

Advanced L^AT_EX

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History

Donald Knuth	1978-82-...	T _E X 3.1415926	HelloWorld!\bye
Leslie Lamport	1985	L ^A T _E X 2.09	\documentstyle{...}
L ^A T _E X3 project team	1994 ...	L ^A T _E X 2 _ε	\documentclass{...}

Extensions of the T_EX engine

pdfT _E X	Type-1 and TrueType fonts, micro-typography, PDF support
XeT _E X	Unicode support, OpenType fonts, PDF support
LuaT _E X	Unicode support, OpenType fonts, micro-typography, new scripting language (Lua)

Today, pdfT_EX is the standard engine of many T_EX distributions:

```
hellmund@mipc42:~>latex
This is pdfTEXk, Version 3.141592-1.40.3 (Web2C 7.5.6)
%&-line parsing enabled.
**^D
! End of file on the terminal... why?
hellmund@mipc42:~>
```

```

File Edit Options Buffers Tools Index Preview LaTeX Command Math Ref Help
\documentclass{article}
\usepackage{fontspec}
\usepackage{xunicode}
\usepackage{xltxtra}

\setmainfont[Mapping=tex-text]{DejaVu Sans}

\begin{document}

\section{Unicode}

\subsection{Ελληνικά}
Το εδώ βασανίζουν χρειάζονται. Μια ώς τέτοιο ανεπιθύμητη.
Ως τέτοιο διορθώσει ώρα, σας βιαστικά συνεντεύξεις μεταγλωττίσει
κι, μη την πάρα επενδυτής. Μου οι πάντα ελέγχου, ναι τελευταία
εκφράσουν ας. Σε θέμα αλφα διαχειριστής από, αν εντολές
τελευταία ροή.

\subsection{Русский}
Нас обеда быстрее проверить он, ещё за всех царь. Именно действий
сохранение но вот. Вы зону большого над, языке английском лет их.
Работе почему доверять ты тем. Хочу осуществлять нее от. Весьма
письмо примерно бог ну, зону джоель ажиотажа до не, давать
английски лет об.

\section{Legacy syntax}
ASCII: --- "Hello World!"\
Unicode: - "Hello dear!"

this is the DejaVu Sans Truetype font.
-U:--- xetex.tex Top of 910 (1,0) (LaTeX/M Ref Fill)-----

```

1 Unicode

1.1 Ελληνικά

Το εδώ βασανίζουν χρειάζονται. Μια ώς τέτοιο ανεπιθύμητη. Ως τέτοιο διορθώσει ώρα, σας βιαστικά συνεντεύξεις μεταγλωττίσει κι, μη την πάρα επενδυτής. Μου οι πάντα ελέγχου, ναι τελευταία εκφράσουν ας. Σε θέμα αλφα διαχειριστής από, αν εντολές τελευταία ροή.

1.2 Русский

Нас обеда быстрее проверить он, ещё за всех царь. Именно действий сохранение но вот. Вы зону большого над, языке английском лет их. Работе почему доверять ты тем. Хочу осуществлять нее от. Весьма письмо примерно бог ну, зону джоель ажиотажа до не, давать английски лет об.

2 Legacy syntax

ASCII: --- "Hello World!"

Unicode: - "Hello dear!"

this is the DejaVu Sans Truetype font.

Microtyping

A narrow column of text, typeset (a) with latex and (b) with pdflatex and `\usepackage{microtype}`

Hello, here is some text without a meaning. This text should show, how a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like »Huardest gefburn«? Kjift – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in

Hello, here is some text without a meaning. This text should show, how a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like »Huardest gefburn«? Kjift – Never mind! A blind text like this gives you information about the selected font, how the letters are written and the impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need

Floats

- ▶ `figure` and `table` environments are floats: `\begin{figure}[!htbp]`
- ▶ default parameters sometimes problematic: floats are moved to the end or at pages by itself

```
\renewcommand{\topfraction}{0.9}           % default 0.7
\renewcommand{\textfraction}{0.07}        % default 0.2
\renewcommand{\floatpagefraction}{0.75}   % default 0.5
% this should be smaller than topfraction
\setcounter{topnumber}{4}                  % default 2
\setcounter{bottomnumber}{2}              % default 1
\setcounter{totalnumber}{6}               % default 3
```

The placeins package

```
\usepackage{placeins}
...
\FloatBarrier
```

Never move a float across the float barrier

The afterpage package

A `\clearpage` command will process all floats and end the current page. We want to execute this command at the next place where \LaTeX will do a page break:

```
\afterpage{\clearpage}
```

The float package

- ▶ allows definition of new floating environments
- ▶ provides the `[H]` specifier: place here and only here!
Dangerous: If not enough space on page, keep page half-full and put it on top of next page. Better:
- ▶ `\afterpage{\FloatBarrier\begin{figure}[H]... \end{figure}}`

- Sometimes helpful: caption and figure side by side



Figure: This is
the caption.

```
\begin{figure}
  \begin{center}
    \begin{minipage}[c]{0.4\linewidth}
      \includegraphics[scale=.4]{Chick}
    \end{minipage}
    \begin{minipage}[c]{0.2\linewidth}
      \caption{This is the caption.\label{fig:23}}
    \end{minipage}
  \end{center}
\end{figure}
```

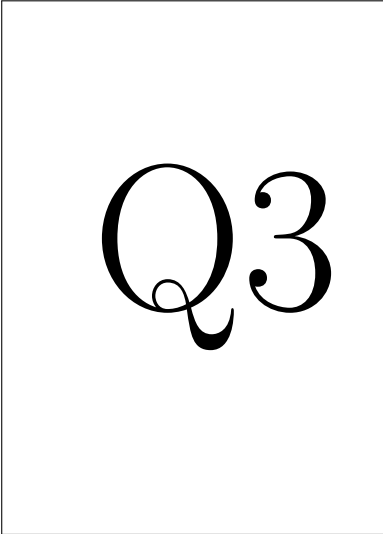
Very large letters

```
\documentclass{article}
\usepackage{type1cm}
\pagestyle{empty}

\begin{document}
\fontsize{12cm}{12.5cm}\selectfont

\begin{center}
Q3
\end{center}

\end{document}
```

A large, black, serif font rendering of the characters 'Q3' centered within a rectangular frame. The 'Q' is a classic blackletter style with a long, flowing tail that loops under the letter. The '3' is also a blackletter style, with a thick, rounded top and a decorative flourish at the bottom.

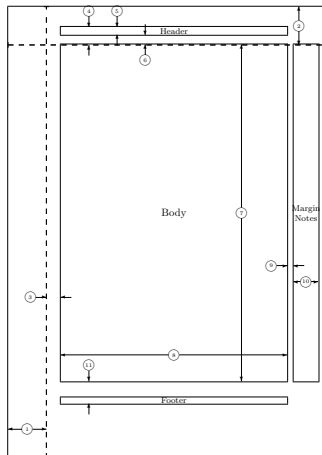
Page layout - the typearea package

BCOR ... binding correction

DIV ... larger value makes
larger textarea

```
\documentclass[a4paper]{article}  
\usepackage[BCOR=1cm,DIV12]{typearea}  
\usepackage{layout}
```

```
\begin{document}  
  \layout  
\end{document}
```



1	one inch + \hoffset	2	one inch + \voffset
3	\oddsidemargin = 27pt	4	\topmargin = -34pt
5	\headheight = 16pt	6	\headsep = 18pt
7	\textheight = 634pt	8	\textwidth = 426pt
9	\marginparsep = 12pt	10	\marginparwidth = 47pt
11	\footskip = 42pt		\marginparpush = 5pt (not shown)
	\hoffset = 0pt		\voffset = 0pt
	\paperwidth = 597pt		\paperheight = 845pt

Playing with colors - the xcolor package

```
\documentclass[a4paper,12pt]{article}
\usepackage{xcolor}
\usepackage[utf8]{inputenc}

\definecolor{natrium}{wave}{589} %wavelength in nm
\definecolor{Pantone424}{RGB}{108,111,112}

\begin{document}
\Huge
\colorbox{natrium}{Natrium}

\colorbox{Pantone424}{\color{white}Universität Leipzig}
\end{document}
```

Natrium

Universität Leipzig

Playing with colors - the xcolor package II

```
\documentclass[a4paper,12pt]{article}
\usepackage{xcolor}
\begin{document}

\setlength{\unitlength}{.75pt}
\newcounter{WL}

\begin{picture}(460,70)(360,-10)
  \setcounter{WL}{360}
  \linethickness{1.25\unitlength}
  \multiput(360,0)(1,0){456}{
    {\color[wave]{\theWL}\line(0,1){50}}
  }
  \addtocounter{WL}{1}}
\end{picture}

\end{document}
```



Counter

```
\documentclass[a4paper]{article}
\usepackage{ifthen,pifont}
\begin{document}

\newcounter{mycounter}
\setcounter{mycounter}{2}      % mycounter = 2
\addtocounter{mycounter}{4}  % mycounter = 6
\addtocounter{mycounter}{\value{page}}
```

```
\arabic{mycounter} = \Roman{mycounter}
```

```
\setcounter{mycounter}{1}
\whiledo {\value{mycounter} < 6}{
  \arabic{mycounter} \ding{111}\
  \stepcounter {mycounter}}
```

```
\end{document}
```

7 = VII

1 ◻ 2 ◻ 3 ◻ 4 ◻ 5 ◻

Lengths

```
\documentclass{article}
```

```
\begin{document}
```

```
\newlength{\mylen}
```

```
\setlength{\mylen}{3cm}
```

```
\addtolength{\mylen}{-1cm}
```

```
\settowidth{\mylen}{Text}
```

```
Text is \the\mylen\ long.
```

```
\setlength{\mylen}{3cm plus 2mm minus 4mm}
```

```
\the\mylen
```

```
\end{document}
```

Text is 28.19965pt long.

85.35826pt plus 5.69054pt minus 11.38109pt

Tables

- ▶ tabular environments:

```
\begin{tabular}[...]{column specifier} ... \end{tabular}
\begin{tabular*}{width}[...]{column specifier} ... \end{tabular*}
```

- ▶ column specifications:
 - `l,r,c` left-aligned, right-aligned or centered
 - `p{width}` paragraph of fixed width
 - `|` vertical line
 - `@{decl}` replace inter-column space by decl

- ▶ Example:

erste	9	irgendwas	23 – 455
zweiter	23	viel Text und noch mehr	444 – 33
dritter	102	blabla	412 – 788

```
\begin{tabular}[t]{l|r|p{2cm}|c@{ -- }c}\hline
  erste   & 9   & irgendwas           & 23 & 455\\ \hline
  zweiter & 23  & viel Text und noch mehr & 444 & 33\\
  dritter & 102 & blabla              & 412 & 788\\ \hline
\end{tabular}
```

The array package

`\usepackage{array}`

- ▶ New column types in the array package:

`m{width}` like `p{width}`, but vertically centered

`b{width}` like `p{width}`, but bottom-aligned

`>{decl}` use before other column options, `decl` is inserted in front of every entry of the column

`<{decl}` use after other column options, `decl` is inserted after every entry of the column

No	a longer text	Math	<i>remarks</i>
233	bla bla blum bla haha	$\sqrt{\alpha}$	<i>solved!</i>
234	hum hum	γ^3	<i>unsolved</i>

```
\begin{tabular}[c]{c}{l | m{2cm} | >{$}c<{$} | >{\itshape}c} \hline
  No & a longer text & & $Math$ & & remarks\\ \hline
 233 & bla bla blum bla haha & & \sqrt{\alpha} & & solved!\\ \hline
 234 & hum hum & & \gamma^3 & & unsolved \\ \hline
```

The dcolumn package

- `\usepackage{dcolumn}` provides a column type which aligns at the decimal point (or any other character):

`D{inputseparator}{outputseparator}{decimal places}`

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	

```
\begin{tabular}[t]{r| D{,}{,}{-1} | D{,}{.}{-1} } \hline
      23,33 &      23,33      & 23.33   \\
    1234,10 & 1234,10      & 1234.10 \\
      0,5678& 0,5678      & 0.5678  \\ \hline
    3312,333 & \multicolumn{2}{c}{no results} \\ \hline
\end{tabular}
```


Color tables

- ▶ `\usepackage[table]{xcolor}`

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```
{ \rowcolors*{2}{blue!10}{blue!50}\hline
  \begin{tabular}[t]{| r | D{,}{,}{-1} | D{,}{.}{-1} | }
      23,33 & 23,33 & 23,33 \\ \hline
      1234,10 & 1234,10 & 1234,10 \\
      0,5678 & 0,5678 & 0,5678 \\ \hline
      3312,333 &
  \multicolumn{2}{>{\columncolor{blue!50}c}{no results}} \\
      ...
  \end{tabular}
}
```

```

\setlength{\tabcolsep}{14pt}
\renewcommand{\arraystretch}{1.2}
\setlength{\extrarowheight}{4pt}

```

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```

...
0,5678& 0,5678      & 0,5678  \\ \cline{2-3}
312,333 & \multicolumn{2}{c|}{no results} \\ \cline{2-3}
23,33 & 23,33      & 23,33  \\[3pt]
...

```

```

\setlength{\tabcolsep}{14pt}
\renewcommand{\arraystretch}{1.2}
\setlength{\extrarowheight}{4pt}

```

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```

...
0,5678 & 0,5678 & 0,5678 \\ \cline{2-3}
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23,33 & 23,33 & 23,33 \\[3pt]
...

```

```

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```

23,33	23,33	23.33
1234,10	1234,10	1234.10
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3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```

...
0,5678& 0,5678      & 0,5678  \\ \cline{2-3}
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23,33 & 23,33      & 23,33  \\[3pt]
...

```

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23,33	23,33	23.33
1234,10	1234,10	1234.10
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```

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0,5678& 0,5678      & 0,5678  \\ \cline{2-3}
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23,33 & 23,33      & 23,33  \\[3pt]
...

```

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\setlength{\extrarowheight}{4pt}

```

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```

...
0,5678& 0,5678      & 0,5678  \\ \cline{2-3}
312,333 & \multicolumn{2}{c|}{no results} \\ \cline{2-3}
23,33 & 23,33      & 23,33  \\[3pt]
...

```

```

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\renewcommand{\arraystretch}{1.2}
\setlength{\extrarowheight}{4pt}

```

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```

...
0,5678& 0,5678      & 0,5678  \\ \cline{2-3}
312,333 & \multicolumn{2}{c}{no results} \\ \cline{2-3}
23,33 & 23,33      & 23,33  \\[3pt]
...

```

```

\setlength{\tabcolsep}{14pt}
\renewcommand{\arraystretch}{1.2}
\setlength{\extrarowheight}{4pt}

```

23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678
3312,333	no results	
23,33	23,33	23.33
1234,10	1234,10	1234.10
0,5678	0,5678	0.5678

```

...
0,5678& 0,5678      & 0,5678  \\ \cline{2-3}
312,333 & \multicolumn{2}{c|}{no results} \\ \cline{2-3}
23,33 & 23,33      & 23,33  \\[3pt]
...

```


Remark about font embedding

- ▶ Tools like `epstopdf` or `pstopdf` which convert PostScript to other formats are based on `ghostscript`.

Problem: `ghostscript` does not embed all fonts.

- ▶ Look for the file `gs_pdfwr.ps` in your `ghostscript` installation. It includes the following lines:

```
/.standardfonts [  
/Courier /Courier-Bold /Courier-Oblique /Courier-BoldOblique  
/Helvetica /Helvetica-Bold /Helvetica-Oblique /Helvetica-BoldOblique  
/Times-Roman /Times-Bold /Times-Italic /Times-BoldItalic  
/Symbol /ZapfDingbats  
] readonly def
```

- ▶ remove from this list all fonts which should be embedded (e.g., `/Symbol`).