

# Introduction to $\text{\LaTeX}$ Part 1

<http://www.win.tue.nl/~marko/latex>



TU/e

Technische Universiteit  
**Eindhoven**  
University of Technology

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$\text{\LaTeX}$  is a document preparation system. It is widely used in the fields of mathematics and natural sciences, but also spreading to many other disciplines.

- $\text{\LaTeX}$  is a set of markup commands used with the powerful typesetting program  $\text{\TeX}$ .
- totally open software system, free of charge.
- maintained by the  $\text{\LaTeX}3$  Project group. Hundreds of user contributions.

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$\text{\LaTeX}$  is no word processor!  $\text{\LaTeX}$  stimulates placing emphasis on content (logical markup) instead of appearance (typographical markup).

# Introduction

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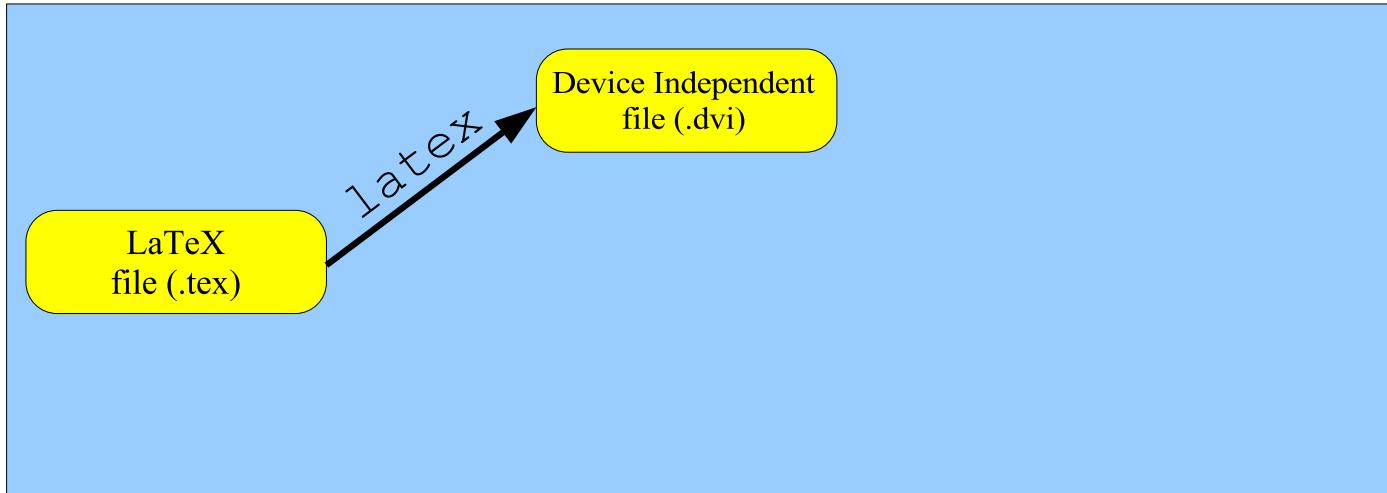
# Introduction

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LaTeX  
file (.tex)

$\text{\LaTeX}$  editor: WinEdt

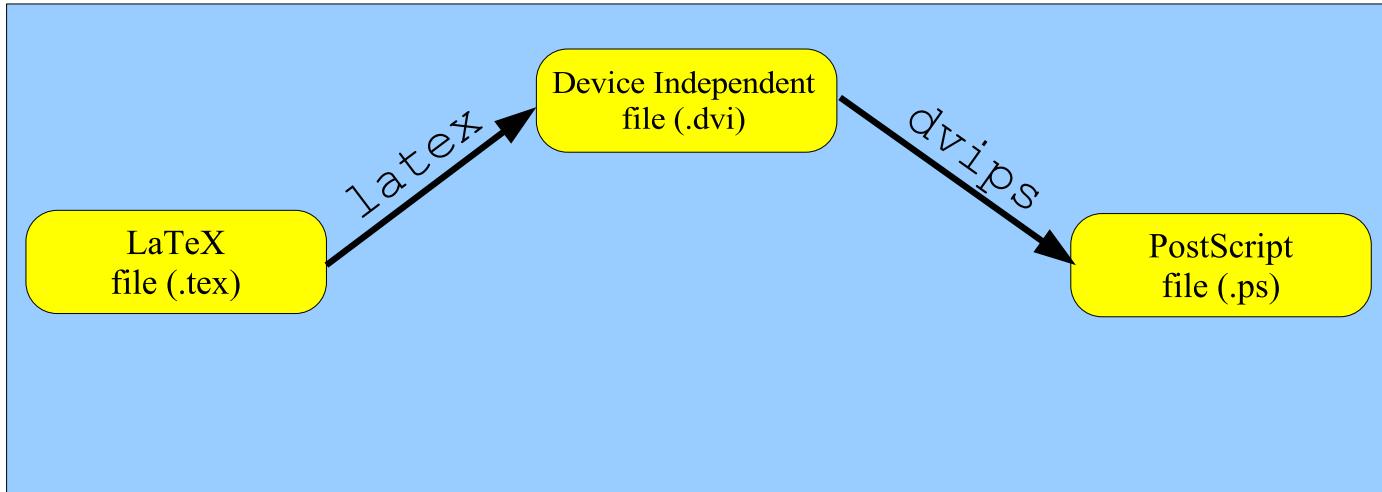
# Introduction



DVI previewer: Yap

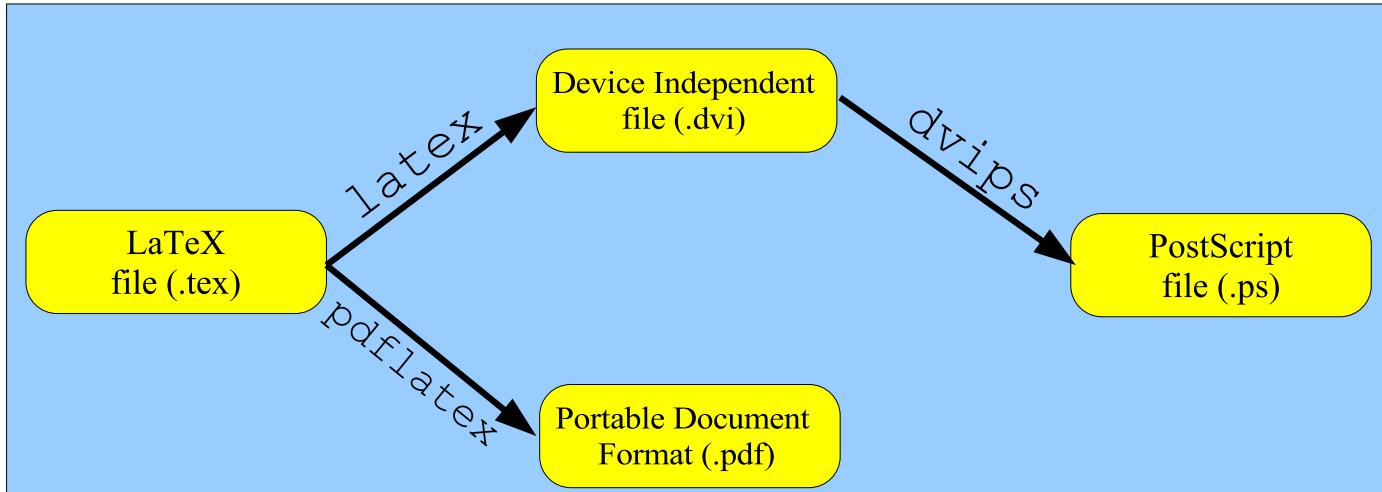
# Introduction

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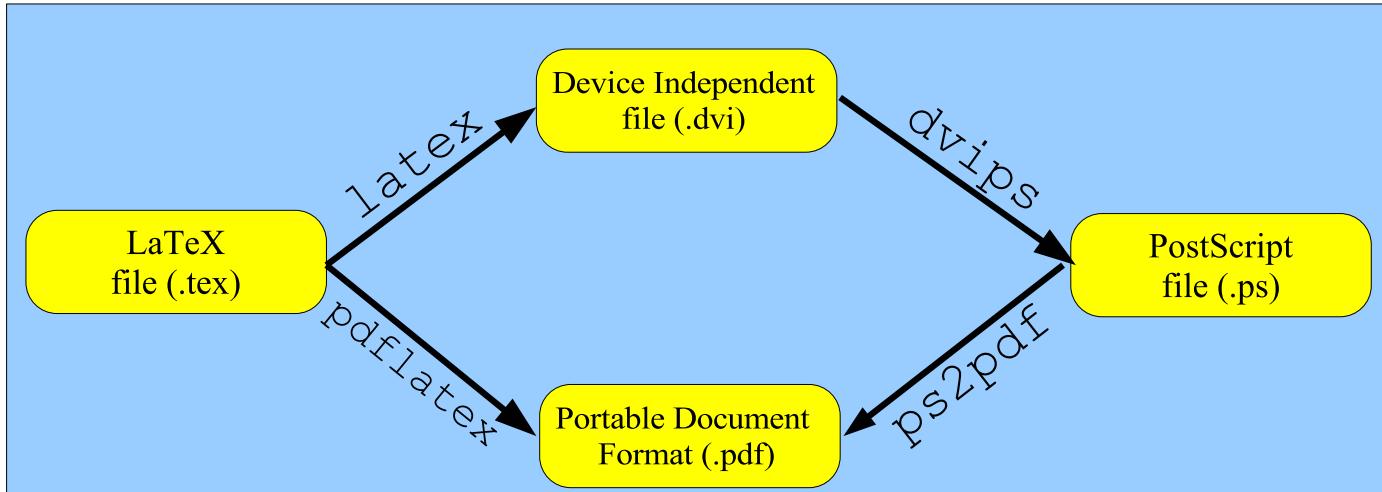
PostScript viewer: GSView

# Introduction



PDF viewer: Adobe (Acrobat) Reader

# Introduction



## The $\text{\LaTeX}$ language

- $\text{\LaTeX}$  commands always start with a backslash: \

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## The $\text{\LaTeX}$ language

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- comments start with a percentage symbol: %
- $\text{\LaTeX}$  takes care of the spacing between words and paragraphs (just like HTML).

## The $\text{\LaTeX}$ language

- $\text{\LaTeX}$  commands always start with a backslash: \
- required command arguments are placed between curly brackets: { }
- optional command arguments are placed between brackets: [ ]
- comments start with a percentage symbol: %
- $\text{\LaTeX}$  takes care of the spacing between words and paragraphs (just like HTML).
- the commands \begin{ } and \end{ } create environments.

## A .tex file

```
\documentclass[options]{document_class}

% preamble

\begin{document}

% document

\end{document}
```

## A .tex file: intro.tex

```
\documentclass[12pt]{article}
\usepackage[english]{babel}

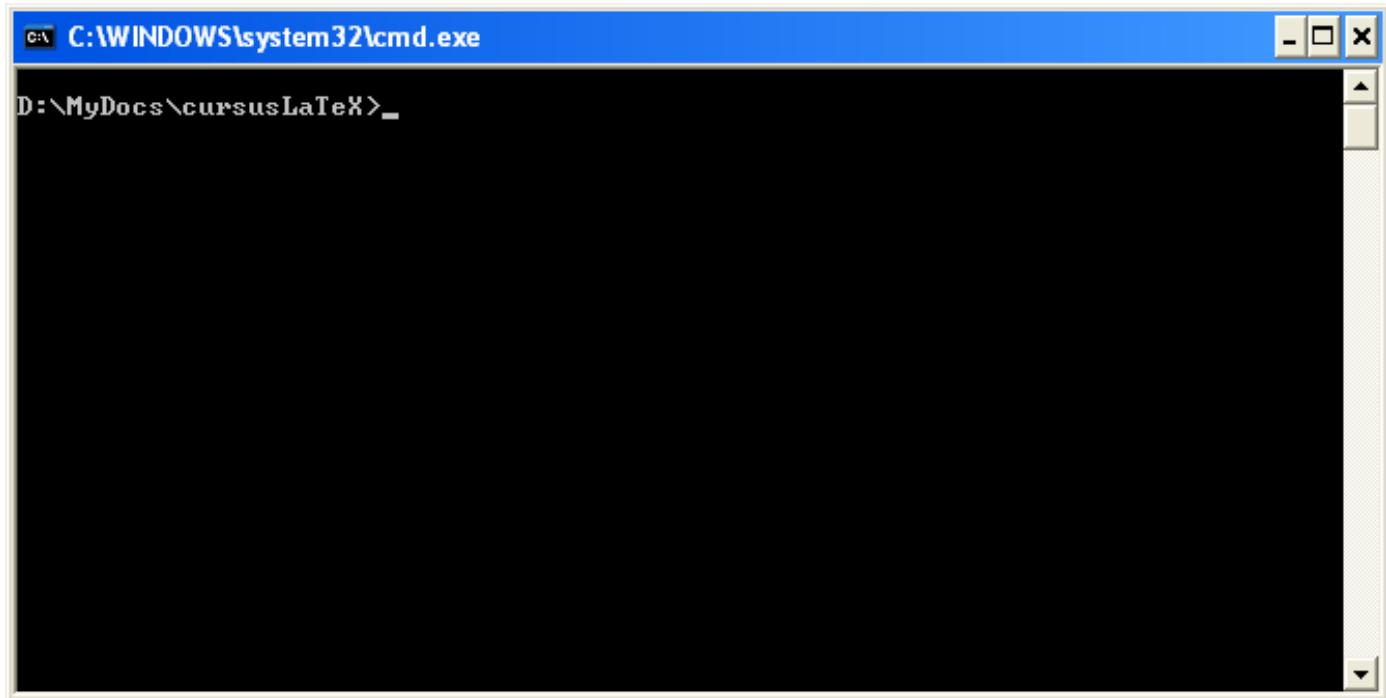
\begin{document}
\section{Introduction}
```

LaTeX is a document preparation system used to create documents of high quality typography.

It is mostly used in the fields of mathematics and natural sciences, but can in fact be used for any type of publication.

```
\end{document}
```

# Invoking LaTeX



# Invoking LaTeX

```
C:\WINDOWS\system32\cmd.exe
D:\MyDocs\cursusLaTeX>latex intro_
```

# Invoking LaTeX

```
C:\WINDOWS\system32\cmd.exe

D:\MyDocs\cursusLaTeX>latex intro
This is e-TeX, Version 3.141592-2.2 (MiKTeX 2.4)
entering extended mode
<intro.tex
LaTeX2e <2003/12/01>
Babel <v3.8g> and hyphenation patterns for american, dutch, nohyphenation, load
ed.
<C:\MiKTeX\texmf\tex\latex\base\article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
<C:\MiKTeX\texmf\tex\latex\base\size12.clo>
<C:\MiKTeX\texmf\tex\generic\babel\babel.sty
<C:\MiKTeX\texmf\tex\generic\babel\english.ldf
<C:\MiKTeX\texmf\tex\generic\babel\babel.def>>>
No file intro.aux.
[1] <intro.aux>
Output written on intro.dvi (1 page, 592 bytes).
Transcript written on intro.log.

D:\MyDocs\cursusLaTeX>_
```

# Invoking Yap

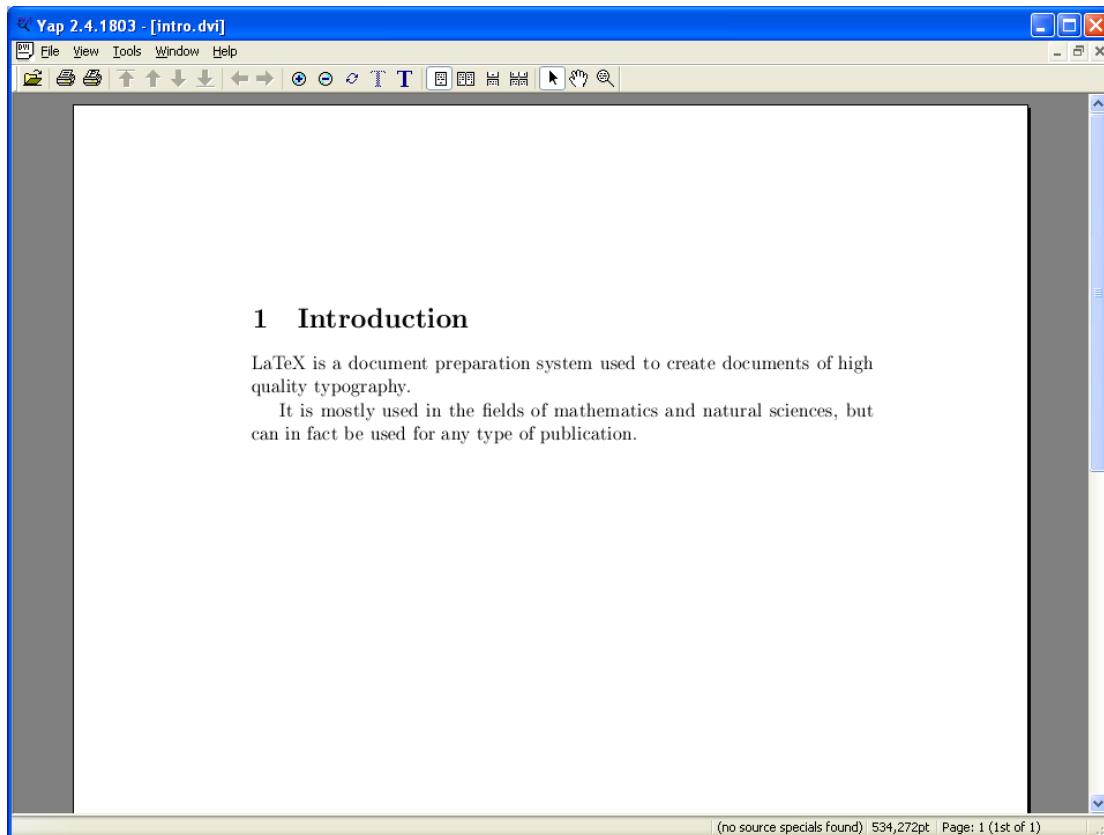
```
C:\WINDOWS\system32\cmd.exe

D:\MyDocs\cursusLaTeX>latex intro
This is e-TeX, Version 3.141592-2.2 (MiKTeX 2.4)
entering extended mode
<intro.tex
LaTeX2e <2003/12/01>
Babel <v3.8g> and hyphenation patterns for american, dutch, nohyphenation, load
ed.
<C:\MiKTeX\texmf\tex\latex\base\article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
<C:\MiKTeX\texmf\tex\latex\base\size12.clo>
<C:\MiKTeX\texmf\tex\generic\babel\babel.sty
<C:\MiKTeX\texmf\tex\generic\babel\english.ldf
<C:\MiKTeX\texmf\tex\generic\babel\babel.def>>>
No file intro.aux.
[1] <intro.aux>
Output written on intro.dvi (1 page, 592 bytes).
Transcript written on intro.log.

D:\MyDocs\cursusLaTeX>yap intro_
```

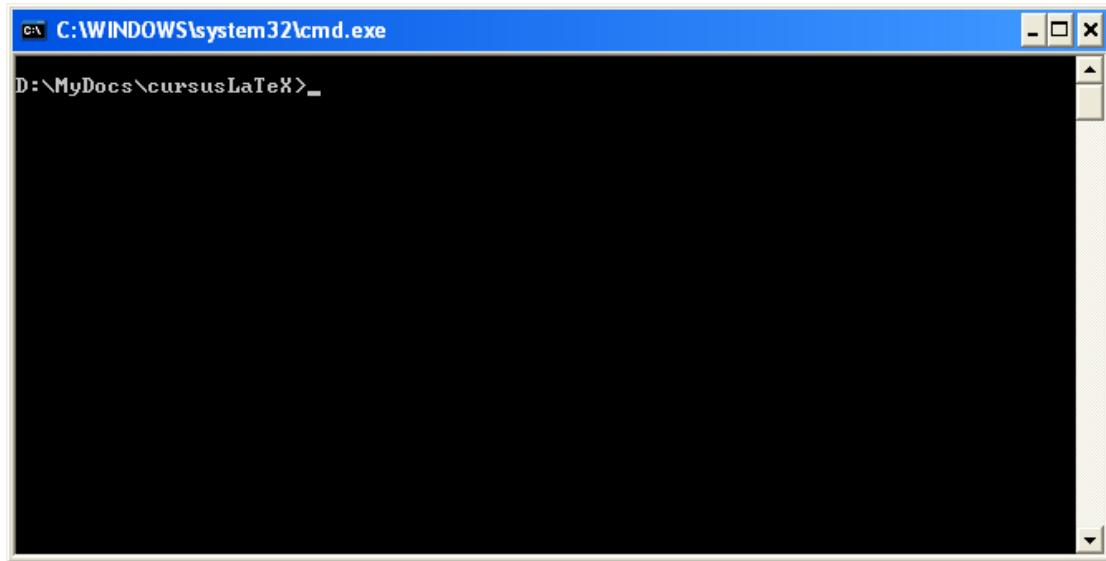
# Invoking Yap

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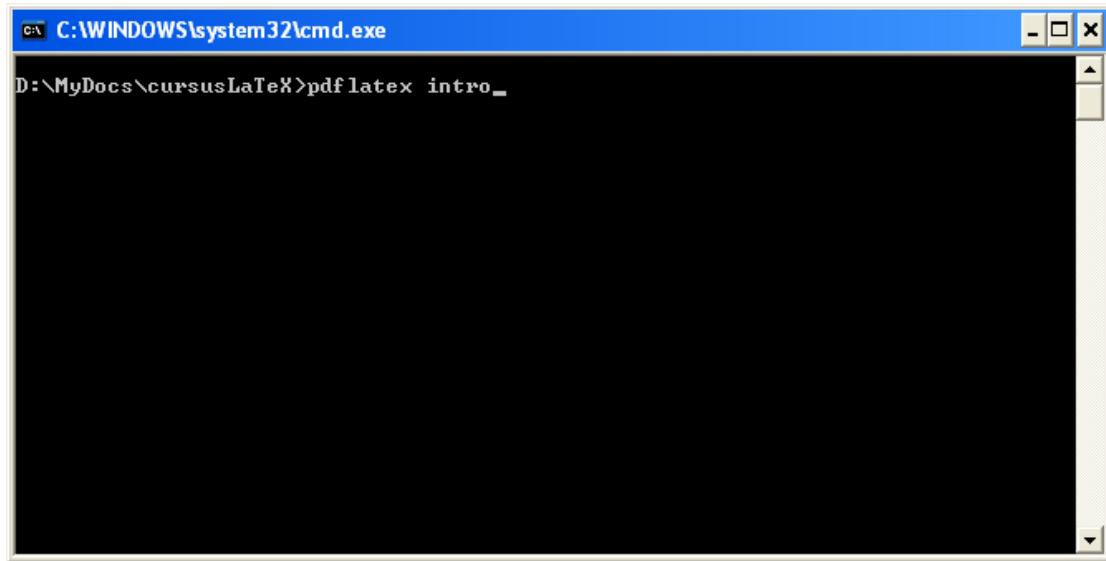


# Alternative to LaTeX: PDFLaTeX

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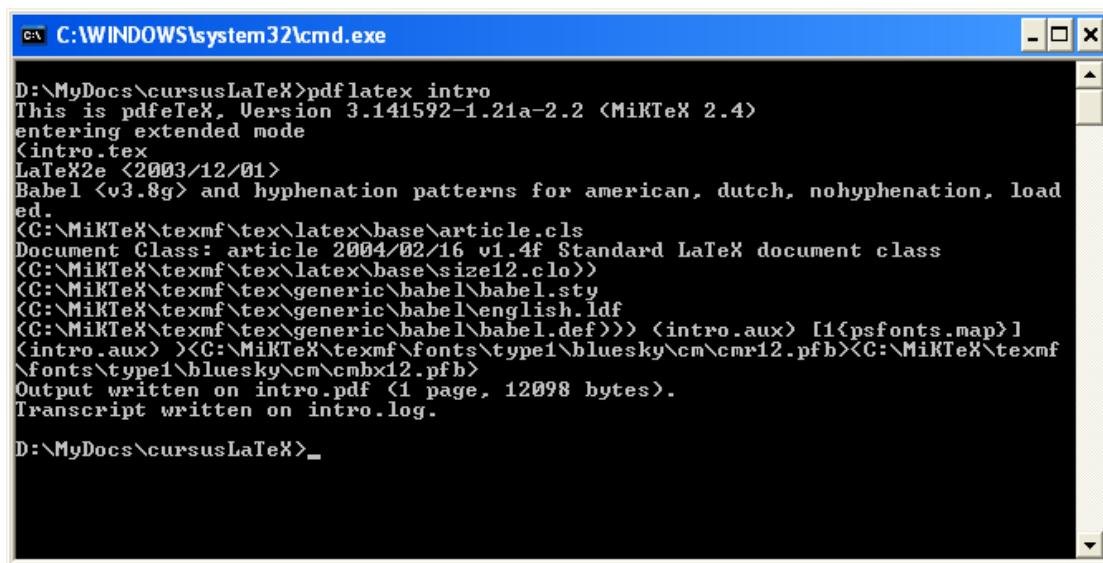


# Alternative to LaTeX: PDFLaTeX



# Alternative to LaTeX: PDFLaTeX

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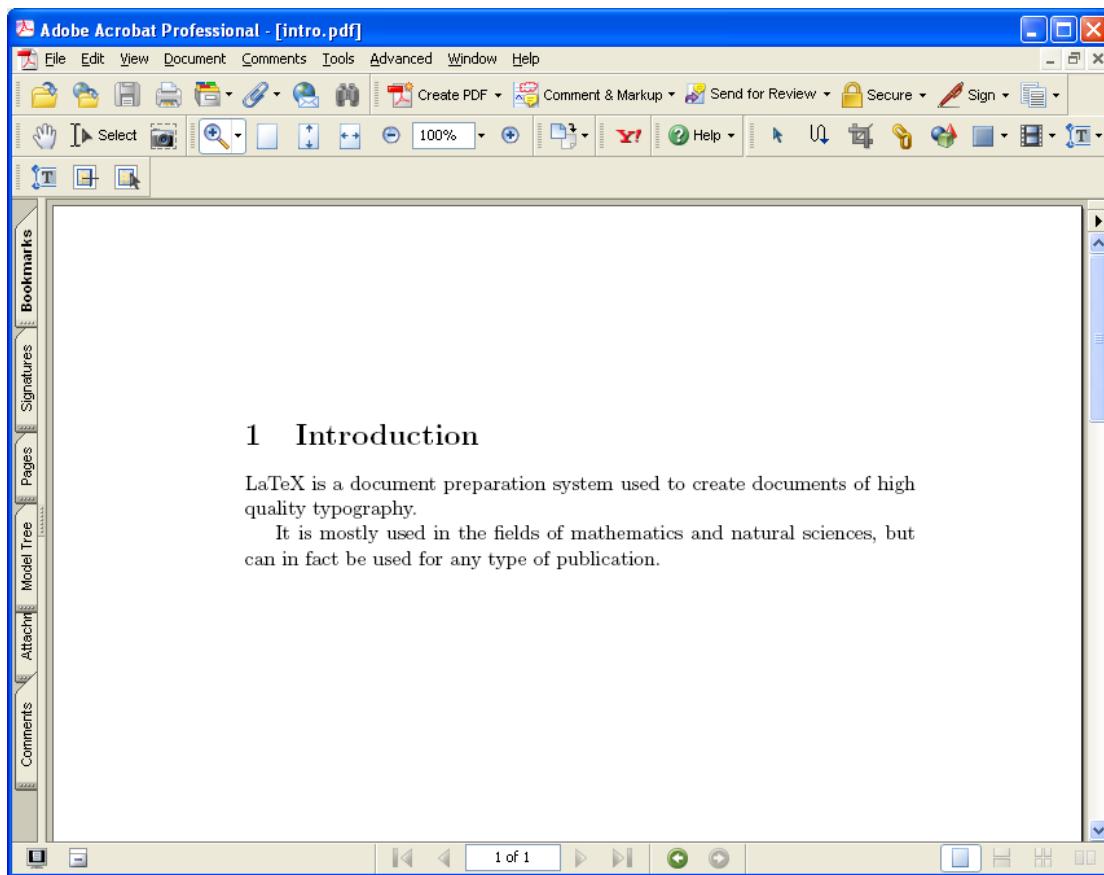
C:\WINDOWS\system32\cmd.exe

```
D:\MyDocs\cursusLaTeX>pdflatex intro
This is pdfTeX, Version 3.141592-1.21a-2.2 (MiKTeX 2.4)
entering extended mode
(intro.tex
LaTeX2e <2003/12/01>
Babel <v3.8g> and hyphenation patterns for american, dutch, nohyphenation, load
ed.
(C:\MiKTeX\texmf\tex\latex\base\article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
(C:\MiKTeX\texmf\tex\latex\base\size12.clo)
(C:\MiKTeX\texmf\tex\generic\babel\babel.sty
(C:\MiKTeX\texmf\tex\generic\babel\english.ldf
(C:\MiKTeX\texmf\tex\generic\babel\babel.def))>> (intro.aux) [1<psfonts.map>]
<intro.aux> ><C:\MiKTeX\texmf\fonts\type1\bluesky\cm\cmyk12.pfb><C:\MiKTeX\texmf
\fonts\type1\bluesky\cm\cmbx12.pfb>
Output written on intro.pdf (1 page, 12098 bytes).
Transcript written on intro.log.

D:\MyDocs\cursusLaTeX>_
```

# Alternative to LaTeX: PDFLaTeX

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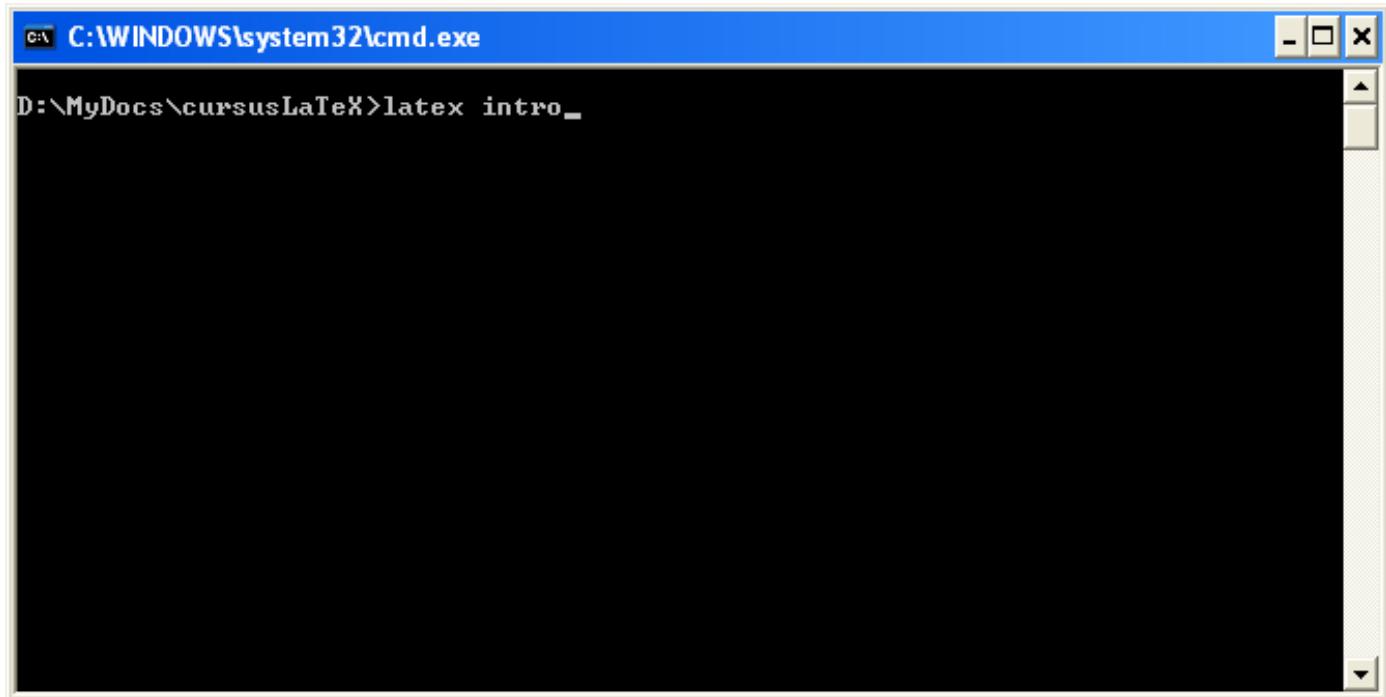


```
\documentclass[12pt]{article}  
\usepackage[english]{babel}  
  
\section{Introduction}
```

LaTeX is a document preparation system.  
It is widely used in the fields of mathematics  
and natural sciences, but also spreading to  
many other disciplines.

```
\end{document}
```

# Error Handling



A screenshot of a Windows Command Prompt window titled "C:\WINDOWS\system32\cmd.exe". The window shows the command "D:\MyDocs\cursusLaTeX>latex intro\_". Below the command, there is a large black rectangular area representing the output of the command, which has failed. The window has standard Windows-style title bar controls (minimize, maximize, close) and scroll bars on the right side.

# Error Handling

```
C:\WINDOWS\system32\cmd.exe - latex intro

D:\MyDocs\cursusLaTeX>latex intro
This is e-TeX, Version 3.141592-2.2 (MiKTeX 2.4)
entering extended mode
<intro.tex
LaTeX2e <2003/12/01>
Babel <v3.8g> and hyphenation patterns for american, dutch, nohyphenation, load
ed.
<C:/MiKTeX/texmf/tex/latex/base/article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
<C:/MiKTeX/texmf/tex/latex/base/size12.clo>
<C:/MiKTeX/texmf/tex/generic/babel babel.sty
<C:/MiKTeX/texmf/tex/generic/babel/english.ldf
<C:/MiKTeX/texmf/tex/generic/babel/babel.def>>>

! LaTeX Error: Missing \begin{document}.

See the LaTeX manual or LaTeX Companion for explanation.
Type H <return> for immediate help.
...
1.5 \section
                  {Introduction}
? -
```

# Error Handling

```
C:\WINDOWS\system32\cmd.exe - latex intro

D:\MyDocs\cursusLaTeX>latex intro
This is e-TeX, Version 3.141592-2.2 (MiKTeX 2.4)
entering extended mode
<intro.tex
LaTeX2e <2003/12/01>
Babel <v3.8g> and hyphenation patterns for american, dutch, nohyphenation, load
ed.
<C:/MiKTeX/texmf/tex/latex/base/article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
<C:/MiKTeX/texmf/tex/latex/base/size12.clo>
<C:/MiKTeX/texmf/tex/generic/babel babel.sty
<C:/MiKTeX/texmf/tex/generic/babel/english.ldf
<C:/MiKTeX/texmf/tex/generic/babel/babel.def>>>

! LaTeX Error: Missing \begin{document}.

See the LaTeX manual or LaTeX Companion for explanation.
Type H <return> for immediate help.
...
1.5 \section{Introduction}
? q_
```

# Error Handling

```
C:\WINDOWS\system32\cmd.exe
D:\MyDocs\cursusLaTeX>latex intro
This is e-TeX, Version 3.141592-2.2 (MiKTeX 2.4)
entering extended mode
<intro.tex
LaTeX2e <2003/12/01>
Babel <v3.8g> and hyphenation patterns for american, dutch, nohyphenation, load
ed.
<C:/MiKTeX/texmf/tex/latex/base/article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
<C:/MiKTeX/texmf/tex/latex/base/size12.clo>
<C:/MiKTeX/texmf/tex/generic/babel/babel.sty
<C:/MiKTeX/texmf/tex/generic/babel/english.ldf
<C:/MiKTeX/texmf/tex/generic/babel/babel.def>>>
! LaTeX Error: Missing \begin{document}.

See the LaTeX manual or LaTeX Companion for explanation.
Type H <return> for immediate help.
...
1.5 \section
                  {Introduction}
? q
OK, entering \batchmode
D:\MyDocs\cursusLaTeX>
```

# Error Handling – Warnings

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```
\documentclass[12pt]{article}  
\usepackage[english]{babel}  
  
\begin{document}  
\section{Introduction}
```

LaTeX is a document preparation system.  
It is widely used in the fields of mathematics  
and natural sciences, but also spreading to  
many other disciplines.

This is an extremely long line which will hopefully result in some kind of error message.

```
\end{document}
```

# Error Handling – Warnings

```
Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

D:\MyDocs\cursusLaTeX>latex introwarning
This is e-TeX, Version 3.141592-2.2 (MiKTeX 2.4)
entering extended mode
<introwarning.tex
LaTeX2e <2003/12/01>
Babel <v3.8a> and hyphenation patterns for american, dutch, nohyphenation, loaded.
<C:\MiKTeX\texmf\tex\latex\base\article.cls
Document Class: article 2004/02/16 v1.4f Standard LaTeX document class
<C:\MiKTeX\texmf\tex\latex\base\size12.clo>
<C:\MiKTeX\texmf\tex\generic\babel\babel.sty
<C:\MiKTeX\texmf\tex\generic\babel\english.ldf
<C:\MiKTeX\texmf\tex\generic\babel\babel.def>>> <introwarning.aux>
Overfull \hbox (264.69043pt too wide) in paragraph at lines 11--12
[1]\OT1/cmr/m/n/12 This is an extremely long line which will hopefully result in some kind of
warning because LaTeX does not know how to hyphenate this word.
[1] <introwarning.aux>
(see the transcript file for additional information)
Output written on introwarning.dvi (1 page, 640 bytes).
Transcript written on introwarning.log.

D:\MyDocs\cursusLaTeX>
```

MiK<sub>T</sub>E<sub>X</sub> is an up-to-date T<sub>E</sub>X implementation for the Windows operating system.

- can be downloaded from <http://www.miktex.org>
- contains all L<sub>A</sub>T<sub>E</sub>X related binaries, like
  - latex.exe, pdflatex.exe, yap.exe, bibtex.exe,
  - dvips.exe, ps2pdf.exe
- contains all standard packages (will be discussed later)

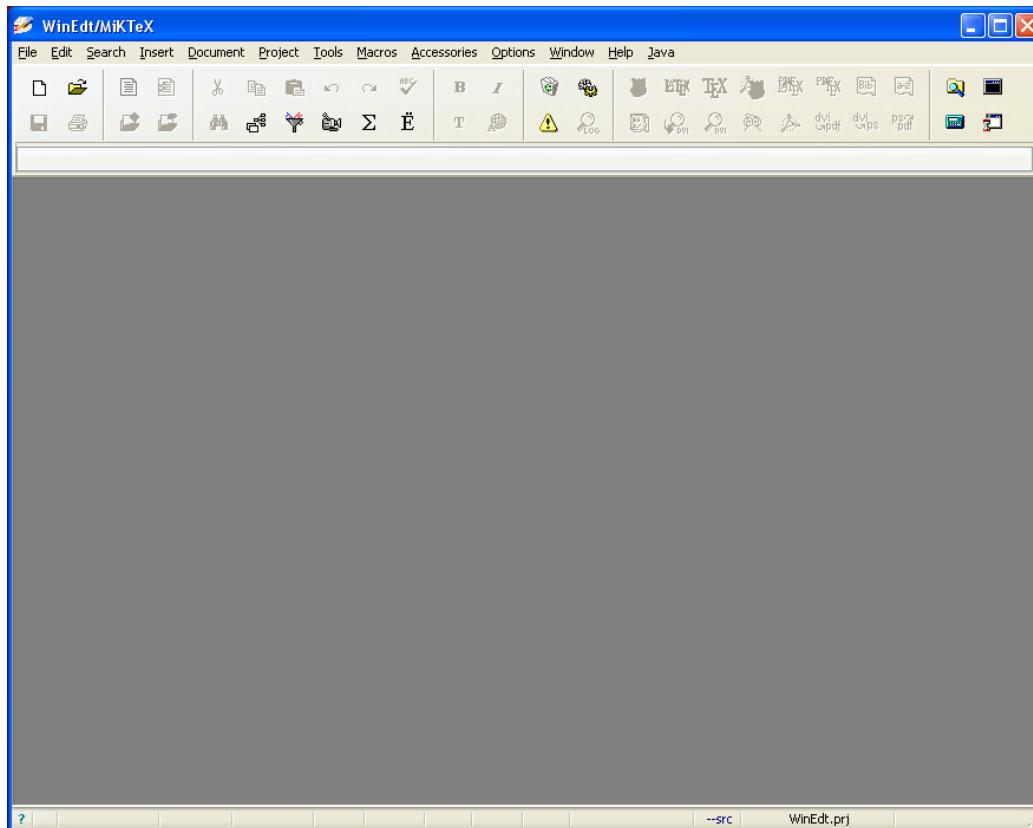
- WinEdt – editor
- Yap – DVI previewer
- GSView – PS previewer

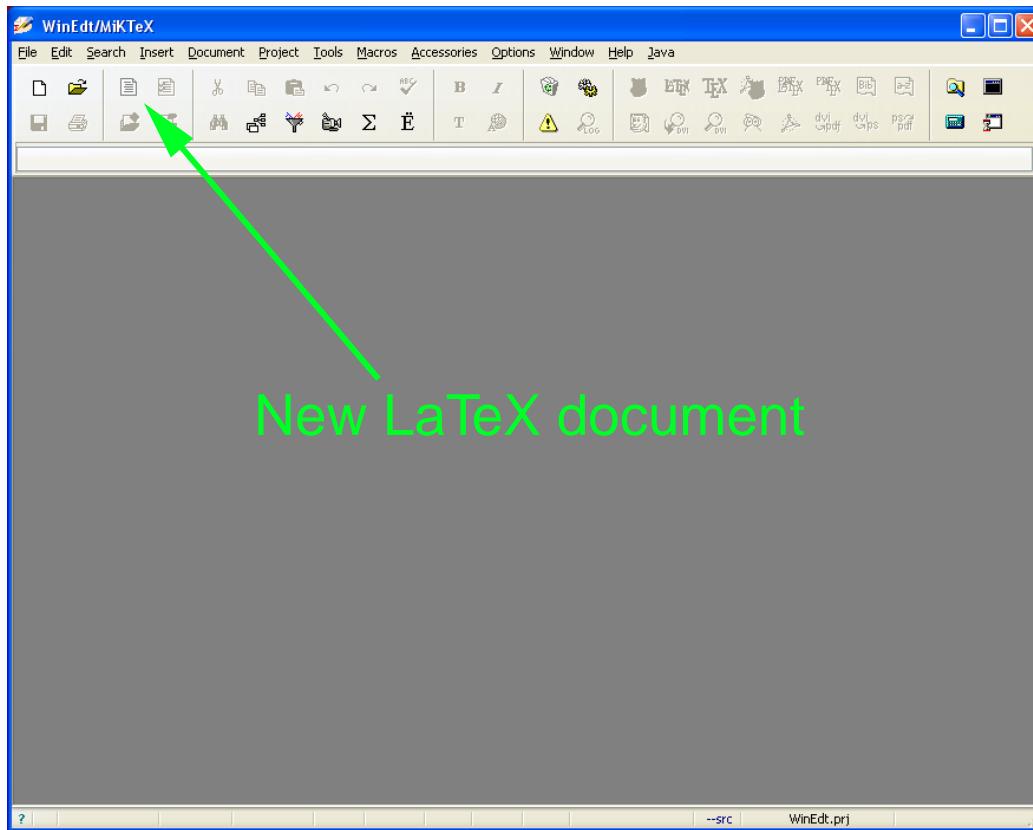
Other useful programs:

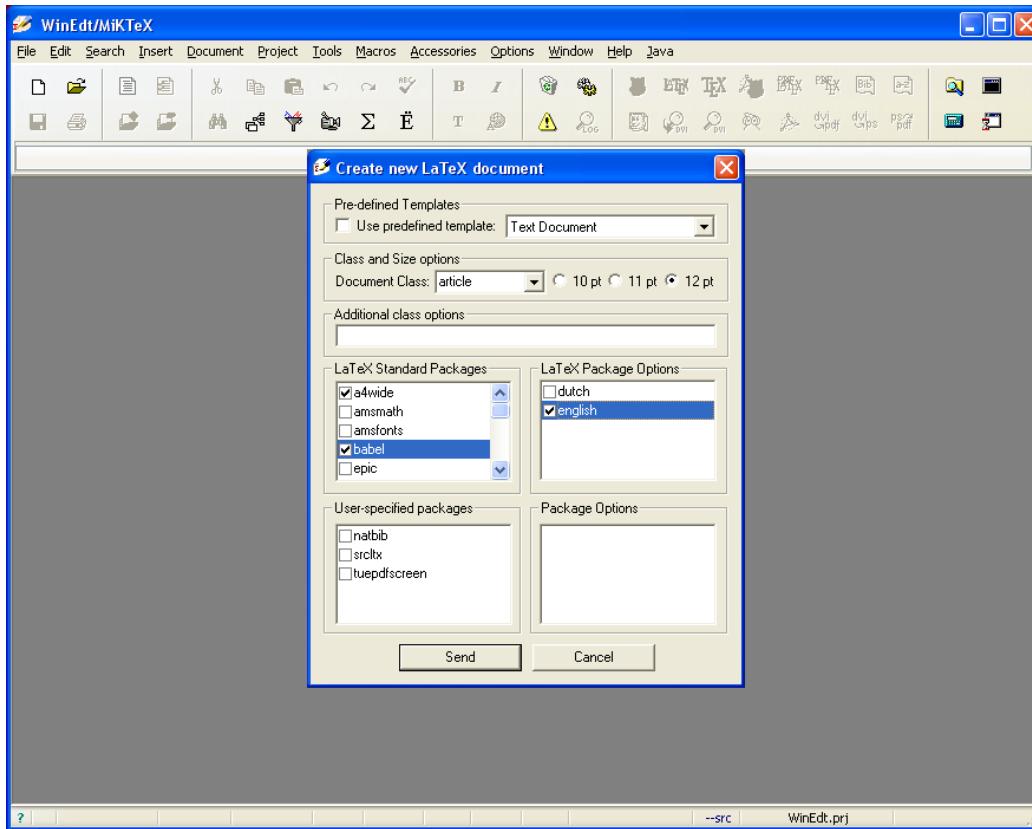
- Adobe Acrobat or Adobe Reader – view/edit PDF files
- Corel Designer – Create and export EPS Images
- Open Office.org Draw – Create and export EPS Images

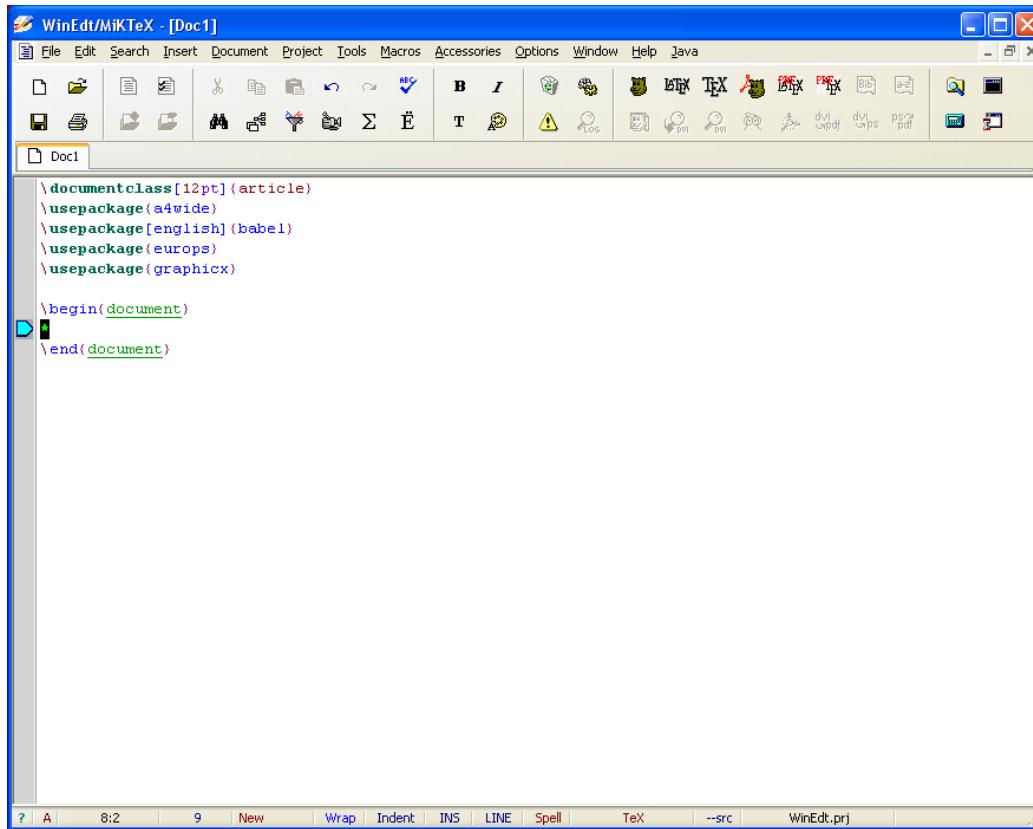
# WinEdt

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The screenshot shows the WinEdt 5.0 interface with the title bar "WinEdt/MiKTeX - [D:\MyDocs\cursusMiKTeX\examples\example1.tex]". The menu bar includes File, Edit, Search, Insert, Document, Project, Tools, Macros, Accessories, Options, Window, Help, and Java. The toolbar contains various icons for file operations, document structure, and tools. The main window displays the LaTeX code for "example1.tex".

```
\documentclass[12pt]{article}
\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage{eurosym}
\usepackage{graphicx}

\begin{document}

\title{\Huge MiK\TeX{} and advanced \LaTeX{}\\ Day 1}
\author{\Large Marko Boon}

\begin{document}
\maketitle

\tableofcontents

\section{Programs on the TU/e MiK\TeX{} CD-ROM:}
\begin{itemize}
\item WinEdt
\item Yap
\item GSView
\item Designer
\end{itemize}

\section{\LaTeX{} for experienced users}
\begin{itemize}
\item create graphics and include them in your \LaTeX{} document
\item use non-standard headers and footers
\item change chapter and section title appearance
\item create a master index
\item create a bibliography
\end{itemize}
```

The status bar at the bottom shows file navigation information: ? | A | 1:1 | 41 | Wrap | Indent | INS | LINE | Spell | TeX | --src | WinEdt.prj |

 runs  $\text{\LaTeX}$  on the current document. If no errors are found, the resulting DVI file will be opened in Yap.

 runs Yap on the generated DVI file.

 converts DVI to PostScript.

 opens the PostScript file in GSView.

 runs PDF $\text{\LaTeX}$  on the current document.

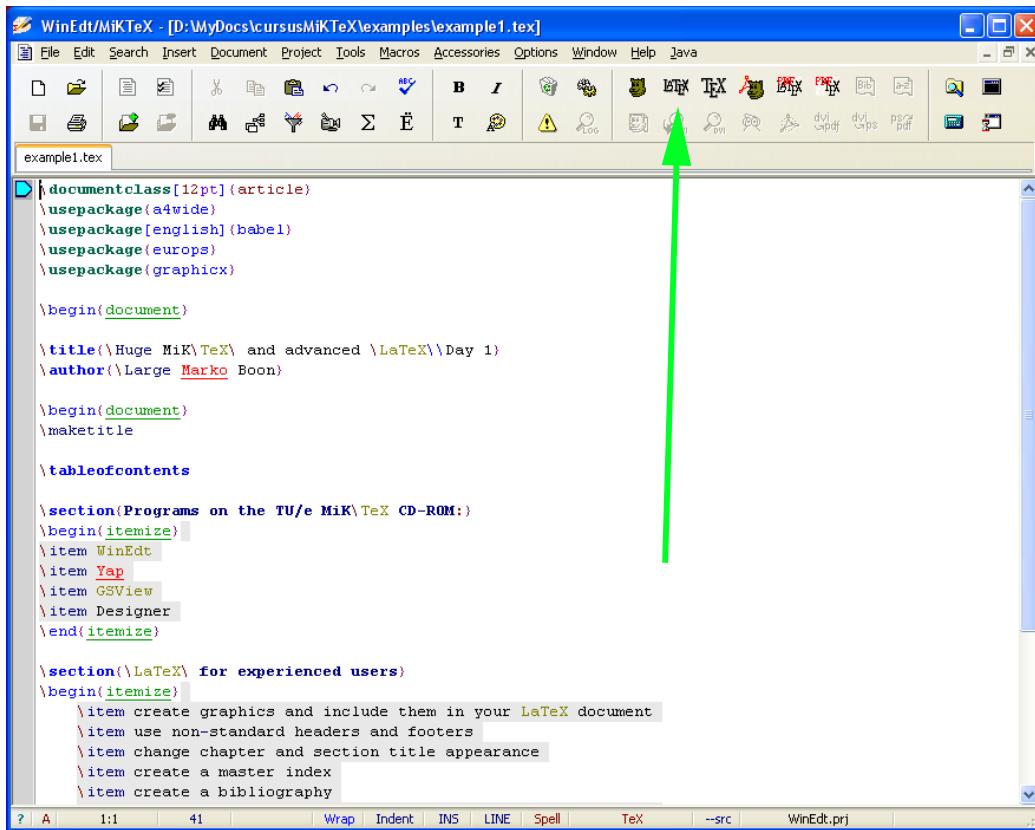
 opens the PDF document in Adobe Reader.

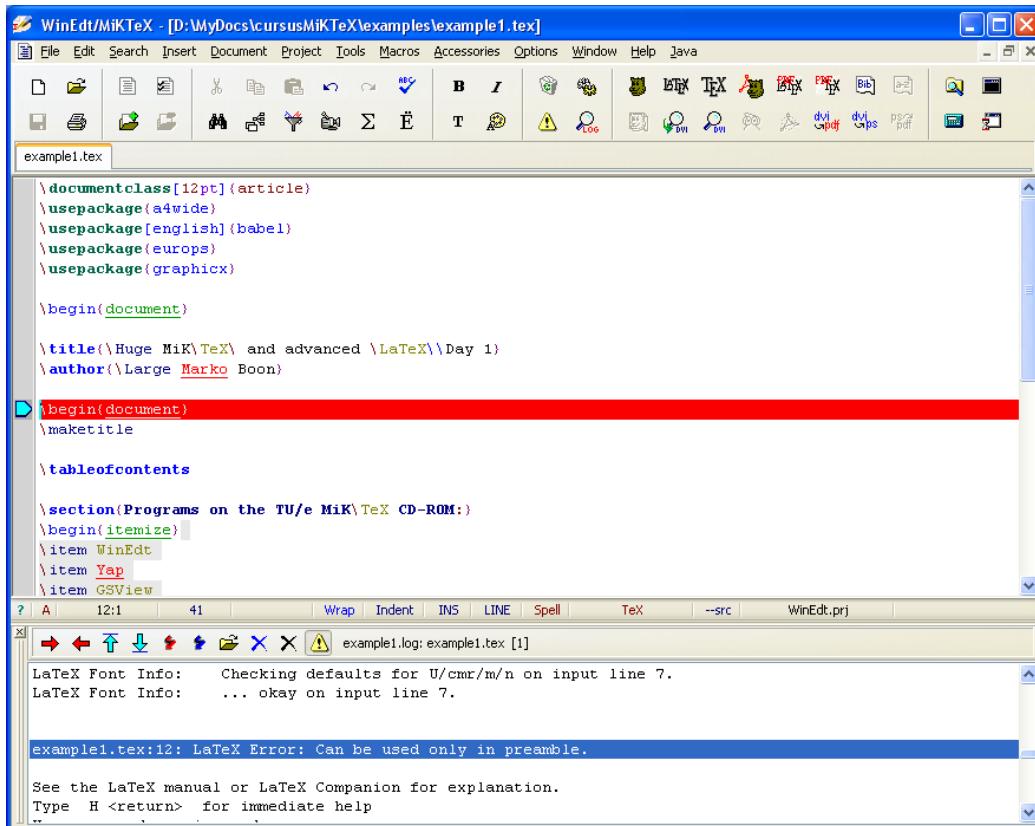
 opens the document in Yap and jumps to the current location in the document.

 starts Bib $\text{\TeX}$ (for bibliographies).

 generates a master index.

 removes all generated auxiliary files (DVI, LOG, PDF, BIB, ...). Only the PostScript file will not be deleted.





The screenshot shows the WinEdt 5.0 interface with a LaTeX document open. The menu bar includes File, Edit, Search, Insert, Document, Project, Tools, Macros, Accessories, Options, Window, Help, and Java. The toolbar contains various icons for file operations, text styling (B, I), and document processing (PDF, PS, DVI, BibTeX). The main window displays the LaTeX code for 'example1.tex'. The code includes document class definitions, package imports, and sections for 'Programs on the TU/e MiK\TeX CD-ROM' and 'LaTeX for experienced users'. The interface features color-coded syntax highlighting and a status bar at the bottom.

```
\documentclass[12pt]{article}
\usepackage{a4wide}
\usepackage[english]{babel}
\usepackage{eurosym}
\usepackage{graphicx}

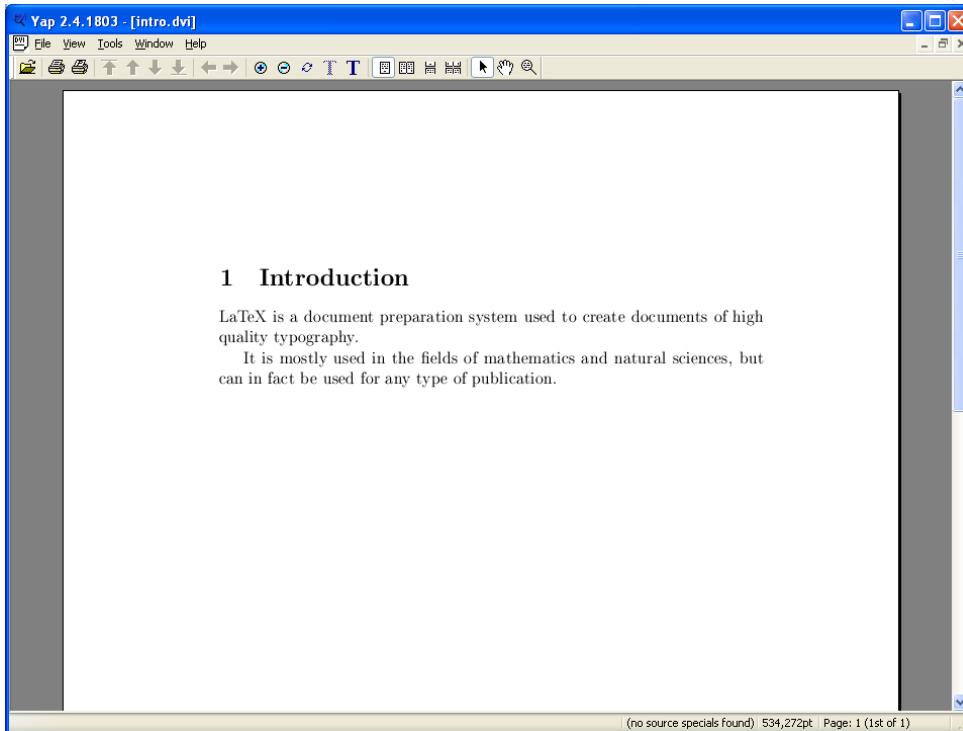
\title{\Huge MiK\TeX and advanced \LaTeX\ Day 1}
\author{\Large Marko Boon}

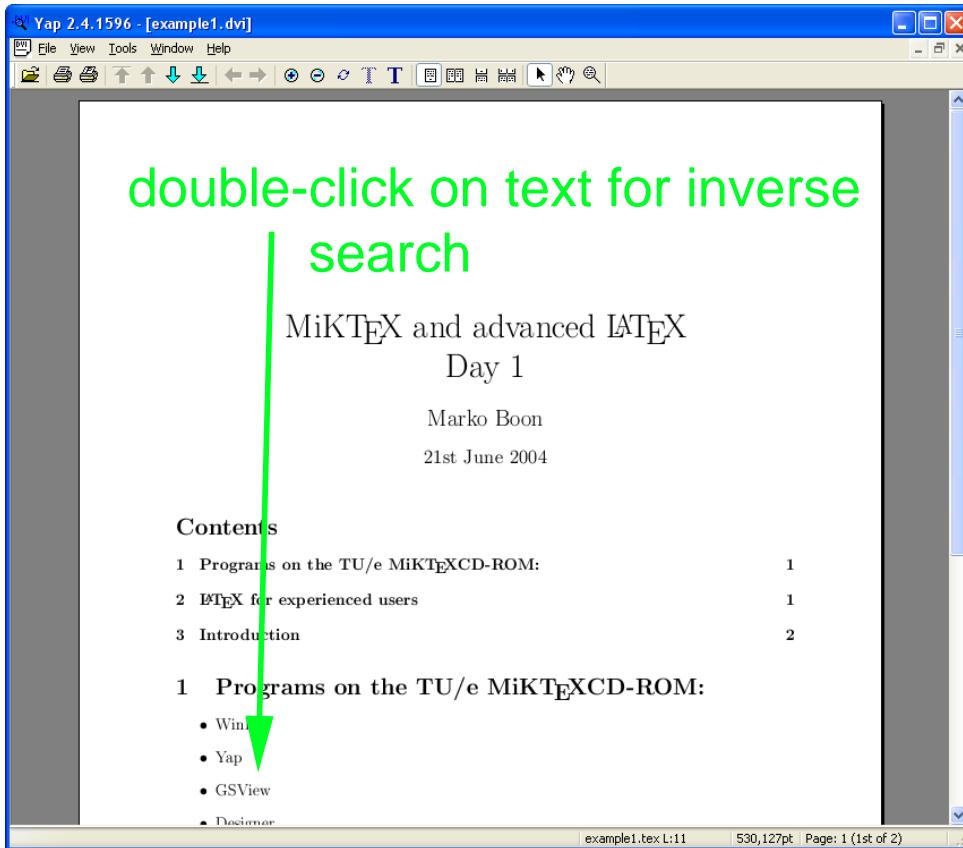
\begin{document}
\maketitle

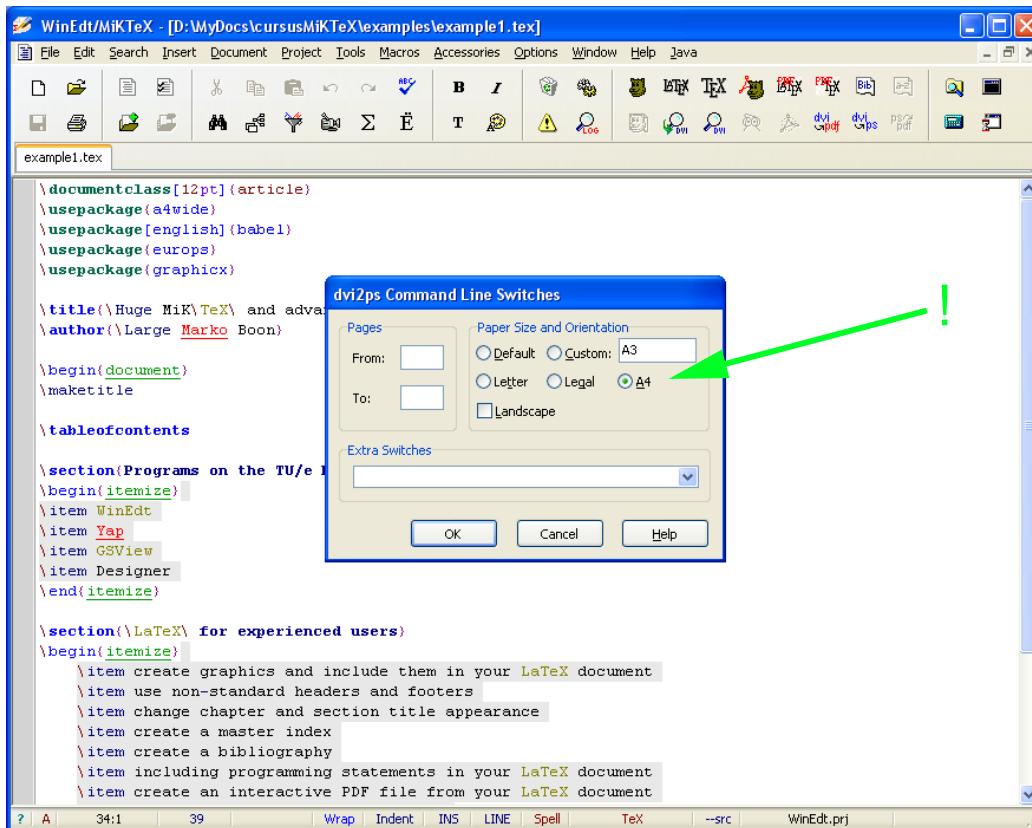
\tableofcontents

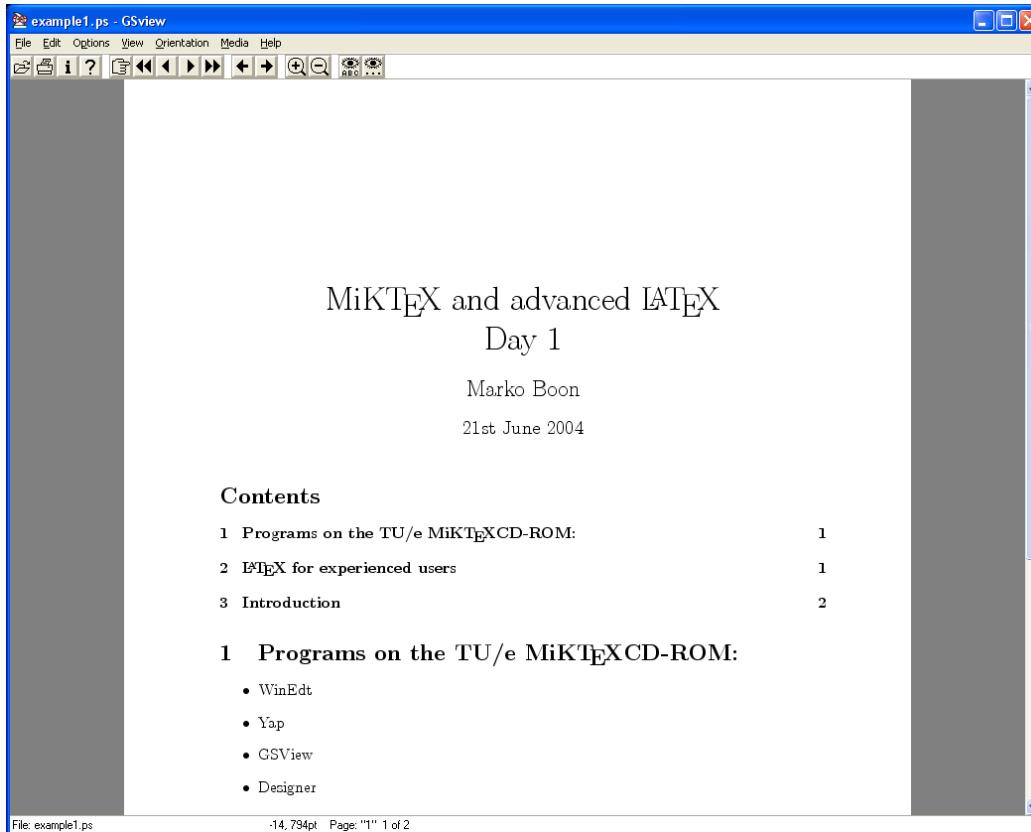
\section{Programs on the TU/e MiK\TeX CD-ROM:}
\begin{itemize}
\item WinEdt
\item Yap
\item GSView
\item Designer
\end{itemize}

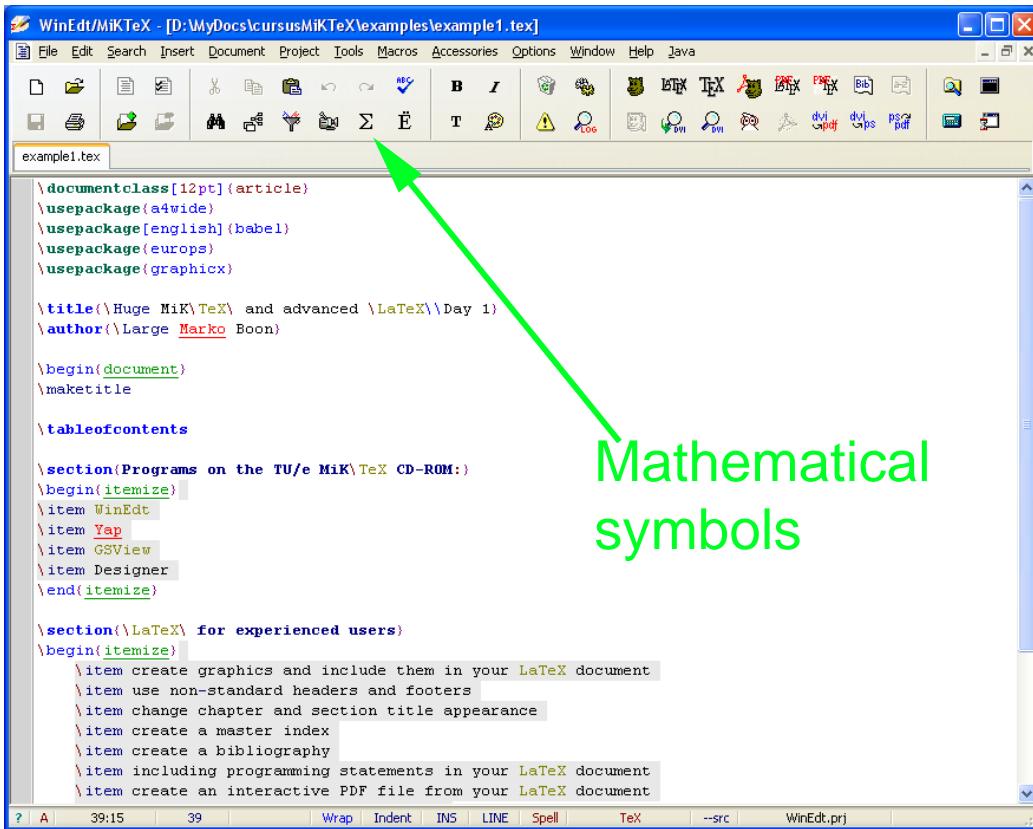
\section{LaTeX for experienced users}
\begin{itemize}
\item create graphics and include them in your \LaTeX\ document
\item use non-standard headers and footers
\item change chapter and section title appearance
\item create a master index
\item create a bibliography
\item including programming statements in your \LaTeX\ document
\item create an interactive PDF file from your \LaTeX\ document
\end{itemize}
```



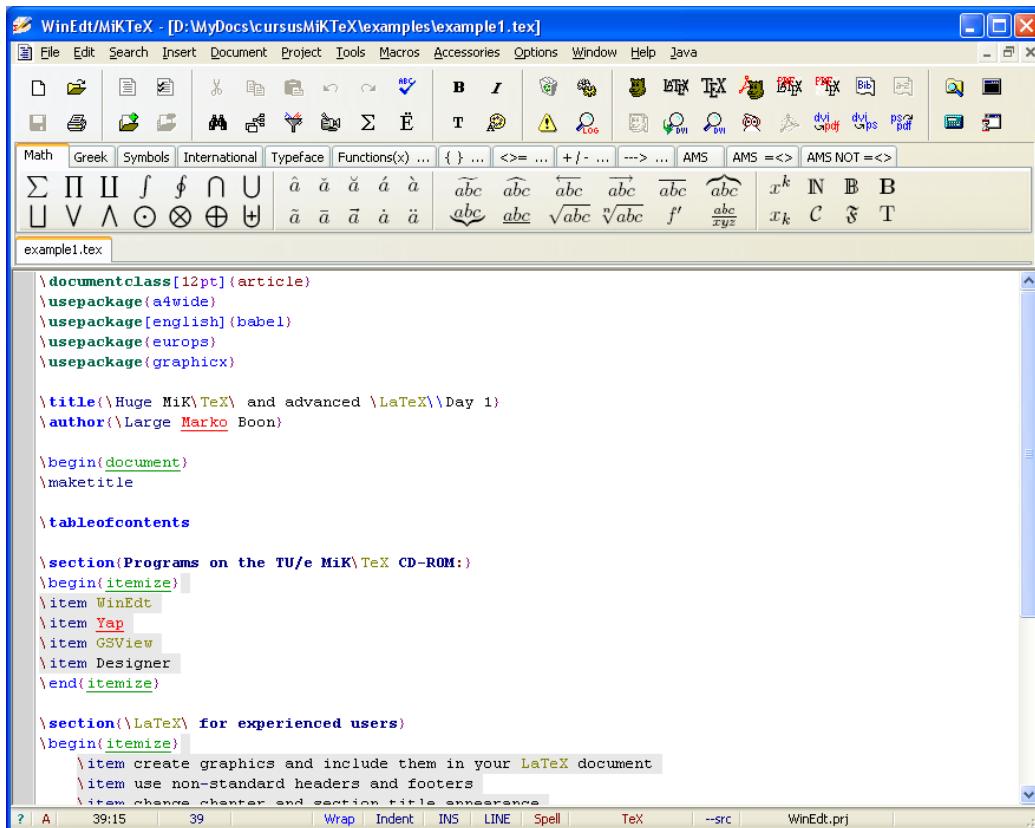


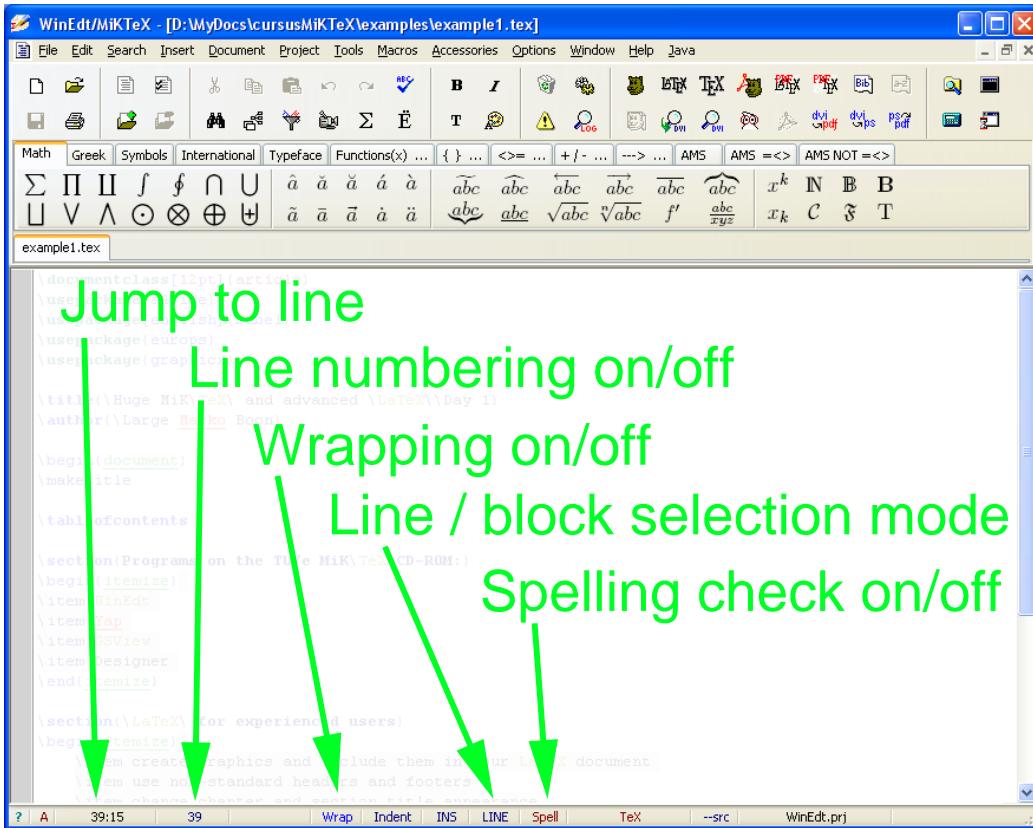






Mathematical  
symbols





A *command* is an instruction to  $\text{\LaTeX}$  to do something special. Three types of command names:

- the single characters # \$ & ~ \_ ^ % { } all have special meaning
- to print one of these characters, precede it with a backslash: \\$ \# \%
- the backslash character \ plus a sequence of letters, ending with the first non-letter: \large \Large \bfseries

A *command* is an instruction to  $\text{\LaTeX}$  to do something special. Three types of command names:

- the single characters # \$ & ~ \_ ^ % { } all have special meaning
- to print one of these characters, precede it with a backslash: \\$ \# \%
- the backslash character \ plus a sequence of letters, ending with the first non-letter: \large \Large \bfseries

Some commands have a so-called \*-form to modify their functionality somehow. Example:

```
\section*{Introduction}
```

# Text, Symbols and Commands

Many commands operate on some piece of text, which then appears as an *argument* in curly braces following the command name. Examples:

```
\section{Introduction}
```

```
\textbf{bold text}
```

```
\begin{document}
```

# Text, Symbols and Commands

Many commands operate on some piece of text, which then appears as an *argument* in curly braces following the command name. Examples:

```
\section{Introduction}
```

```
\textbf{bold text}
```

```
\begin{document}
```

Optional arguments are put into square brackets and mandatory arguments into curly brackets:

```
\documentclass[11pt]{article}
```

```
\usepackage[dutch]{babel}
```

## Environments

An *environment* affects the text within it treating it differently according to the environment parameters.

This text will not appear centered.

```
\begin{center}
```

This text will appear centered.

This text will appear centered.

This text will appear centered.

```
\end{center}
```

This text will not appear centered.

## Declarations

A *declaration* is a command that changes the values or meanings of certain parameters or commands without printing any text. The effect ends when another declaration of the same type is encountered.

This text appears normal while \bfseries this text appears boldface.

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A *declaration* is a command that changes the values or meanings of certain parameters or commands without printing any text. The effect ends when another declaration of the same type is encountered.

```
This text appears normal while \bfseries this text  
appears boldface.
```

When the declaration occurs within an environment or within a { } block, its scope extends only to until the end of this environment or block.

```
This text appears normal while {\bfseries this text  
appears boldface}. This text is normal again.
```

```
\begin{center}
```

```
\bfseries
```

This text appears bold.

```
\end{center}
```

This text is normal again.

## Loading Packages

A *package* is a set of  $\text{\LaTeX}$  commands (or symbols, environments, declarations) stored in a file with the extension `.sty`. To invoke a package, simply call

```
\usepackage{package_name}
```

in the preamble!

Example:  $\text{\LaTeX}$  does not have a command to include graphics, so if we want to include graphics in our document, we should load the package `graphicx` which defines a new command `\includegraphics`.

## Special Characters – Spaces

$\text{\LaTeX}$  takes care of spacing in your document. The following two texts appear exactly the same in the DVI file:

```
\section{Introduction}
```

LaTeX is a document preparation system.  
It is widely used in the fields of mathematics  
and natural sciences, but also spreading to  
many other disciplines.

```
\section{Introduction} LaTeX is a  
document preparation system. It is  
widely used in the fields  
of  
mathematics and natural  
sciences,  
but also spreading to many other disciplines.
```

## Special Characters – Spaces

Some rules:

- one blank is the same as a thousand, only the first one counts.
- blanks at the beginning of an input line are ignored.
- blanks terminating a command name are removed.
- the end of a line is treated as a blank.

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To force a space to appear where it would otherwise be ignored: \ .

To create a smaller space: \ ,

A protected space: ~ ensures that certain words remain together.

To force a new line: \newline or \\

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To create a smaller space: \ ,

A protected space: ~ ensures that certain words remain together.

To force a new line: \newline or \\

But you should never use \\, but start a new paragraph instead.

## Special Characters – Spaces

Spacing of any desired size may be inserted into the text with the commands

```
\hspace{10cm}
```

```
\hspace*{-3mm}
```

`\hspace` has no effect if it should come at the beginning of a line. The `*-form` will insert the spacing no matter where it occurs.

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```
\hfill
```

The command `\hfill` is an abbreviation for `\hspace{\fill}` which inserts enough space at that point to force the text on either side to be pushed to the left and right margins:

```
Left \hfill Right
```

Left Right

## Special Characters – Spaces

Vertical spacing is created using the `\vspace` or `\vfill` command:

```
\vspace{10cm}  
\vspace*{-3mm}  
\vfill
```

Further commands for increasing the spacing between paragraphs are:

```
\smallskip  
\medskip  
\bigskip
```

## Lengths and units

Lengths consist of a decimal number, followed by a dimensional unit. Some units:

cm centimeter

mm millimeter

in inch (= 2.54cm)

pt point ( $1in = 72.27\text{ pt}$ )

em font-specific size: the width of the capital M

ex font-specific size: the height of the letter x

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em font-specific size: the width of the capital M

ex font-specific size: the height of the letter x

Using `\setlength{length_variable}{length_value}` you can modify length variables in  $\text{\LaTeX}$ .

```
\setlength{\textwidth}{10cm}
```

## Special Characters – Quotation Marks

Single quotes are produced with:    '    '

Double quotes are produced with:    "    "

Avoid using the double quote character "

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```
He said: 'Hello world'.
```

```
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```

```
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## Special Characters – Hyphens and Dashes

To create – characters of different length, just repeat the - character:

- is called hyphen
- is called en dash
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The minus sign is obtained by entering math mode (which will be discussed later):

```
$3 - 4 = -1$
```

$$3 - 4 = -1$$

## Special Characters – Command Characters

As mentioned before, the characters # \$ ~ \_ ^ { } % are interpreted as commands.

To print them as text, give a command consisting of \ plus that character:

```
\# \$ ~ _ ^ { } %
```

```
# $ ~ _ ^ { } %
```

## Special Characters – Command Characters

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To print them as text, give a command consisting of \ plus that character:

```
\# \$ ~ _ ^ { } %
```

```
# $ ~ _ ^ { } %
```

To print a backslash, use the command \textbackslash: \

## Special Characters – Accents

Diacritical marks or accents can be created with  $\text{\LaTeX}$ :

```
\`e \^e \~o \"o \=o \v{s} \c{c}  
be\"invloeden  
het re\"ele deel  
Cura\c{c}ao
```

è é ô ö õ ò š ç

beïnvloeden

het reële deel

Curaçao

## Special Characters

The package `textcomp` defines a lot of special characters. First we have to load this package in the preamble:

```
\usepackage{textcomp}
```

Now we can use all the special characters:

```
\texteuro \copyright \textcelsius
```

€ © °C

## Special Characters

Special symbols can be entered directly, but only if the right input encoding is specified. The input encoding depends on the type and language of the operating system. We have to load the package `inputenc` to specify the correct encoding:

```
\usepackage [ansinew] {inputenc}
```

beïnvloeden, reëel, Curaçao  
€ f © ¥ §

beïnvloeden, reëel, Curaçao  
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€ f © ¥ §

beïnvloeden, reëel, Curaçao  
€ f © ¥ §

Please note that some of these characters also require the `textcomp` package.

## The Euro Symbol: €

Adobe created a font containing euro symbols which also contains bold, italic and serif versions. To use these symbols, load the package `europs`. Now we can use the following commands:

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\EUR – creates a Euro symbol depending on the current text style

**Bold:** €

*Italic:* €

Sans-serif: €

## The date

$\text{\LaTeX}$  contains a macro to print the current date: `\today`. The format of the date depends on the language set with the package `babel`.

`\today`

October 7, 2008

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`\today`

October 7, 2008

`\selectlanguage{dutch} \today`

7 oktober 2008

## Hyphenation

$\text{\LaTeX}$  determines how to hyphenate words based on the language set in the package babel:

```
\usepackage [dutch] {babel}
```

However, it is possible to tell  $\text{\LaTeX}$  how to hyphenate a word:

```
\hyphenation{man-u-script com-pu-ter re-sus-ci-tate}
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\hyphenation{man-u-script com-pu-ter re-sus-ci-tate}
```

It is possible in  $\text{\LaTeX}$  to turn hyphenation off. If you want to turn it off for the complete document, put the command `\sloppy` in the preamble.

If you want to turn hyphenation off temporarily, use the environment

```
\begin{sloppypar}
```

```
\end{sloppypar}
```

## Document Class

The first command in a .tex file determines the global processing format for the entire document:

```
\documentclass[options]{class}
```

Supported classes are book, report, article, letter or slides.

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Supported options:

- **font sizes:** 10pt 11pt 12pt
- **paper size:** a4paper letterpaper
- **number of columns:** onecolumn twocolumn
- **print style:** oneside twoside
- **formula style:** leqno fleqn

## Loading packages

Packages are loaded in the preamble. A *package* is a set of  $\text{\LaTeX}$  commands (or symbols, environments, declarations) stored in a file with the extension `.sty`.  
Important packages:

- a4wide uses smaller page margins, which means that more text fits on one page.
- amsmath contains advanced mathematical symbols.
- babel loads hyphenation rules for foreign languages.
- europs loads the Euro symbol: €.
- fancyhdr is used to customise headers and footers.
- graphicx defines a command to load external graphics.
- hyperref adds interactivity (hyperlinks, bookmarks) to your document.

## Page Style

The page style is controlled by the command:

```
\pagestyle{style}  
\thispagestyle{style}
```

Most common styles are:

empty page head and footer is empty.

plain empty page head, centred page number in the foot. Default for article and report.

headings the head contains the page number as well as title information. The foot is empty. Default for book.

## Page Style

The package `fancyhdr` defines a new page style: `fancy` that the user can easily redefine. Now it is possible to specify the headers and footers manually:

```
\lhead{...}      \chead{...}      \rhead{...}  
  
\lfoot{...}     \cfoot{...}     \rfoot{...}
```

If you want to distinguish between odd and even pages, it becomes slightly more complicated:

```
\fancyhead[RO, LE]{...}  
  
\fancyfoot[C]{...}
```

L = Left, C = left, R = right, O = odd, E = even.

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```

If you want to distinguish between odd and even pages, it becomes slightly more complicated:

```
\fancyhead[RO, LE]{...}  
  
\fancyfoot[C]{...}
```

L = Left, C = center, R = right, O = odd, E = even. The command `\fancyhf{}` clears all headers and footers.

## fancyhdr - Example

```
\pagestyle{fancy}  
\fancyhf{}  
\fancyhead[CE] {\bfseries\leftmark}  
\fancyhead[CO] {\bfseries\rightmark}  
\fancyfoot[RO]{\thepage}  
\fancyfoot[LE]{\thepage}
```

The command `\thepage` displays the page number. The commands `\leftmark` and `\rightmark` contain the automatic texts for the headings.

## Page Numbering

You can set the page number manually:

```
\setcounter{page}{14}
```

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```
\setcounter{page}{14}
```

You can also control the style of the page numbering:

```
\pagenumbering{style}
```

The allowed styles are:

arabic normal (Arabic) numerals: 1, 2, 3, 4

roman lowercase Roman numerals: *i*, *ii*, *iii*, *iv*

Roman uppercase Roman numerals: *I*, *II*, *III*, *IV*

alph for lowercase letters: *a*, *b*, *c*, *d*

Alph for uppercase letters: *A*, *B*, *C*, *D*

## Paragraph Formatting

The following parameters affect the appearance of a paragraph:

\parskip the distance between paragraphs, usually in units of ex

\parindent the amount of indentation for the first line of a paragraph

Use the \setlength command to change the values of these parameters.

```
\setlength{\parskip}{1ex}  
\setlength{\parindent}{0mm}
```

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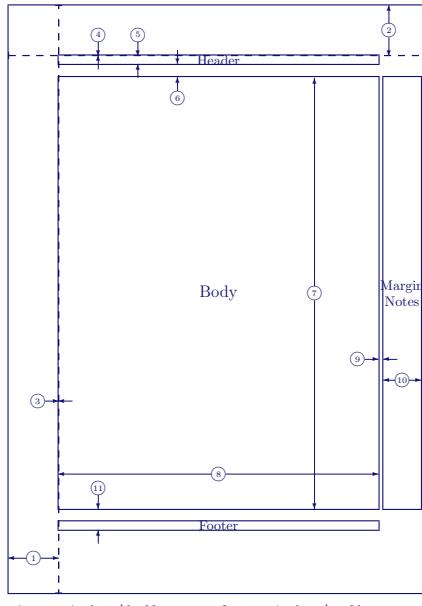
```
\setlength{\parskip}{1ex}  
\setlength{\parindent}{0mm}
```

To suppress the indentation for one paragraph, or to force it:

```
\noindent  
\indent
```

## Page Format

Each page consists of a head, a body (containing the actual text) and a foot. All dimensions can be controlled using the `\setlength` command.



```
1 one inch + \hoffset  
2 one inch + \voffset  
3 \oddsidemargin = 0pt  
4 \topmargin = 0pt  
5 \headheight = 12pt  
6 \headsep = 19pt  
7 \textheight = 621pt  
8 \textwidth = 460pt  
9 \marginparsep = 7pt  
10 \marginparwidth = 54pt  
11 \footskip = 30pt  
\hoffset = 0pt  
\paperwidth = 597pt  
\marginparpush = 7pt (not shown)  
\voffset = 0pt  
\paperheight = 845pt
```

```
1 one inch + \hoffset  
3 \oddsidemargin = 0pt  
5 \headheight = 12pt  
7 \textheight = 621pt  
9 \marginparsep = 7pt  
11 \footskip = 30pt  
\hoffset = 0pt  
\paperwidth = 614pt  
2 one inch + \voffset  
4 \topmargin = 0pt  
6 \headsep = 19pt  
8 \textwidth = 460pt  
10 \marginparwidth = 54pt  
\marginparpush = 7pt (not shown)  
\voffset = 0pt  
\paperheight = 794pt
```

## Multicolumn Text

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- The document class option `twocolumn` sets the entire document in two columns per page
- Individual pages may be output in one or two columns:

```
\onecolumn  
\twocolumn [header text]
```

Please note that these commands start a new page.

## Multicolumn Text

- The document class option `twocolumn` sets the entire document in two columns per page
- Individual pages may be output in one or two columns:

```
\onecolumn  
\twocolumn [header text]
```

Please note that these commands start a new page.

- To select a different number of columns within one page, use the `multicols` environment which is defined in the package `multicol`:

```
\usepackage{multicol}  
...  
\begin{multicols}{3} [header text]  
Text set in 3 columns.  
\end{multicols}
```

## Parts of the Document – Title Page

```
\title{Title text}  
\author{Author names and addresses}  
\date{Date text}  
\maketitle
```

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\title{Title text}  
\author{Author names and addresses}  
\date{Date text}  
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```

Use the **\and** command to define multiple authors:

```
\author{Marko Boon\\ marko@win.tue.nl \and  
Anton Stoorvogel\\ a.a.stoorvogel@tue.nl}
```

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```
\title{Title text}  
\author{Author names and addresses}  
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```

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```
\author{Marko Boon\\ marko@win.tue.nl \and  
Anton Stuurvogel\\ a.a.stuurvogel@tue.nl}
```

Use the **\thanks** command to create a footnote:

```
\author{Marko Boon\thanks{E-mail: marko@win.tue.nl}}
```

## Parts of the Document – Title Page

```
\title{Title text}  
\author{Author names and addresses}  
\date{Date text}  
\maketitle
```

Use the **\and** command to define multiple authors:

```
\author{Marko Boon\\ marko@win.tue.nl \and  
Anton Stoorvogel\\ a.a.stoorvogel@tue.nl}
```

Use the **\thanks** command to create a footnote:

```
\author{Marko Boon\thanks{E-mail: marko@win.tue.nl}}
```

Use **\date{ }{ }** to omit the date.

## Parts of the Document – Abstract

The abstract is produced with the abstract environment:

```
\begin{abstract}  
Text for the abstract.  
\end{abstract}
```

In document class report the abstract appears on a separate page (without page number).

In document class article the abstract appears below the title.

## Parts of the Document – Sections and chapters

The following commands produce automatic, sequential sectioning:

```
\chapter{ }
\section{ }
\subsection{ }
\subsubsection{ }
```

```
\chapter*{ }
\section*{ }
\subsection*{ }
\subsubsection*{ }
```

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```
\chapter{ }
\section{ }
\subsection{ }
\subsubsection{ }
```

```
\chapter*{ }
\section*{ }
\subsection*{ }
\subsubsection*{ }
```

Remarks:

- The command `\chapter` exists in document classes book and report only.
- A \* behind the command results in the unnumbered version which will not be included in the table of contents.
- The book class also provides a `\part` command.

## Parts of the Document – Appendix

An appendix is introduced with the declaration \appendix

- Resets the section/chapter counter
- Changes the numbering form from numerals to capital letters (A, B, ...)
- Replaces the word “Chapter” by “Appendix”.

Please note that the actual word “Appendix” is not added to the table of contents!

## Book Structure

To simplify the structuring of the book, use the commands:

```
\frontmatter  
\mainmatter  
\backmatter
```

Front matter: preface, table of contents

Main matter: main body of text

Back matter: bibliography, index

Front matter has Roman page numbering and suppresses the numbering of chapters. Back matter also has unnumbered chapters. The page number is reset for the main matter.

## Table of Contents

The table of contents is generated and printed with the command `\tableofcontents` (normally after title page and abstract).

All entries are created automatically, based on the sectioning commands. You have to run `latex` twice to get all references right! It is recommended to use the `texify` command.

## Table of Contents

The table of contents is generated and printed with the command `\tableofcontents` (normally after title page and abstract).

All entries are created automatically, based on the sectioning commands. You have to run `latex` twice to get all references right! It is recommended to use the `texify` command.

To create additional entries manually, use the command:

```
\addcontentsline{toc}{section type}{entry text}  
\appendix  
\addcontentsline{toc}{chapter}{\noindent Appendix}  
\chapter{Statistical Tables}
```

# TeXify and PDFTeXify

81/82

If you use the button for (PDF)TeXify instead of (PDF)LaTeX, WinEdt will run LaTeX, BibTeX, makeindex as many times as necessary.



TeXify



PDFTeXify

## Labels and References

The command `\label{marker}` stores the current value of the relevant counter (section, chapter, equation, figure, table etc.) at that point in the text. To refer to a label, use:

- `\ref` to print the section, chapter, equation, figure or table number.
- `\pageref` to print the page number on which the `\label` command was issued.

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- `\pageref` to print the page number on which the `\label` command was issued.

```
\section{Labels and References}\label{labels}}
```

In section `\ref{labels}` you will find information on how to create labels and references in `\LaTeX`. The sections starts on page `\pageref{labels}`.