LaTeX Assignment 1/3

- ▶ GROUP ASSIGNMENT

LATEX Assignment 1/3

- ▶ GROUP ASSIGNMENT
- ▶ create a report in LATEX about all the **homework** of the previous lectures
- ▶ the Report should have the following elements
    1. a table of content
    2. one section per homework (one main author per section)
    3. a list of references (cross referenced in the text)
    4. one or more figures/section (figure should be cross referenced)
    5. at least one table/section (table should be cross referenced)
    6. show that you master LATEX by using: bold, italic, color, etc.
    7. use your prefered VCS to keep track of the contributions
    8. create a very simple Makefile (manually) to compile and generate the final pdf
    9. add a link to the VCS repository to your wiki so we can copy/checkout the last version and build your report to create the pdf file

LaTeX Assignment 2/3

- ▶ This is a Teamwork, so split the responsabilities among the group members: one student reponsible for each section (he/she should write the first draft and commit it to the repository, the others checkout add/remove and commit)
- ▶ likely there will be conflicts solve them (friendly)
- ▶ it is the responsability of the group if the project fail to compile (so everyone should test that extracting from the repository and compiling the project works correctly)
- ▶ IMPORTANT:
  - ▶ if you use 3rd party figure, don't forget to mention the source (use footnote for that)
  - ▶ use appropriate quoting environment to avoid plagiarim
  - ▶ do not commit all the files to the git/cvs only the tex, bib (if any), and makefile

LATEX Assignment 3/3

Further Reading (read or watch before you start your project it might help you. Don't forget to include this further reading as separate section in your report.

- ▶ http://oestrem.com/thingstwice/2007/05/latex-vs-word-vs-writer/
- ▶ http://openwetware.org/wiki/Word_vs._LaTeX
- ▶ http://tex.stackexchange.com/questions/1756/why-should-i-use-latex
- ▶ http://www.youtube.com/watch?v=5RECQJCebCA

ESA: LaTeX

Part 1:

1. Intro & Hello World
2. Document class, options, packages
3. Sections, lists, and some more
4. Documentation

ESA: LaTeX

Part 2:

1. Cross-references, citations
2. Maths
3. Tables and figures
4. Defining commands and environments

T_EX (/'tɛx/)

- **Donald Erwin Knuth** created T_EX, a typesetting system
- many novel ideas (at the time)
    - Mathematical typesetting
    - Hyphenation and justification
    - ...
- pronounced /'tɛx/
- X represents the Greek letter χ (chi)
- abbreviation of $\tau\epsilon\chi\nu\eta$ (technē), which means both "art" and "craft"
- $\tau\epsilon\chi\nu\eta$ is also the source word of the english word 'technical'

Why TEX?

- **Donald Erwin Knuth** wrote "The Art Of Computer Programming".
- first volume was typeset using **hot metal** typesetting
- second volume was typeset using photographic techniques, Knuth found it to be awful. . .
- after seeing a output of a digital typesetting system, he decided to create his own system
- on May 13, **1977** he described the basic features of TEX in a memo to himself

LaTeX

- ▶ Written in TeX by **Leslie Lamport** in the **early 1980s**
- ▶ a document *markup* system
- ▶ used for creating **academic papers** or **books**, as well as **manuals** and such.
- ▶ Dominant method for writing TeX, few people use TeX directly anymore
- ▶ First version: **LaTeX 2.09** (**1985**)
- ▶ Current version: **LaTeX 2_ϵ** (**1994**)
- ▶ LaTeX3 [1]

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[1] http://www.latex-project.org/latex3.html
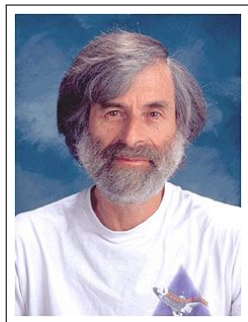
Why LaTeX?

- ▶ Most operating systems are supported
- ▶ Typesetting is automatic, so the user can focus on the content
- ▶ LaTeX sources are **flat text**; compact and portable
- ▶ It **WAS** the de **facto standard** for typesetting academic papers in Maths, Computer Science or Physics
- ▶ It's **free! (well, it's open source. . .)**
- ▶ Has **many options** for using different (natural) languages
- ▶ Not WYSIWYG like OpenOffice or Word

Markup Language

LaTeX is (mostly) a Markup Language (GML):

▶ The source file has a logical markup: **commands** are used to position sections, footnotes, etcetera, and to indicate whether a text is a quote or verbatim. . .

▶ The **visual side** of the document is taken care of by class files which are imported into the source

Advantages to a markup

- you are forced to think about the structure of the document
- the **content** is more important than the **layout**
- the **layout** is consistant, since it is generate
- the average user is not an expert at typesetting, the provided **styles** more often lead to a **better looking** document
- makes it easier to **automate** certain actions on the source (extraction of text for instance)

When to use LaTeX

- **mathematical** typesetting
- **complex documents** using references, indices etcetera
- **supports distributing sources** over multiple files for maintainability

When *not* to use LaTeX

- if you don't know what you are doing and want **fast** results
- if **layout** is more important than content (debatable)
- if you need to **import a lot of objects** like pictures (the 'smoelenboek' was made in LaTeX, takes a while to compile...)

How is LATEX used?

- ▶ create a LATEX source file
- ▶ LATEX source file usually have extension `.tex`
- ▶ run `latex` on the source file, like compilation
- ▶ if there are no errors a `.dvi` file should have been created
- ▶ DVI stands for **DeVice Independent**
- ▶ DVI files can be viewed using a previewer like `xdvi`
- ▶ Generally you work with multiple screens; editor, console, viewer

Portable Document Format (FYI) [2]

- a file format created by **Adobe Systems** in **1993** for document exchange
- based (at least in part) on **PostScript**
- used for representing documents
- encapsulates the text, fonts, images, and 2-D vector graphics of a document
- **independent** of the application software, hardware, and operating system
- open standard, **officially published on July 1, 2008** as ISO 32000-1:2008

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[2]http://en.wikipedia.org/wiki/Portable_Document_Format

Converting DVI to PostScript or PDF

- A `.dvi` file can be converted to PostScript and PDF

from	to	command
DVI	PS	dvips *filename*
DVI	PDF	dvipdf *filename*

- you can also create a PDF directly from LaTeX using:
  `pdflatex` *filename*

Previewers

- DVI: `xdvi`
- PostScript: `gv`, `evince`
- PDF: `xpdf`, `acroread`, `evince`

Install them using `apt-get` if they are not installed yet

LATEX example

```latex
\documentclass{article}
% PREAMBLE
\begin{document}
% CONTENTS
Hello World! \LaTeX{} says hi!
\end{document}
```

Example explained

The first line `\documentclass`{article}
indicates which **type** of documentclass we are using, in this case
we are creating an article. The **command** loads the class file
`article.cls` which takes care of most of the **layout** of the
document.

- ▶ Additional style files can be imported using the `usepackage`
  command in the PREAMBLE
- ▶ You can also add your **own** definitions in the PREAMBLE

LATEX example

```
\documentclass[twocolumn,11pt]{article}
\usepackage{a4wide,times,latexsym,amsmath}
\usepackage[dutch]{babel}
\pagestyle{empty}
\newcommand{\vector}[1]{\ensuremath{\mathbf{#1}}}
\begin{document}
This is the text. An example with vectors:
\[ \vector{v} = 2 \vector{w}
\]
\end{document}
```

Standard classes

- article
- report
- book
- slides
- letter

Standard class options

- `10pt|11pt|12pt`. Default is 10pt.
- `letterpaper|a4paper`. Default is letterpaper.
- `landscape`.
- `final|draft`. Default is final
- `oneside|twoside`. Default is oneside
- `onecolumn|twocolumn`. Default is onecolumn

LaTeX Source

- LaTeX source code consists of **textual content** and **commands** for the document.
- commands start with a backslash (\), they are case-sensitive
- the following characters are reserved for use in commands:

  \ % $ ^ _ & # ~ { }

- you can use them literally by prefixing them with a backslash, like \$ to use add a $.

Title

Using the `\maketitle` command you can add a title at the beginning of the document. Use it right after the `\begin{document}`command. Before issuing the `\maketitle` command you have to specify the title, the author and the date:
`\title`{De Titel van dit Document}
`\auhor`{P. Puk \and P. Bel}
`\date`{24 augustus 1965}
`\maketitle`
To leave out the date declare an empty one `\date{}`. If you do not specify a date LATEX will use the current date (`\today`).

Sections

The standard classes support (most of) the following sections:

\part (not in article)
\chapter (not in article)
\section
\subsection
\subsubsection
\paragraph
\subparagraph

Sections

Use: \section{Title of the Section}

- ► LATEX automatically generates section-numbering
- ► A table of contents can be created using \tableofcontents
- ► to create a numberless section use \section*{}

Environments

use a defined environment as follows:
\begin{environment}
...
\end{environment}
Examples are: document, math, itemize, enumerate, description, quote.

Itemize

An example of the itemize environment:

- ► First item
- ► Second item
- ► Third item

Itemize source

```
\begin{itemize}
\item First item
\item Second item
\item Third item
\end{itemize}
```

Enumerate

Example of the enumerate environment:

1. First item
2. Second item
3. Third item

Enumerate source

```
\begin{enumerate}
\item First item
\item Second item
\item Third item
\end{enumerate}
```

Manipulation of List numbers

Example of the enumerate environment:

- ▶ Default numbering Scheme for all levels is numbers
- ▶ These numbers can be changed by redefining the commands that typeset the numbers of various list levels.

1. First level item
    1.1 Second level item
        1.1.1 Third level item
    1.2 Second level item
2. First level item

Manipulation of List numbers (2)

- ► These numbers can be changed by redefining the commands that typeset the numbers of various list levels.
- ► Using \theenumi, \theenumii, \theenumiii and \theenumiv correspond to the number label in different levels of enumerated lists.
- ► \labelenumi, \labelenumii, \labelenumiii and \labelenumiv correspond to the number label in different levels of different levels of itemized lists.

A. First level item
  A.1 Second level item
    A.1.1 Third level item
B. First level item

Description

Example of the description environment:

Item One A description of the first item. A description can span multiple lines, as with this first item...

Item Two A description of the second item.

Item Three A description of the third item.

Description source

```
\begin{description}
\item[Item One] A description of the first item. A description
can span multiple lines, as with this first item...
\item[Item Two] A description of the second item.
\item[Item Three] A description of the third item.
\end{description}
```

Quote

An example of a short quote:

> *This is the short quote This second part is made up of
> two lines, if I add enough characters I should make it. . .*

This is the end of the short quote

Quote source

An example of a short quote:
\begin{quote}
This is the short quote This second part is made up of two lines, if
I add enough characters I should make it. . .
\end{quote}
This is the end of the short quote

Quotation

An example of a longer quote:

> *This is the longer quote, it can also span lines. This second part is made up of two lines, if I add enough characters I should make it. . .*

This is the end of the longer quote

Quotation source

An example of a longer quote:
\begin{quotation}
This is the longer quote, it can also span lines. This second part is
made up of two lines, if I add enough characters I should make
it. . .
\end{quotation}
This is the end of the longer quote

Font Shape

Fonts are made up of shape, series, and family. The following are the shapes:

Upright shape	`\textup{Upright shape}`
Italic shape	`\textit{Italic shape}`
Slanted shape	`\textsl{Slanted shape}`
SMALL CAPS SHAPE	`\textsc{Small caps shape}`

Font: Series en Family

Medium series	\textmd{Medium series}
Boldface series	\textbf{Boldface series}
Roman family	\textrm{Roman family}
Sans serif family	\textsf{Sans serif family}
Typewriter family	\texttt{Typewriter family}

Font size

Font sizes can be varied:

Hallo!	`{\tiny Hallo!}`
Hallo!	`{\scriptsize Hallo!}`
Hallo!	`{\footnotesize Hallo!}`
Hallo!	`{\small Hallo!}`
Hallo!	`{\normalsize Hallo!}`
Hallo!	`{\large Hallo!}`
Hallo!	`{\Large Hallo!}`
Hallo!	`{\LARGE Hallo!}`
Hallo!	`{\huge Hallo!}`
Hallo!	`{\Huge Hallo!}`

General remarks (1)

- Extra spaces are ignored
- an end of line (EOL) in the source is **not related to an EOL in the output**
- commands that end with a letter will 'eat' spaces after it
- this can be remedied by appending a forced space (\ ) or an empty argument ({}):
  The Latex version is `\LaTeX 2.09`: I will get LATEX2.09
  The Latex version is `\LaTeX\ 2.09`: I will get LATEX 2.09
  The Latex version is `\LaTeX{}`: I will get LATEX 2.09
- add **empty lines** to start a new paragraph

General remarks (2)

- Dashes: X-ray, 12–15, or —:

  `X-ray, 12--15, or ---`
- LaTeX assumes that a **period** implies the end of a sentence and adds extra whitespace. Prefix them with a backslash to prevent this.
- apply emphasis using \emph{}: This is very
  `\emph`{important}!
  This is very *important*!

General remarks (3)

- Single quotes (' ') use ' and '.
- Double quotes (" ") use `` and ''
- Elipsis: "...", use \ldots
- A footnote[3] is made using \footnote{}:

  A footnote\footnote{this is a footnote} is ...

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[3]this is a footnote

Possible problems

- watch your character **encoding**. Problems can ensue from **leftover characters** that LATEX does not understand. This happens mostly after copy/paste actions.
- a lot of problems are created by **unterminated** environments, or simply **forgetting a closing bracket**. LATEX does not always give coherent error messages

Documentation

- Tobias Oetiker, et al. *The Not So Short Introduction To LATEX2$_\epsilon$, 2007*
- Leslie Lamport. *LATEX User Guide & Reference Manual*. Addison-Wesley, 1994. The first edition of 1986 describes LATEX 2.09.
- Goossens, Mittelbach, et al. *The LATEX Companion*. Addison-Wesley, 1994.
- Kopka en Daly. *A Guide to LATEX*. (3de editie, Addison-Wesley, 1999).
- Donald Knuth. *The TEX Book*. Addison-Wesley, 1994.
- http://www.tug.org/tutorials/tugindia/