Exercises LaTeX workshop

TeXniCie

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Remember the slides are available on `https://texnicie.nl` Also, make sure you have at least these lines in your preamble:

```
\usepackage[a4paper,margin=2.54cm]{geometry}
\usepackage{amsmath,amssymb,amsthm}
\usepackage{graphicx}
```

Part 1: Text document

☐ **Exercise 1** (first document)**.** Create a document with a title and a first line of text. Set the author to be your name. Change the paper size to a5paper, and set the margins to 1cm.

☐ **Exercise 2** (emphasize)**.** Emphasize some text by using `\emph{your text}`. Put some another word or phrase in bold.

☐ **Exercise 3** (flushright)**.** Find out what the `\flushright` command does.

☐ **Exercise 4** (headings)**.** Create headings (section, subsection etc.), and create a table of contents for it. The table of contents should be on its own page.

☐ **Exercise 5** (spacing)**.** Let's make your document very s p a c i o u s. First, add the following lines to your preamble:

```
\usepackage{parskip}

\setlength{\parskip}{20pt}
\renewcommand{\baselinestretch}{1.5}
```

Check if this increases paragraph spacing and line spacing.

Next, change the vertical margins to be 4 cm. Refer to the manual of the geometry package, or try what the following package options for geometry do: `top=`, `bottom=`, `vmargin=`.

☐ **Exercise 6** (hyphenation)**.** LaTeX can hyphenate words automatically. For this it needs the `babel` package, with package option `english` (i.e. `\usepackage[english]{babel}`). Try to produce such hyphenation in your document.

Hint: if you are having difficulty, increase the horizontal margin size, and change the paper size to A5 if you haven't already.

☐ **Exercise 7** (special characters)**.** Reproduce the following text:

When I woke up this morning, the temperature in my room was 13°C with 75% humidity. I wrote down this data on my "C:\" drive, in a file called temp_room.txt. That morning the dollar-to-euro exchange rate was $1.00 is €0.84.

Hints:

- You can use `\textdegree` instead of pasting in a degree symbol, if you use `\usepackage{gensymb}`.

- Look at the slide of typing special characters literally.

- Use `\usepackage{lmodern}` for a nicer euro symbol. (You can enter a euro symbol directly in the code)

- For special characters it is often advisable to use `\usepackage[utf8]{inputenc}` (which Overleaf includes by default). Then more characters can be typed in directly in code.

☐ **Exercise 8** (parskip)**.** Add two paragraphs to your document, and observe the difference with `\usepackage{parskip}` and without it. Which style do you prefer?

☐ **Exercise 9** (manual spacing)**.** Find out what the following commands do: `\quad`, `\qquad`, `\hspace{2cm}`, `\;`, `\!`, `\vspace{2cm}`, `\bigskip`.

☐ **Exercise 10** (colors)**.** Add package `\usepackage{xcolor}`, produce the following text in red and orange colors: **Hi, I like the color red.**

Part 2: Formulas and figures

☐ **Exercise 11.** *Recreate the following expression in inline mode:*

$$\left(\frac{x^3}{3(x+1)^2}\right)^{\frac{1}{n}}$$

☐ **Exercise 12.** *Recreate the following proof by using align:*

If $ax^2 + bx + c = 0$, where $a \neq 0$, and if $d = b^2 - 4ac$, then

$$x = \frac{-b \pm \sqrt{d}}{2a} \tag{1}$$

Proof. We see that the equation is equivalent to

$$ax^2 + bx = -c \tag{2}$$

Or equivalently

$$-\frac{c}{a} = x^2 + \frac{b}{a}x = x^2 + 2\frac{b}{2a}x \tag{3}$$

By adding $\left(\frac{b}{2a}\right)^2$ to both sides we get

$$\left(\frac{b}{2a}\right)^2 - \frac{c}{a} = x^2 + 2\frac{b}{2a} + \left(\frac{b}{2a}\right)^2 \tag{4}$$

$$= \left(x + \frac{b}{2a}\right)^2 \tag{5}$$

If we multiply both sides with $4a^2$ we get

$$b^2 - 4ac = (2ax + b)^2 \tag{6}$$

$$\pm\sqrt{b^2 - 4ac} = 2ax + b \tag{7}$$

And therefore

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = x \tag{8}$$

☐

☐ **Exercise 13** (basic image)**.** Find an image of your favourite animal species, and upload the image into your Overleaf document. First, use a direct `\includegraphics{...}` with ... the name of the image. If this works, wrap a proper figure environment around it as seen in the slides.

☐ **Exercise 14** (reference)**.** Add a reference to a numbered equation and a figure in your text. Use the proper LaTeX way of doing this, i.e. with `\label{fig:cuteanimal}` and `\ref{fig:cuteanimal}`. This ensures the numbers will stay correct.

☐ **Exercise 15** (image trimming)**.** You can crop an image from within LaTeX using this command:

`\includegraphics[width=0.9\linewidth,trim=10pt 10pt 10pt 10pt,clip]{example-image-a}`

Observe how changing the 4 numbers in the trim option (corresponding to left, bottom, right, top respecitvely) affects the cropping. Make sure you have added `\usepackage{graphicx}` to your preamble!