Introduction to LaTeX

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Outline

- What is LaTeX
- How does a LaTeX file looks like
- Documentstyles
- Format helps
- Tables
- Program listings
- Letters
- Mathematics
- Bibliography
- Graphics (Postscript)

What is LaTeX

WYSIWIG

What You See Is What You Get, (Framemaker)

WYTIWYG

What You Type Is What You Get, (LaTeX)

WYDEIWYG

What You Don't Expect is What You Get, (LaTeX)

- command driven
- based on TeX.
- nearly all what you have done in TeXyou can still do in LaTeX

A sample LaTeX file

```
% EVERYTHING TO THE RIGHT OF A  % IS IGNORED

\documentstyle[11pt]{article}
\begin{document}

\section{Simple Text}

Spaces    are ignored.
More than 2 empty lines are ignored.

Double quotes: ``quoted text''.

Single quotes: `single-quoted text'.

Long dashes: ---

Italic : {\em this is italic text}.

Bold   : {\bf this is  bold  text}.

 \$  \&  \#  \%  \_  \{   \}.
\end{document}
```

A sample LaTeX file, output

1 Simple Text

Spaces are ignored. More than 2 empty lines are ignored.

Double quotes: “quoted text”.

Single quotes: ‘single-quoted text’.

Long dashes: —

Italic : *this is italic text.*

Bold : **this is bold text**.

$ & # % _ { }.

LaTeX commands

- begin with '\'
- watch out for upper- and lower-case letters
- switch commands: e.g. `\em`.
  '`{\em`' turns switch on,
  '`}`' turns it off.
- argument commands

  ```
  \command{text}
  ```

  e.g. `\section`

Format Helps

Quotations

```
Keep in mind always the two constant Laws of
Frisbee:
\begin{quote}
The most powerful force in the world is that of
a disc straining to land under a car, just out
 of reach (this force is technically termed
``car suck'').

Never precede any maneuver by a comment more
predictive than ``Watch this!''
\end{quote}
```

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>
> Never precede any maneuver by a comment more predictive than “Watch this!”

Centering and Flushing

```
\begin{flushleft}
one two  three \\
four \\
five
\end{flushleft}
```

one two three
four
five

```
\begin{center}
one two three \\ four \\ five
\end{center}
```

one two three
four
five

```
\begin{flushright}
one two three \\ four \\ five
\end{flushright}
```

one two three
four
five

Lists

`itemize`

, `enumerate`, `description`

```
\begin{itemize}
\item Itemized lists are very usefull.
\item However, don't forget
  \begin{enumerate}
  \item The `item' command.
  \item The `end' command.
  \end{enumerate}
\end{itemize}
```

- Itemized lists are very usefull.
- However, don't forget
    1. The 'item' command.
    2. The 'end' command.

Description

```
Two animals that you should
know about are:
\begin{description}
  \item[swift] dark colored bird of the family
  Apodipae,   chracteristically having long,
  narrow wings and a short
  tail.
  \item[owl] often nocturnal birds of prey
  of the order Strigiformes, ...
\end{description}
```

Two animals that you should know about are:

swift dark colored bird of the family Apodipae, chracteristically having long, narrow wings and a short tail.

owl often nocturnal birds of prey of the order Strigiformes, ...

Tables

tables difficult

```
Income   Expenditure Result    \\
20s 0d   19s 11d     happiness \\
20s 0d   20s 1d      misery   \\
```

Income Expenditure Result
20s 0d 19s 11d happiness
20s 0d 20s 1d misery

`tabbing`

, set `\=`, `\>` move `\\` newline, `\kill` no output

Tabbing

```
\begin{tabbing}
Income \=Expenditure \=    \kill
Income \>Expenditure \>Result \\
20s 0d \>19s 11d \>Happiness   \\
20s 0d \>20s 1d  \>Misery    \\
\end{tabbing}
```

Income	Expenditure	Result
20s 0d	19s 11d	Happiness
20s 0d	20s 1d	Misery

```
\begin{tabular}{|l||c|c|}
\hline
Income & Expenditure & Result \\
\hline
\hline
20s 0d & 19s 11d & Happiness   \\
20s 0d & 20s 1d  & Misery    \\
\hline
\end{tabular}
```

Income	Expenditure	Result
20s 0d	19s 11d	Happiness
20s 0d	20s 1d	Misery

Verbatim Output

e.g. include computer program.

```
The section of program in
question is:
\begin{verbatim}
{ this finds %a & %b }

for (i=0; i<10; i++){
  xyz[i] = f(i);
  process(i);
}
\end{verbatim}
```

```
{ this finds %a & %b }

for (i=1; i < 100; i++){
   xyz[i] = f(i);
   process(i);
}
```

Format

Type Styles

`\rm`	Roman	`\it`	*Italic*	`\sc`	SMALL CAPS
`\em`	*Emphatic*	`\sl`	*Slanted*	`\tt`	`Typewriter`
`\bf`	**Boldface**	`\sf`	Sans Serif		

Font Size

`\tiny`	`\small`	`\large`	`\huge`
`\scriptsize`	`\normalsize`	`\Large`	`\Huge`
`\footnotesize`		`\LARGE`	

Sectioning

```
\chapter                           - index only in book
   \section                        - index
      \subsection                  - index
         \subsubsection            - index
            \paragraph
               \subparagraph
```

```
\tableofcontents
```

Title

```
\begin{document}
\title{required title}
\author{required author}
\date{required date}
\maketitle
```

```
\title{Step through \LaTeX~}
\author{D. Duck \and A.N. Other}
\date{14th November 1991}
\maketitle
```

Step trough $\LaTeX$

D. Duck   A.N. Other

14th November 1991

Letters

```
\documentstyle{letter}
\begin{document}

\address{Skyhall II, Room 324 \\
         Lambreth Ln.\\
         Syracuse, NY 13210}
\signature{Gregor von Laszewski\\
           Diplom Informatiker}

\begin{letter}{Computer Company \\
               4711 Cologne Street \\
               Cologne, FRG}

\opening{Dear Bill,}

I'm happy to ..

\closing{Best Regards,}
\cc{CIA\\ BND}
\end{letter}
\end{document}
```

Environment

set HOME = ...

```
set path = ( .... \
             /usr/local/bin \
            .... )



set TEXINPUTS  = (.\
                  $HOME/tex \
                 /usr/local/lib/tex/macros \
                 /usr/local/lib/tex/inputs )

#set TEXFONTS =  (~gregor/tex/lib/fonts \
#                 ~gregor/tex/lib/fonts/TFM )
```

call latex: latex filename.tex
call previewed: xdvi filename
call to postscript: dvi2ps filename -o filename.ps
view postscript files: ghostview filename.ps
view postscript files: pageview filename.ps
print : lpr filename.ps
save pages use: `\documentsyle[twocolumn]{article}`
others:
Window dump: xwd
2d,3d Graphics: gnuplot, xvgr

Figures

```
\include{psfig}

\begin{document}
 ...
\begin{figure}[htb]
     \centerline{\psfig{figure=Picture.idr,
                        width=3in}}
     \caption{This  is a Figure}
     \label{F:smiley}
\end{figure}

The figure~\ref{F:smiley} points out that ...
```

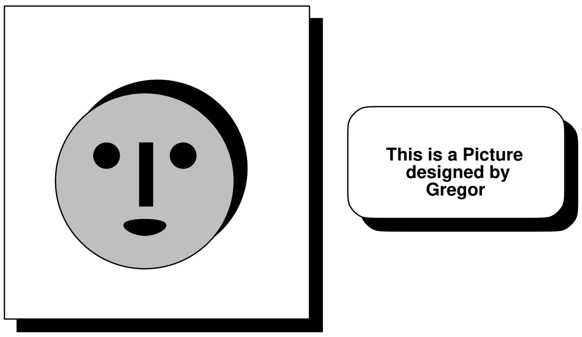

Figure 1: This is a Figure

The figure 1 points out that ...

Figures

```
 \begin{figure} [htb]
  \vspace*{4cm}
  \special {psfile=postscript_picture.ps
            vscale=.5 hscale=.5
            hoffset=0 voffset=0}
  \caption{This is a PS figure}
  \label{F:psfigure}
\end{figure}


The figure~\ref{F:psfigure} shows ....
```

Parameters

```
Keyword   Value Type
-------   ----------
psfile    string       - A PostScript file to include
hsize     dimension    - Maximum horizontal size
                         (for clipping)
vsize     dimension    - Maximum vertical size
                         (for clipping)
hoffset   dimension    - Amount to shift right
voffset   dimension    - Amount to shift up
                        (or down, for MacDraw'ings)
hscale    number       - A scale factor in x-dimension
vscale    number       - A scale factor in y-dimension
```

Where is the (0,0) point of drawing program (figure)
place the vspace propper.

Mathematics

x^2 `$x^2$`

a_n `$a_n$`

x_i^n `$x_i^n$`

$A^{x_i^2}_{j^{2n}_{n,m}}$ `$A^{x_i^2}_{j^{2n}_{n,m}}$`

$$\frac{1}{x+y}$$

`\[ \frac{1}{x+y} \]`

$$\frac{1}{\frac{1}{x}+y}$$

`\[ \frac{1}{\frac{1}{x}+y} \]`

$$\sqrt{\frac{1}{x+y}}$$

`\[ \sqrt{\frac{1}{x+y}} \]`

$$\sqrt[n]{\frac{1}{x+y}}$$

`\[ \sqrt[n]{\frac{1}{x+y}} \]`

$$\sum_{i=1}^n \int^b_a f_i(x) dx$$

`\[ \sum_{i=1}^n \int^b_a f_i(x) dx \]`

$$\alpha\beta\gamma\Gamma$$

`\[ \alpha\beta\gamma\Gamma \]`

$\vee \times\ wedge \cap$ `$ \vee \times\ wedge \cap $`

Commands

```
\newcommand{\Axbline}[1]{a_{#1 1}x_1 +
      a_{#1 2}x_2 +\ldots +a_{#1 n}x_n
        & = & b_{#1}}
\begin{eqnarray}
\Axbline{1} \nonumber \\
\Axbline{2} \nonumber \\
 & \vdots &  \\
\Axbline{n} \nonumber
\label{E:lin}
\end{eqnarray}
```

The set of linear equations can be rewritten as a matrix vector equation (`\ref{E:mat}`).

$$\begin{aligned} a_{11}x_1 + a_{12}x_2 + \ldots + a_{1n}x_n &= b_1 \\ a_{21}x_1 + a_{22}x_2 + \ldots + a_{2n}x_n &= b_2 \\ &\vdots \\ a_{n1}x_1 + a_{n2}x_2 + \ldots + a_{nn}x_n &= b_n \end{aligned} \tag{1}$$

The set of linear equations can be rewritten as a matrix vector equation (2).

Use eqnarray* to switch numbering off.

Bibliography

```
@conference{LasICGA,
author      = "G. von Laszewski",
title       = "Intelligent Structural
               Operators for the graph
               partitioning problem",
booktitle   = "Proc. of the 4th intern.
               Conf. on Genetic Algorithms",
year        = 1991,
month       = "July",
note        = "plenary presentation",
publisher   = "Morgan Kaufman",
adress      = "San Diego, CA"
}
```

Bibliography

The Bibligraphy: library.bib The LaTeX file: doc.tex

In `\cite{LasICGA}` intelligent structural operators for the .... .

....

```
\bibliographystyle{plain}
\bibliography{library.bib}

\end{document}
```

Creating a dvi file:

latex doc

bibtex doc

latex doc

latex doc

watch out for the warnings at the end

xvgr

Interactive 2-Ddimensional Plotting Program.

Most simple form of input: data in two columns

The example file xvgr.dat contains two dimensional data.

```
1 20
2 40
3 150
4 100
5 200
6 110.12
7 30
8 99
```

The call xvgr xvgr.dat displays the information on screen. You can interactively add labels for the axis. Go under View/Ticks-ticklabels. Chose in the edit field the axis and change the Axis label as riquired. When the input is correct say Apply which accepts the choice.

Make sure that the picture is in the display field shown on the screen. If this should not be the case use the "define view" function to change the graphic window size and position.

Labels can be set via the labels button. Edit the labels for the Graphs.

More than one graph can be divided by blank lines in the xvgr.dat file.

Printing and Including

Print the picture with File/Printer Setup. Choose Printer Setup: File. Printfile to the name you want, e.g. xvgr.ps Say Print.

Save your data with save all to e.g. file graph.xvgr. Next time you can start xvgr without parameter and read sets e.g. graph.xvgr.

The program /home/venus/bin/xvgr2ps converts xvgr pictures to LaTeX readeble postscript.

```
\include{psfig}

\begin{document}
 ...
\begin{figure}[htb]
     \centerline{\psfig{figure=xvgr.ps,
                          width=3in,angle=-90}}
     \caption{This  is a Figure}
     \label{F:xvgr}
\end{figure}

The figure~\ref{F:xvgr} points out that ...
```

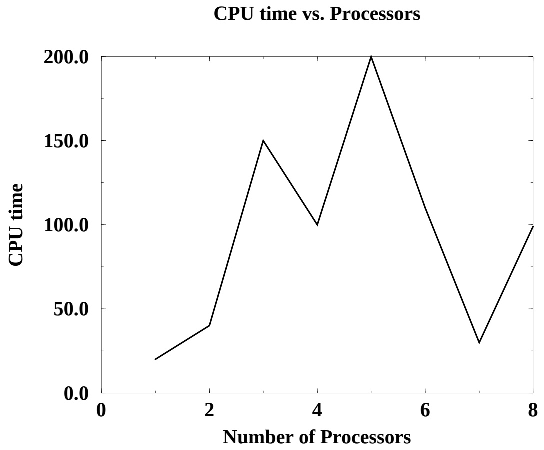

Figure 2: This is a Figure

The figure 2 points out that ...