things...

# T<sub>E</sub>X Directory Structure

- TDS is a standard for organising T<sub>E</sub>X files
- All positions relative to a root directory TEXMF
  - Usually `/usr/share/texmf`, `/usr/local/share/texmf` or `/opt/texmf`
- Basic structure under TEXMF:  
`<program>/package/...`
- Under Un\*x a command to find files, directories, etc. exists:

```
> kpsewhich package.sty
> kpsewhich class.cls
> kpsewhich -expand-var='$TEXMF'
```

  - See man-page or use `--help` argument

# Main TDS Directories

## ➤ Packages and classes stored under:

- `TEXMF/tex/FORMAT/PACKAGE/`
- e.g. `TEXMF/tex/latex/base/`,  
`TEXMF/tex/latex/graphics/`, ...

## ➤ Documentation files stored under:

- `TEXMF/doc/FORMAT/PACKAGE`
- e.g. `TEXMF/doc/latex/base/`,  
`TEXMF/doc/help/`, ...

## ➤ Other top-level directories:

- `fonts`, `metafont`, `bibtex`, `metapost`, `source`

# T<sub>E</sub>X Package Documentation

- T<sub>E</sub>X packages (classes, styles, etc.) usually come in a source file format (.dtx)
- Source files are a mixture of documentation and T<sub>E</sub>X sources
- For package, class files, etc. documentation is stripped from sources
- To get the actual documentation run latex on .dtx file:  

```
> latex graphics.dtx
```
- Sources may be installed under  
TEXMF/source/**FORMAT**/**PACKAGE**  
(at similar place than stripped file under TEXMF/tex)
- Note, sources may contain more than one package file

# Defining New Commands (T<sub>E</sub>X)

➤ T<sub>E</sub>X macros can be changed or new ones can be defined

➤ T<sub>E</sub>X syntax for changing commands:

```
\def#1#2{Definition}
```

● #1, etc. specifies list of arguments

➤ Some examples:

```
\def\myname{F.~C.~Langbein}  
\def\heading#1{\textbf{\large #1}}
```

➤ This is the T<sub>E</sub>X way of defining macros!

# Defining New Commands ( $\text{\LaTeX}$ )

- To define a new macro under  $\text{\LaTeX}$  use:

```
\newcommand{\NAME} [narg] {\MACRO}
```

- Example:

```
\newcommand{\xvec} [1] {\ensuremath{\#1_1, \ldots, \#1_n}}
```

- Defines new  $\text{\xvec}$  command:

```
 $\text{\xvec}\{x\}$  and  $\text{\xvec}\{y\}$ 
```

$x_1, \dots, x_n$  and  $y_1, \dots, y_n$

- To redefine a macro using  $\text{\LaTeX}$  style:

```
\renewcommand{\NAME} [narg] {\MACRO}
```

- Under  $\text{\LaTeX}$  this is the proper way to redefining commands, but note that  $\text{\def}$  also works (if you are not a purist)

# Redefining Macros

- You may redefine macros provided by classes and packages
- For simple modifications:
  - Find the definition in the class/package files and rewrite it
  - It is often sufficient to get the basic idea of the command in order to make a simple adjustment
- Redefinition has to be after original definition (after the package inclusion)
- Sometimes this may mean you have to redefine a command with the @ character in it
  - `\makeatletter` makes @ a useable letter character for macro names
  - `\makeatother` switches @ back to an “other” character



# Redefining \section

➤ In `article.cls` you find the definition:

```
\newcommand\section{\@startsection {section}{1}{\z@}%  
  {-3.5ex \@plus -1ex \@minus -.2ex}%  
  {2.3ex \@plus.2ex}%  
  {\normalfont\Large\bfseries}}
```

➤ `\@startsection` is the basic macro for creating sections

➤ For small-caps section:

```
\makeatletter  
\newcommand\section{\@startsection {section}{1}{\z@}%  
  {-2.5ex \@plus -1ex \@minus -.2ex}%  
  {1.3ex \@plus.2ex}%  
  {\normalfont\Large\bfseries\scshape}}  
\makeatother
```



# More on Defining Macros

- For more on defining macros and T<sub>E</sub>X internals start with reading **The T<sub>E</sub>Xbook** by D. Knuth
- Also read the sources and package/class files...