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Practical Work in LaTeX

Technical Information and Communication

Introduction

To be able to complete this practical work you have to have read the slides from the lectures *Professional typesetting with LaTeX 2ε*. A good manual is *The Not So Short Introduction to LaTeX 2ε*.[1]

In Moodle you will after the assignment deadline find a zip file that contains an example template. **Use this template for writing your final report for the course**.

Installation

To give all details here about how to install a distribution of LaTeX is not feasible, since this procedure is heavily dependent on the operating system in combination with the used distribution. Please read the installation instructions for the specific distribution you choose to install. The following distributions are recommended:

- TeX Live – Linux, Mac OS X, and Windows (`http://www.tug.org/texlive/`)
- MikTeX – Windows (`http://www.miktex.org/`)

You will also need a text editor, where you write your LaTeX-code. This program should save files in text format as default. Therefore, a word processing application is not suitable. Some suitable alternatives:

- TeXnicCenter – Windows (`http://www.toolscenter.org/`)
- GNU Emacs – Linux (`http://www.gnu.org/software/emacs/`)
- TeXShop – Mac OS X (`http://www.uoregon.edu/~koch/texshop/`)
- TeXstudio – Windows, Linux, Mac (`http://texstudio.sourceforge.net`)

To be able to read and process PostScript-files you will also need Ghostscript and Ghostview.[2]

[1] `http://www.ctan.org/tex-archive/info/lshort/english/`
[2] `http://www.cs.wisc.edu/~ghost/index.html`

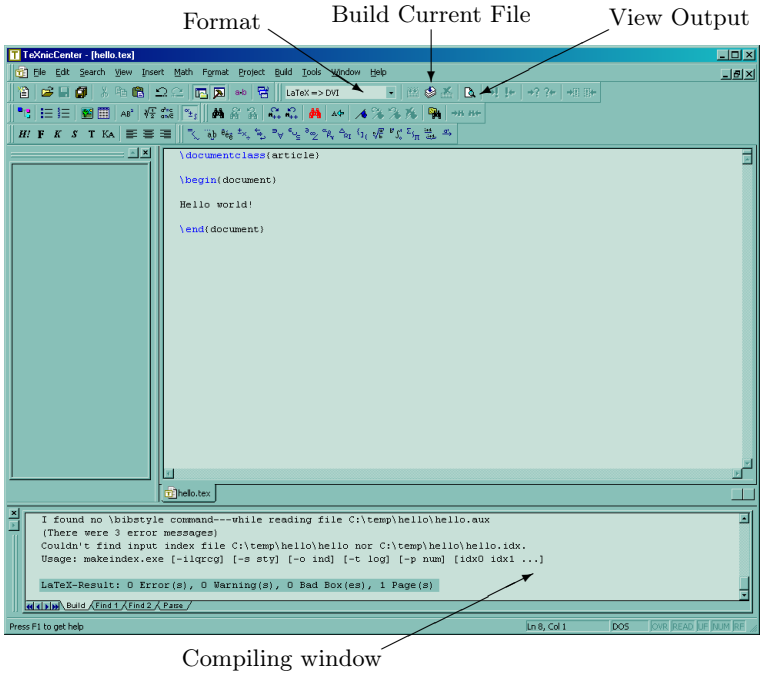


Figure 1: TEXnicCenter.

Practical LATEX

During a usual session with LATEX you change between several different programs – one of the reasons it seems harder to use LATEX than it actually is. Here we give a guide that shows how you create a simple document. Begin by starting a text editor and enter the following code:

```
\documentclass[a4paper]{article}
\begin{document}
Hello world!
\end{document}
```

In TEXnicCenter it could look like in Figure 1. Be sure to write the code exactly as the example says. Create a folder and save the code in a file with the file name `hello.tex` in the new folder. The file suffix `tex` is recommended. Since the document is created using LATEX the document consists of a number of different files, it is wise to keep each document in a separate folder. For now, the new folder only contains one file: `hello.tex`. The next step is to create a file that produces nice output. We do this by compiling our file, with LATEX. In TEXnicCenter you do this by pressing the button "Build Current File" (Ctrl+F7). In Linux we switch to a terminal window and execute the command:

```
latex hello.tex
```

Please note that numerous messages scroll by in the compiling window or terminal window. If you have written the code correctly the last line in the compiling window of TEXnicCenter should look like:

```
LaTeX-result:  0 Error(s), 0 Warning(s), 0 Bad Box(es), 1 Page(s)
```

If one or many errors occurred, verify that you write the code correctly, correct any possible error, save the file and compile it again. If all went well, it is now time to look at the result. Note that in TEXnicCenter, in the frame "Format", it says `LaTeX => DVI`, see Figure 1. This

means that when you compile your file LaTeX generates a file with the name `hello.dvi`. Two more files are created: `hello.aux` and `hello.log`. The first of these contains information that LaTeX needs to get cross references correct. In the other file all messages that are printed in the compilation window stored.

To see the result you click the button "View Output" (F5). The file `hello.dvi` is opened in the dvi viewer. You can zoom in and out using the plus and minus key, respectively. You may even zoom in parts of the document on the screen by pressing the right mouse button and move the mouse pointer over the document like a magnifying glass. To view the result on Linux or Unix you have to execute the command

```
xdvi hello.dvi &
```

in a terminal window (the et sign ensures that you do not lock the terminal window while Xdvi is open). Change back to your text editor, but do not exit the dvi-viewer. Add your own sentence directly after "Hello world!". Save the file and compile it. If everything went well you can switch to the dvi-viewer. Note that the dvi-viewer automatically updates the contents of the document. This example illustrates the procedure you follow when working with LaTeX: Write some text, save file, compile and view the result. If all looks alright, write some more text, save, compile, etc.

In Windows you can print the document from the dvi-viewer. But if you want to send the document to people not using LaTeX there will be problems, since the format DVI is not used outside the LaTeX-world. But if you change to `LaTeX => PDF` in the box "Format" in TeXnicCenter and then compile, you receive a PDF-file instead, and these are more accepted. To create a PDF-file in Linux and Unix you execute `pdflatex` instead of `latex`.

Assignment

You may submit the assignment in groups of **no more** than two (2) persons. Latest day to hand in is **16 December 2018**. **Note that this Assignment is mandatory to pass the course. Solutions sent in after this deadline will not be graded!** Upload **all files** needed for compilation in LaTeX to Moodle. Put all of your files that are needed to compile the document (LaTeX files, template files, pictures, and so on) in a .zip file and name the file with your and your group partners name, for example `YourLastnameAndYourGroupPartnersName.zip`, **not** `lab.zip`, or similar.

Create **one single LaTeX document** that consists of **working examples** for all of the assignments below.

Contact Jonas Nordqvist [3] if you have questions. Your solution should compile without errors and **no** warnings should be generated. A solution that does not comply to these guidelines or does not compile due to errors or missing files will not be graded!

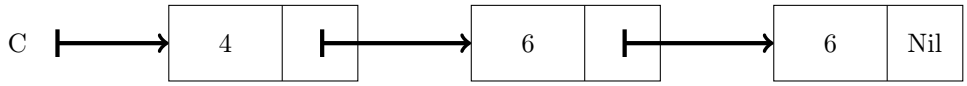
1. Show that you can answer the following questions by **constructing an example** that illustrates them. This means, if you send me the files to a document that compiles without problems, has an abstract and table of contents and is structured with sections and subsections you already answered the first three questions here.
   (a) What does the main structure of a LaTeX document look like?
   (b) How does one typeset an abstract, table of contents, footnote and list?
   (c) How does one get headings on different levels?
   (d) How does one select different typefaces?
   (e) How does one get LaTeX to use Swedish hyphenation?
2. Typeset the following formula:
$$\frac{\sin mx}{\sin x} = (-4)^{(m-1)/2} \prod_{j=1}^{(m-1)/2} \left(\sin^2 x - \sin^2 \frac{2\pi j}{m} \right)$$
   and $f_n = f_{n-1} + f_{n-2}$. The first should be separate and the second should be inlined as it is here in the text right now.
3. Typeset the following table. Pay special attention how the table and the text are formatted! Your table should look exactly like this example.

		World Record	
Name	**Country**	**Event**	**Result**
Anna-Karin Kammerling	Sweden	50 m butterfly	25.57
Wilson Kipketer	Denmark	800 m	2:11.96
Jan Železný	Czech Republic	javelin throw	98.5
Sergei Bubka	Ukrain	pole vault	6.14

4. Show how you make the table from the previous question float with a table text and how a reference is made to it in the text.

[3] jonas.nordqvist@lnu.se

5. Typeset the following picture using Ti*k*Z:



6. Show how to include a picture.

7. Show how to make the figures in the two latest questions floating with a figure text and how to reference to them in the text.

8. Find all errors in the following code and give suggestions for how to correct them.

   (a) `$x^n^2 + y^{n + 1 = z^n`

   (b)
   ```
   \begin{center}
     \emphh{The Johansson Brothers & Son}
   \end{center}
   ```

   (c)
   ```
   .. end of a paragraph. \\
   \\
   A new paragraph ...
   ```

9. Typeset a snippet of program code by your own choice using the listings package.

10. Create the command `\summation{n}{\alpha}` that generates $\sum_{i=0}^{n} \alpha_i$ for example.
    Show two uses with different arguments. For instance, use the command with the arguments `\summation{10}{\gamma}` or `\summation{50}{\beta}` to get $\sum_{i=0}^{10} \gamma_i$ or $\sum_{i=0}^{50} \beta_i$ respectively.

11. Typeset a reference list according to IEEE with the book: *Permutations Groups* by Peter J. Cameron, published 1999 by Cambridge University Press in Cambridge and the article: *Periods of Maps on Irreducible Polynomials over Finite Field* by Patrick Morton in the journal Finite Fields and their Applications (Finite Fields Appl.) that was published 1997 in volume 3 on pages 11–24. Show how to use these in the text.

Template for the final report

The report you will write must fulfill the following topographic rules.

1. The paper format must be A4.
2. The margin sizes: outer and inner 3 cm, head 2 cm and foot 2.5 cm.
3. The document must be single sided and one column on each page.
4. The name of the report may not appear in the column title or in the foot.
5. Every page after the table of contents must be paginated. The page number must be centered in the foot 3.5 cm from the lower edge of the paper.
6. Footnotes, figures and tables must be numbered, the last two with respect to section. The last two must be floating and references from the text must appear to them in the text.
7. The size of the body text must be 12 points. The typeface must be Times.

8. Use bold or italic typeface to emphasize text, do not underline.

9. No blank lines between paragraphs. Every paragraph, except the first after a heading, is started with a spacing with the width of M, i.e. 1 em.

10. Headings must be numbered, except for the table of contents, and be set in the same typeface as the body text.

11. The bibliography list must follow IEEE. In a reference to a book the following information should be included in said order:

    (a) The author or authors family names and first names or initials or organization
    (b) Book title in italic typeface
    (c) Edition
    (d) Publishing city
    (e) Publisher
    (f) Year
    (g) First and last page referenced.

    An example:

    > [2] Trappe, Wade and Washington, Lawrence, *Introduction to Cryptography with Coding Theory*, 2d ed, Upper Saddle River, NJ, Pearson Prentice Hall, 2006, pp 164–200.

    In a reference to an article from a scientific journal must the following information in said order:

    (a) The author or authors family names and first names or initials or organization
    (b) The title of the article, using citation signs
    (c) Whole journal's title, in italic typeface
    (d) Volume, number and possibly part
    (e) First and last page referenced
    (f) Day of publish.

    An example:

    > [12] Branner, Bodil and Hubbard, John H., "The iteration of cubic polynomials. Part I: The global topology of parameter space", Acta Mathematica, vol 160, pp 181–201, may 1988.

    For more information see *IEEE Standards Style Manual*.[4] Specifically you find information about how to refer to work in the text.

12. The title page must have the following information:

    - A title.
    - An optional subtitle.
    - The name of the author or authors. In case of multiple authors, they are ordered according to their family names. Please note that the names must be stacked on top of each other.

[4] `http://standards.ieee.org/guides/style/`

13. The page after the title page must contain an English and a Swedish abstract, both should be typeset using the `abstract` environment. This page must not be paginated.

14. The third (without cover page) or fourth (with cover page) page should contain a table of contents.

15. The first section must start on a new page directly after the table of contents.