

# Introduction to L<sup>A</sup>T<sub>E</sub>X

3D geoinformation group

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# Outline for Section 1

## ① Writing Documents

- Good and Bad Practices

- Separating Content from Formatting

- What is  $\LaTeX$

## ② Using $\LaTeX$

- Getting Started

- Structure Elements

## ③ References and External Programs

- References and Bibliography

- Graphics

## ④ Additional sources from 3D geoinformation group

## Before we start!

It is always good to ask yourself some questions before start writing:

Is it a participative document?

What is the document for?

How do I have to submit it?

## Before we start!

It is always good to ask yourself some questions before start writing:

Is it a participative document?

What is the document for?

How do I have to submit it?

You could work draft versions in cooperative platforms like google docs or OneDrive and at the end turn it into a  $\text{\LaTeX}$  document.

# Typical Word Processor

## Formatting Words

This is not the best...



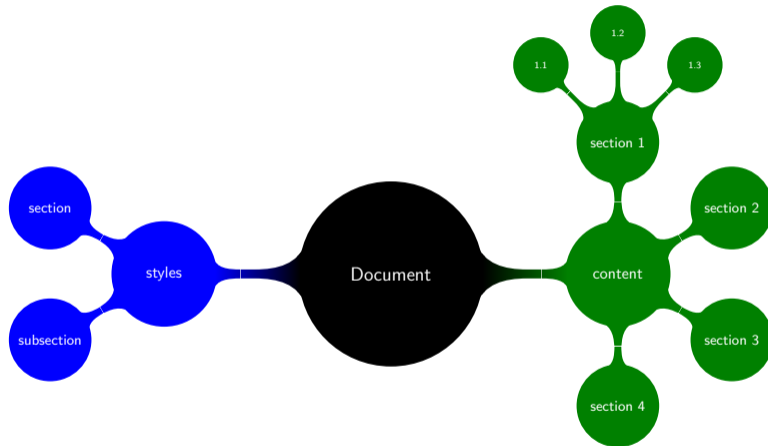
# Typical Word Processor

## Using Styles

That's better. . .



# Separating Content from Formatting



# Attitude adjustment

## A new approach

- Use commands to describe “what it is”, not “how it looks”
- Focus on your content
- Let  $\text{\LaTeX}$  do its job



# What is $\text{\LaTeX}$

## The Engine



# Examples

## A simple document

```
\documentclass{article}

\begin{document}
  Hello World! % This is just comments...
\end{document}
```

# Outline for Section 2

## 1 Writing Documents

- Good and Bad Practices

- Separating Content from Formatting

- What is  $\text{\LaTeX}$

## 2 Using $\text{\LaTeX}$

- Getting Started

- Structure Elements

## 3 References and External Programs

- References and Bibliography

- Graphics

## 4 Additional sources from 3D geoinformation group

- Install it locally:
  - A distribution (engine and packages):
    - MiKTeX (Windows)
    - MacTeX (OSX)
    - TeXLive (Linux)
  - An Editor:
    - TexStudio (Windows, OSX, Linux)
    - TexMaker (Windows, OSX, Linux)
    - Other (Wikipedia Comparison)
- Use it online:
  - Overleaf Professional accounts available for TU Delft community

# Examples

```
\documentclass{article}

\title{A Title}
\author{John Doe}

\begin{document}
  \maketitle

  \section{This is a section}
  Some text here.

  \subsection{This is a subsection}
  Some other text here.

  \subsection{This is another subsection}
  Guess what!

  This is another piece of information...
\end{document}
```

# Examples

## Simple Structure

A Title

John Doe

December 1, 2017

### **1 This is a section**

Some text here.

#### **1.1 This is a subsection**

Some other text here.

#### **1.2 This is another subsection**

Guess what!

This is another piece of information...

# Examples

## Structure Elements

```
\begin{itemize}
  \item Tea
  \item Milk
  \item Biscuits
\end{itemize}
```

- Tea
- Milk
- Biscuits

```
\begin{figure}
  \includegraphics{chick}
\end{figure}
```



```
\begin{equation}
  \alpha + \beta + 1
\end{equation}
```

$$\alpha + \beta + 1 \quad (1)$$

# Examples

## Source code

- For the most part, you can just type your text normally.

Words are separated by one or more spaces.

Paragraphs are separated by one or more blank lines.

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Paragraphs are separated by one or more blank lines.

- Space in the source file is collapsed in the output.

The rain in Spain  
falls mainly on the plain.

The rain in Spain falls mainly  
on the plain.

- Add `\usepackage` to the preamble (before the `\begin{document}`) to add functionality



# Examples

## Math

- Why are dollar signs  $\$$  special? We use them to mark mathematics in text.

*% not so good:*

Let  $a$  and  $b$  be distinct positive integers, and let  $c = a - b + 1$ .

*% much better:*

Let  $a$  and  $b$  be distinct positive integers, and let  $c = a - b + 1$ .

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Let  $a$  and  $b$  be distinct positive integers, and let  $c = a - b + 1$ .

- Always use dollar signs in pairs — one to begin the mathematics, and one to end it.
- $\LaTeX$  handles spacing automatically; it ignores your spaces.

Let  $y=mx+b$  be  $\dots$

Let  $y = m x + b$  be  $\dots$

Let  $y = mx + b$  be ...

Let  $y = mx + b$  be ...

# Math Notation

- Use caret `^` for superscripts and underscore `_` for subscripts.

```
$y = c_2 x^2 + c_1 x + c_0$
```

```
y = c_2x^2 + c_1x + c_0
```

- Use curly braces `{ }` to group superscripts and subscripts.

```
$F_n = F_{n-1} + F_{n-2}$ % oops!
```

```
F_n = F_n - 1 + F_n - 2
```

```
$F_n = F_{n-1} + F_{n-2}$ % ok!
```

```
F_n = F_{n-1} + F_{n-2}
```

- There are commands for Greek letters and common notation.

```
$_\mu = A e^{Q/RT}$
```

```
\mu = Ae^{Q/RT}
```

```
$_\Omega = \sum_{k=1}^n \omega_k$
```

```
\Omega = \sum_{k=1}^n \omega_k
```

# Examples I

## Tables

Use an ampersand `&` to separate columns and a double backslash `\\` to start a new row (like in the `align*` environment that we saw in part 1).

- The argument specifies column alignment — **left**, **right**, **right**.

```
\begin{tabular}{lrr}
```

```
    Item & Qty & Unit \ $ \\
```

```
    Widget & 1 & 199.99 \\
```

```
    Gadget & 2 & 399.99 \\
```

```
    Cable & 3 & 19.99 \\
```

```
\end{tabular}
```

Item	Qty	Unit \$
Widget	1	199.99
Gadget	2	399.99
Cable	3	19.99

# Examples II

## Tables

- It also specifies vertical lines; use `hline` for horizontal lines.

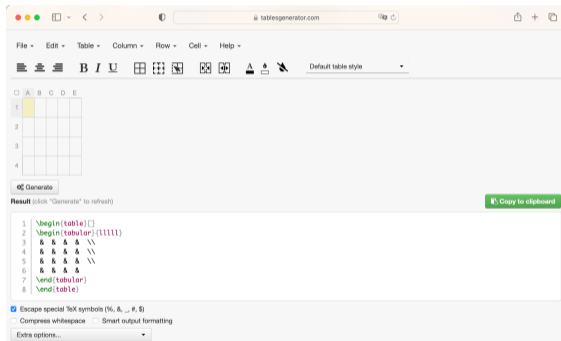
```
\begin{tabular}{|l|r|r|} \hline
  Item  & Qty & Unit \ $ \\ \hline
  Widget & 1   & 199.99 \\
  Gadget & 2   & 399.99 \\
  Cable  & 3   & 19.99 \\ \hline
\end{tabular}
```

Item	Qty	Unit \$
Widget	1	199.99
Gadget	2	399.99
Cable	3	19.99

# Examples III

## Tables

Tables generator offers an easy to use website to create and fill tables:



The screenshot shows the tablesgenerator.com website interface. At the top, there is a browser address bar with the URL "tablesgenerator.com". Below the address bar is a menu bar with "File", "Edit", "Table", "Column", "Row", "Cell", and "Help". A toolbar contains various icons for table manipulation, including a table icon, bold (B), italic (I), underline (U), and a "Default table style" dropdown. The main workspace features a grid with columns labeled A, B, C, D, E and rows labeled 1, 2, 3, 4. The top-left cell (A, 1) is highlighted in yellow. Below the grid is a "Generate" button. The "Result" section displays the following LaTeX code:

```
1 \begin{table}[]
2 \begin{tabular}{|l|l|l|l|l|}
3 & & & & \\
4 & & & & \\
5 & & & & \\
6 & & & & \\
7 \end{tabular}
8 \end{table}
```

Below the code, there are checkboxes for "Escape special TeX symbols (% , & , \_ #, \$)", "Compress whitespace", and "Smart output formatting". An "Extra options..." dropdown menu is also visible.

<https://www.tablesgenerator.com>

# Outline for Section 3

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# Cross-referencing

- Use `\label` and `\ref` for automatic numbering.
- The `amsmath` package provides `\eqref` for referencing equations.

```
\documentclass[13pt]{article}
\usepackage{amsmath} % for \eqref
\usepackage{geometry}
\geometry{
  a4paper,
  total={170mm,257mm},
  left=20mm,
  top=20mm,
}
\begin{document}

\section{Introduction}
\label{sec:intro}
```

In Section `\ref{sec:method}`, we `\ldots`

```
\section{Method}
\label{sec:method}
```

## 1 Introduction

In Section 2, we ...

## 2 Method

By (1), we have ...

$$e^{ix} + 1 = 0$$

(1)

Put your references in a .bib file in 'bibtex' database format:

```
@Article{Jacobson1999Towards,  
  author = {Van Jacobson},  
  title = {Towards the Analysis of Massive Multiplayer Online  
          Role-Playing Games},  
  journal = {Journal of Ubiquitous Information},  
  Month = jun,  
  Year = 1999,  
  Volume = 6,  
  Pages = {75--83}}
```

```
@InProceedings{Brooks1997Methodology,  
  author = {Fredrick P. Brooks and John Kubiawicz and  
          Christos Papadimitriou},  
  title = {A Methodology for the Study of the  
          Location-Identity Split},  
  booktitle = {Proceedings of OOPSLA},  
  Month = jun,  
  Year = 1997}
```



- When using the **natbib** package<sup>1</sup> with `\citet` and `\citep`.
- Add `\bibliography` and `\bibliographystyle` at the end.

```

\documentclass{article}
\usepackage{natbib}
\begin{document}

\citet{Brooks1997Methodology}
show that \ldots. Clearly,
all odd numbers are prime
\citep{Jacobson1999Towards}.

\bibliography{bib-example}
% if 'bib-example' is the name of
% your bib file

\bibliographystyle{plainnat}
% try changing to abbrvnat

\end{document}

```

Brooks et al. [1997] show that ... Clearly, all odd numbers are prime [Jacobson, 1999].

#### References

Frederick P. Brooks, John Kubiakowicz, and Christos Papadimitriou. A methodology for the study of the location-identity split. In *Proceedings of OOPSLA*, June 1997.

Van Jacobson. Towards the analysis of massive multiplayer online role-playing games. *Journal of Ubiquitous Information*, 6:75–83, June 1999.

# Manage Refereres

## External Program

- Use a tool like JabRef or BibDesk.
- All scientific websites can export to bibT<sub>E</sub>X format.
- Save references as .bib file and link it from your L<sup>A</sup>T<sub>E</sub>X document.

# Designing Graphics

## Suggested Tools

- Vector graphics (Graphs, Charts, Figures):
  - Adobe Illustrator (Proprietary)
  - Inkscape (Open Source)
  - draw.io (Free and Online)
  - TikZ package on  $\text{\LaTeX}$  (for brave people)
- Image Editing
  - Adobe Photoshop (Proprietary)
  - GIMP (Open Source)

# Outline for Section 4

## ① Writing Documents

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# Quick L<sup>A</sup>T<sub>E</sub>X course

We have published a GitHub repository in which you can find useful tools for your learning.

tudelft3d / latex-getting-started Public Edit Pins Watch 6 Fork 3 Star 1

<> Code Issues Pull requests Actions Projects Security Insights

main 1 branch 0 tags Go to file Add file Code

hugoledoux Remove Mendeley as a suggestion db3a2d1 on 30 Mar 20 commits

template	Change title to give example of homework submission	14 months ago
.gitignore	Update gitignore	14 months ago
LICENSE	Initial commit	14 months ago
README.md	Remove Mendeley as a suggestion	6 months ago

☰ README.md

## Quick LaTeX course

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### LaTeX installation

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#### Online environment: Overleaf

### About

Quick LaTeX course

- Readme
- CC0-1.0 license
- 1 star
- 6 watching
- 3 forks

### Releases

No releases published

### Packages

No packages published

# Templates for deliverables

- Quick L<sup>A</sup>T<sub>E</sub>X course
- GEO2022 (MSc Thesis in Geomatics)
- Overleaf TUDelft templates