This is My First LaTeX Document

Lab2 Practice

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1 Borrowed Words

Quotations are often used in a document, either to add *weight* to our arguments by referring to a higher authority or because we find that we cannot improve on the way an idea has been expressed by someone else. Consider the following example, a quotation from Bertrand Russell.

Some mathematicians elevate the spirit of Mathematics to a kind of intellectual aesthetics. It is best voiced by Bertrand Russell in the following lines.

The true spirit of delight, the exaltation, the sense of being more than man, which is the touchstone of the highest excellence, is to be found in Mathematics as surely as in poetry. Real life is, to most men, a long second best, a perpetual compromise between the ideal and the possible; but the world of pure reason knows no compromise.

Yes, to men like Russell, Mathematics is more of an art than science.

2 Making Lists

2.1 Bullet Lists

For **Bullet Lists** use the `itemize` command. Try to make the following list.

One should keep the following in mind when using TEX:

- TEX is a typesetting language and not a word processor,
- TEX is a program and not an application,
- TEX there is no meaning on comparing TEX to a word processor, since the design purposes are different.

Being a program, TEX offers a high degree of flexibility.

2.2 Numbered Lists

For numbered lists use `enumerate`. Make the following list.

The three basic steps in producing a printed document using LATEXare as follows:

1. Prepare a source file with the extension `.tex`
2. Compile it with LATEXto produce a `dvi` file
3. Print the document using a `dvi` driver

2.3 Multilevel Lists

Multilevel lists are usually combinations of numbered and bulleted lists. Try to create the following list.

There are **three levels** in the following list:

1. First item in the first level
2. Second item in the first level
   i. first item in the second level
   ii. second item in the second level
   iii. third item in the second level
      - first item in the third level
      - second item in the third level

That is it; a multilevel list.

3 Truth Table

I hope you still remember the ***Truth Tables*** from CELEN086, last Semester!! Try to create the following Truth Table.

p	q	$p \vee q$	$p \wedge q$
T	T	T	T
T	F	T	F
F	T	T	F
F	F	F	F

Table 1: The Truth Table for AND, OR gates.

Can you create this table?

	Year		
City	2006	2007	2008
London	45678	445768	55666
Berlin	34567	32456	29876
Paris	49876	51000	51987
Istanbul	667788	668890	676869
Cairo	69876	65432	54300

Table 2: Some figures about some famous cities

3.1 Figures

In LaTeXwe can include figures and pictures very easily using the `graphicx` package. Below is a picture of Euler, Swiss mathematician and scientist. The scale is 0.5.

Figure 1: Leonhard Euler(1707-1783)

4 Mathematics

4.1 Solving Quadratic Equations

There is an *exact* method for solving quadratic equations of the form $ax^2 + bx + c = 0$ where a, b and c are real numbers ($\in \mathbb{R}$). We first compute Δ (*delta*):

$$\Delta = \sqrt{b^2 - 4ac}. \tag{1}$$

Now, depending on the **sign** of Δ we can determine the quality of the roots:

$$\Delta \begin{cases} > 0 & \text{two real roots,} \quad x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} \\ = 0 & \text{one real root,} \quad x_{1,2} = \frac{-b}{2a} \\ < 0 & \text{NO real roots, complex conjugates} \quad x_{1,2} = \frac{-b \pm \sqrt{\Delta}\, i}{2a} \end{cases}$$

4.2 Derivatives

The table below shows first and second derivative of some well-known functions.

y	y'	y''
x^n	nx^{n-1}	$n(n-1)x^{n-2}$
$\sqrt[3]{x}$	$\frac{1}{3}x^{-2/3}$	$\dots$
$\sin x$	$\cos x$	$-\sin x$
$\ln x$	$\frac{1}{x}$	$\frac{-1}{x^2}$
$\frac{1}{x+1}$	$\frac{-1}{(x+1)^2}$	$\frac{2}{(x+1)^3}$

4.3 Integration

Integration is the opposite of differentiation. For a real function $f(x)$ we have the following relationship:

$$\int f(x)dx = F(x) + C, \tag{2}$$

where $f(x) = \frac{d}{dx}F(x)$.

Also, an integral represents the area under a curve, that is the area between the curve and the $x-$axis. The following integral gives the area under $f(x)$ from $x = x_1$ to $x = x_2$:

$$A = \int_{x_1}^{x_2} f(x)dx = F(x_2) - F(x_1). \tag{3}$$

Area should always be nonnegative: $A \geq 0$.