Introduction to LATEX Writing papers the right way

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Tun'Up Munich e.V.

SAP: MEET & CODE 2021
Tun'Up your Report

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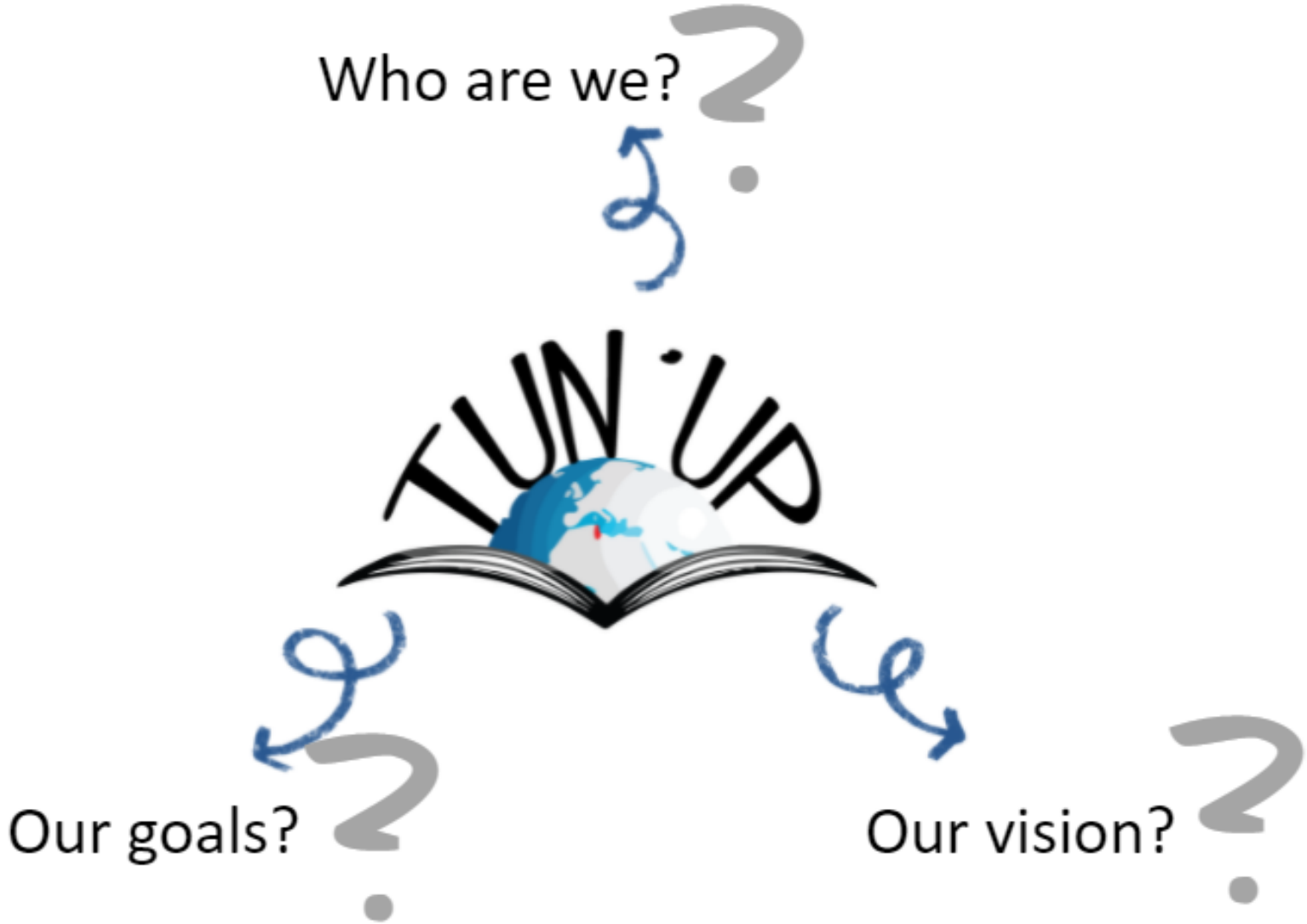

Who are we?
TUN'UP
Our goals?
Our vision?

Tun'Up Tunis

Who ?

Social and **humanitarian** non-profit organization initiated by **young Tunisians** in Tunisia and Germany.

Goal ?

Conscious about the **distressed state** of many Tunisian educational institutions and the **difficulties** faced by pupils and students in Tunisia , we aim to promote the **education system** in our homeland.

Tun'Up Munich e.V.

Vision ?

Volunteering for a better **education.**

We are young!
We are passionate!
We are dedicated!
And we take action.

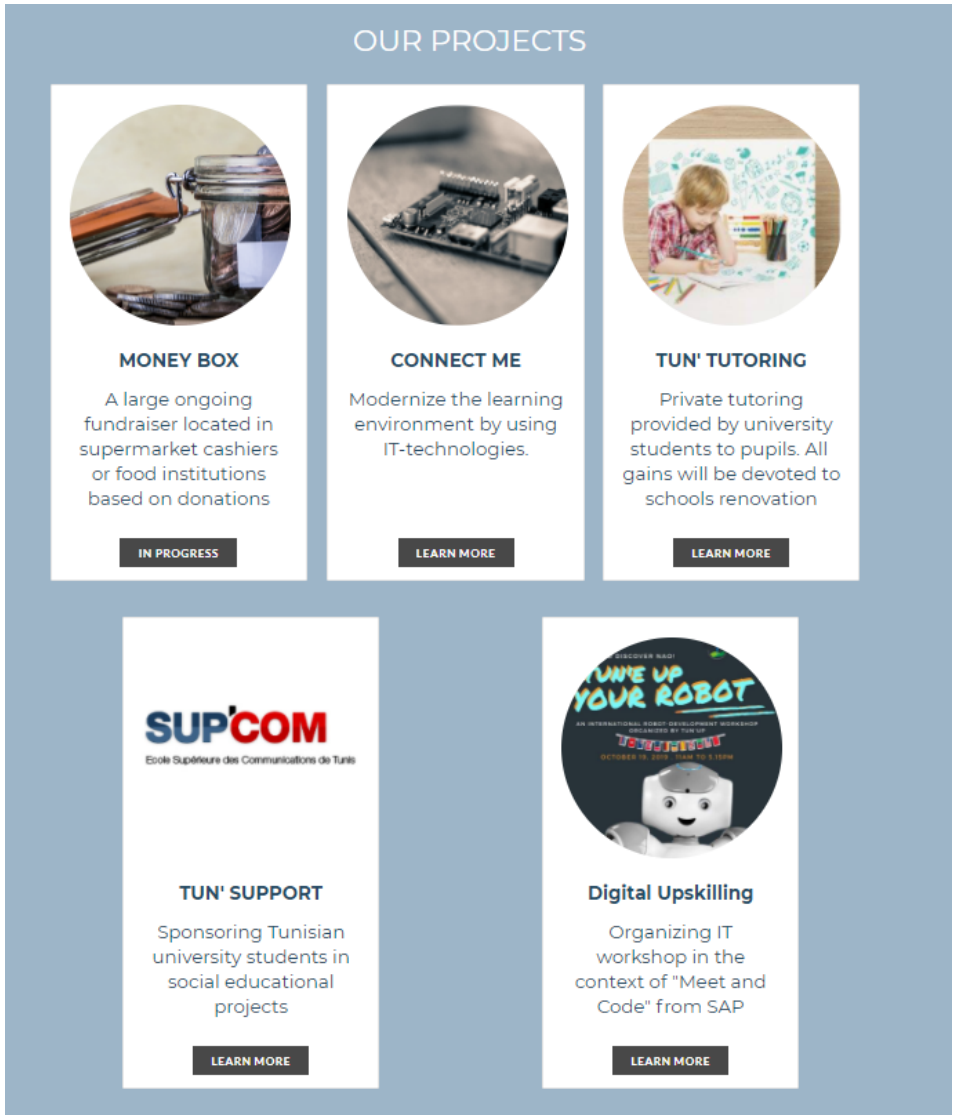
Tun'Up Munich e.V. is a social and humanitarian non-profit organization dedicated to improving the educational environment in Tunisia and empower the youthful generation.

We, members of Tun'Up Munich e.V., believe that education is the key to growth and success. We believe investing in it is investing in our future.

Our vision is, everyone should have access to it and our goal is ensuring opportunities by

- Supporting our subsidiary in Tunisia, mainly financially and strategically.
- Fundraising events and partnerships to ensure a sustainable impact.
- Endorsement of social commitment in education through oriented and collaborative projects.
- Being an active part of the educational system's development in Tunisia.

Current Projects — http://www.tunup.org/tunup-munich.html



Project Ex: Primary school "Sidi Said" in Siliana-Bargou

Collection of school supplies

Computer an IT Club

Reading Club & Graffiti

Warm winter, teaching material & canteen furniture

Trip to the City of Sciences

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What is Latex ?

- Pronounced "Lah-tech" or "Lay-tech". LaTeX was created in the early 1980s by Leslie Lamport
- Latex is a software system for document preparation with high-quality typesetting.
- LaTeX is typically distributed along with plain TeX under a free software license.
- Latex is a tool used to create professional-looking documents.
  - You only need to focus on the contents of your document
  - The computer will take care of the formatting
- LaTeX is widely used in academia for the communication and publication of scientific documents in many fields, including mathematics, computer science, engineering, physics, chemistry, economics, linguistics, quantitative psychology, philosophy, and political science.

Why latex ?

- Beautifully Typeset Output
- Structured Files
- Management of Internal References
- Management of Citations
- Customizable
- User-Friendly
- Commonly Used $\rightarrow$ helpful and strong community
- Easily Converted Files

Latex with Overleaf

- No need to download any software
- All you need is a web browser and overleaf account
- Effortless sharing with colleagues, co-workers and supervisor
- No risk of losing your documents and progress
- Always have the latest version (no need for manual updates)
- Automatic real-time preview
- Documentation and tutorials available
- Not just for papers (this presentation is done in Latex by the way)

Latex Vs traditional text editor

- What you see is what you get
- Very easy to use
- Becomes tricky with complex layout
- Less intuitive with complex features
- Suitable for basic documents

LaTeX

- What you see is what you mean
- Requires syntax knowledge
- Very clean layout
- Extensive additional possibilities (include source code, Formulas . . .)
- Suitable for Bachelor/Master-Thesis, scientific papers, phD . . .

How does it look like?

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Essentials

```
\documentclass[a4paper,12pt]{article}
\begin{document}
A sentence of text.
\end{document}
```

- The `\documentclass` command must appear at the start of every LATEX document. Text in the curly brackets species the document class. The article document class is suitable for shorter documents such as journal, articles and short reports.
- The text in the square brackets species options — in this case it sets the paper size to A4 and the main font size to 12pt.

Creating a Title

```
\title{My First Document}
\author{My Name}
\date{\today}
\maketitle
```

- `\maketitle` command creates a title You need to specify the title of the document.
- If the date is not specified today's date is used.
- Author is optional.

Sections

You should divide your document into chapters (if needed), sections and subsections. The following sectioning commands are available for the article class:

- `\section{...}`
- `\subsection{...}`
- `\subsubsection{...}`
- `\paragraph{...}`
- `\subparagraph{...}`

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Font Effects

There are LATEX commands for a variety of font effects:

`\textit{words in italics}` *words in italics*

`\textsl{words slanted}` *words slanted*

`\textsc{words in smallcaps}` WORDS IN SMALLCAPS

`\textbf{words in bold}` **words in bold**

`\texttt{words in teletype}` `words in teletype`

`\textsf{sans serif words}` sans serif words

`\textrm{roman words}` roman words

`\underline{underlined words}` underlined words

Colored Text

- To put colored text in your document you need to use a package Packages are included before the `\begin{document}` command.
- Packages are activated using the `\usepackage[options]{package}` command, where package is the name of the package and options is an optional list of keywords that trigger special features in the package.
- The basic colour names that `\usepackage{color}`‘ knows about are black, red, green, blue, cyan, magenta, yellow and white:
  `\color{red}Fire` Fire
  `\color{black}Dark` Dark
  `\color{green}Gras` Gras

Font Sizes

There are LATEX commands for a range of font sizes:

- `\tiny tiny words` tiny words
- `\scriptsize scriptsize words` scriptsize words
- `\footnotesize footnotesize words` footnotesize words
- `\small small words` small words
- `\normalsize normalsize words` normalsize words
- `\large large words` large words
- `\Large Large words` Large words
- `\LARGE LARGE words` LARGE words
- `\huge huge words` huge words

Lists

Latex supports two types of lists: enumerate produces numbered lists, while itemize is for bulleted lists. Each list item is defined by \itemLists can be nested to produce sub-lists.

```
\begin{enumerate}
\item First thing
\begin{itemize}
\item A sub-thing
\end{itemize}
\item Second thing
\end{enumerate}
```

The list should look like this:

1. First thing
    - A sub-thing
2. Second thing

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Tables

The tabular command is used to typeset tables.
This code starts a table: `\begin{tabular}{...}` Where the dots between the curly brackets are replaced by code defining the columns:

- l for a column of left-aligned text.
- r for a column of right-aligned text.
- c for a column of centre-aligned text.
- | for a vertical line.

The table data follows the command:

- & is placed between columns.
- \\ is placed at the end of a row (to start a new one).
- `\hline` inserts a horizontal line.
- `\cline{1-2}` inserts a partial horizontal line between column 1 and column 2.

The command `\end{tabular` finishes the table.

Examples of Tables (1)

Examples of tabular code and the resulting tables:

```
\begin{tabular}{|l|l|}
Apples & Green \\
Strawberries & Red \\
Oranges & Orange \\
\end{tabular}
```

Apples	Green
Strawberries	Red
Oranges	Orange

Examples of Tables (2)

```
\begin{tabular}{|r|l|}
\hline
8 & here's \\
\cline{2-2}
86 & stuff \\
\hline \hline
2008 & now \\
\hline
\end{tabular}
```

8	here's
86	stuff
2008	now

Examples of Tables (3)

```
\begin{tabular}{rc}
Apples & Green \\
\hline
Strawberries & Red \\
\cline{1-1}
Oranges & Orange \\
\end{tabular}
```

Apples	Green
Strawberries	Red
Oranges	Orange

Exercices

Write code to produce the following tables:

Item	Quantity	Price ($)
Nails	500	0.34
Wooden boards	100	4.00
Bricks	240	11.50

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Figures (1)

Images should be PDF, PNG, JPEG or GIF files.
The following code will insert an image called myimage:

```
\begin{figure}[h]
\centering
\includegraphics[width=1\textwidth]{myimage}
\caption{Here is my image}
\label{image-myimage}
\end{figure}
```

- `[h]` is the placement specifier. h means put it approximately here (if it will fit). Other options are t (at the top of the page),b (at the bottom of the page) and p (on a separate page for figures).
- `\centering` centres the image on the page, if not used images are left-aligned by default.
- `\includegraphics{...}` is the command that actually puts the image in your document.

Figures (2)

- `\includegraphics{...}` is the command that actually puts the image in your document.
- `[width1]=` is an optional command that specifies the width of the picture - in this case the same width as the text. The width could also be given in centimeters (cm). You could also use [scale=0.5] which scales the image by the desired factor, in this case reducing by half.
- `\caption{...}` defines a caption for the figure. If this is used LATEX will add `\Figure` and a number before the caption. If you use captions, you can use `\listoffigures` to create a table of figures.
- `\label{...}` creates a label to allow you to refer to the table or figure in your text.

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Inserting Equations

- You can enter math mode with an opening and closing dollar sign \$. This can be used to write mathematical symbols within a sentence. for example: \$1 + 2 = 3\$ produce $1 + 2 = 3$.
- If you want a "displayed" equation on its own line use \$\$...\$\$ For example: \$\$ 1 + 2 = 3 \$ \$

$$1 + 2 = 3$$

- For a numbered displayed equation, use `\begin{equation}...\end{equation}` For example, `\begin{equation}` 1+2=3 `\end{equation}` produces:

$$1 + 2 = 3 \tag{1}$$

- Use `\begin{eqnarray}`:.`\end{eqnarray}` to write equation arrays for a series of equations/inequalities. For example,

```
a & = & b + c \\ & = & y - z
```

$$\begin{aligned} a &= b + c && (2) \\ &= y - z && (3) \end{aligned}$$

Mathematical Symbols (1)

- Powers are inserted using the hat ^ symbol. For example, `$n^2$` produces n^2.
- Indices are inserted using an underscore _. For example, `$2_a$` produces 2_a.
- Fractions are inserted using `\frac{numerator}{denominator}`
  `$\frac{a}{3} $` produces: $\frac{a}{3}$
- Square root symbols are inserted using `\sqrt{...}` . If a magnitude is required it can be added using optional square brackets [...].
  `$\sqrt{y} $` produces: $\sqrt{y}$
  `$\sqrt[x]{y} $` produces: $\sqrt[x]{y}$

Mathematical Symbols (2)

- The command \sum inserts a sum symbol; \int inserts an integral. For both functions, the upper limit is specified by a hat ^ and the lower by an underscore _.
  $ \sum_{x=1}^5 y^z$ produces: $\sum_{x=1}^{5} y^z$
  $\int _a ^ b f(x)$ produces: $\int_{a}^{b} f(x)$
- Greek letters can be typed in math mode using the name of the letter preceded by a backslash.Many Greek capital letters are used in the Latin alphabet - for those that are different capitalise the first letter of the name to produce a capital Greek letter. For Example:
  $ \alpha $ = α
  $ \beta $ = β
  $ \delta , \Delta $ = δ, Δ
  $ \theta , \Theta $ = θ, Θ
  $ \pi , \Pi $ = π, Π

Exercices

Write code to produce the following equations:

$$e = mc^2 \tag{4}$$

$$\pi = \frac{c}{d} \tag{5}$$

$$x = \sqrt{\frac{x_i}{z}y} \tag{6}$$

$$z = \sqrt[x]{y^2} \tag{7}$$

$$\frac{\partial}{\partial x}e^x = e^x \tag{8}$$

$$\frac{\partial}{\partial x}\int_0^\infty f(s)ds = f(x) \tag{9}$$

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Insert Source Code

- You can insert source code in inline mode with lstinline, separated with the lstlisting environment and since a file with lstinputlisting
- listings Parameter setting via lstset (global) or via option (local)

```
\begin{lstlisting}[language=java]
int x = 0;
while (x < 10)
{
    print (x);
    x++;
}
\end{lstlisting}
```

```
int x = 0;
while (x < 10)
{
    print (x);
    x++;
}
```

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The BibTeX file

Your BibTeX file contains all the references you want to cite in your document. It has the file extension .bib. You should enter each of your references in the BibTeX file in the following format:

```
@article{
Birdetal2001,
Author = {Bird, R. B. and Smith, E. A. and Bird, D. W.},
Title = {The hunting handicap: costly signaling in human
foraging strategies},
Journal = {Behavioral Ecology and Sociobiology},
Volume = {50}, Pages = {9-19},Year = {2001} }
```

Each reference starts with the reference type (@article in the example above). Other types include @book, @incollection for a chapter in an edited book and @inproceedings for papers presented at conferences

Inserting the bibliography

Type the following where you want the bibliography to appear in your document (usually at the end):

```
\bibliographystyle{plain}
\bibliography{Doc1}
```

Where Doc1 is the name of your .bib file. And plain represent the style. LATEX comes with several styles with numerical in-text citations, these include (Plain, Abbrv, Unsrt, Alpha)

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Contact

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