LaTeX for Psychological Researchers

Lecture 3: Writing an article

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Document Structure

Every LaTeX document has the following form:

```
\documentclass{ CLASS }

    PREAMBLE

\begin{document}

    BODY

\end{document}
```

The Document Class

The first line of any LaTeX document is always to define the document class, written as \documentclass{CLASS}. You can define the type of the document that you will write by changing CLASS in the class you want.

```
\documentclass[option1,option2,...]{CLASS}
```

The Document Class Arguments

A few possible documentclasses:

Document class	Output
`article`	For writing articles, but this is also your general all-purposes class.
`report`	Can contain chapters. For larger articles, thesis and small books.
`book`	For larger books.
`letter`	For letters.
`apa`	For APA style articles, comes with the apa package and includes apacite.
`beamer`	For making presentations. comes with the beamer package.

The Document Class Options

The options differ per documentclass and each document class has different defaults (for example, article and report use oneside by default, but book uses twoside). A few common options are:

Option	Specifies
10pt, 11pt, 12pt	Main font size
a4paper, letterpaper, ...	Sets the paper size
onecolumn, twocolumn	Number of columns for main text
oneside, twoside	Is the document meant for two sided printing?
landscape	Flip the document
draft	Enables you to easily spot typesetting errors

We will use the article documentclass!

Document Structure

Every LaTeX document has the following form:

```
\documentclass{ CLASS }

    PREAMBLE

\begin{document}

    BODY

\end{document}
```

The Preamble

- ▶ The preamble is used to define several things that influence the whole document
- ▶ Packages are loaded in the preamble
- ▶ Define variables, custom commands or other things needed in the document
- ▶ Depending on the documentclass several things must be defined in the preamble. For example:
  - ▶ author, title, date and more in `article`
- ▶ The command \maketitle in the body (right after \begin{document}) uses information from the preamble to create a title.
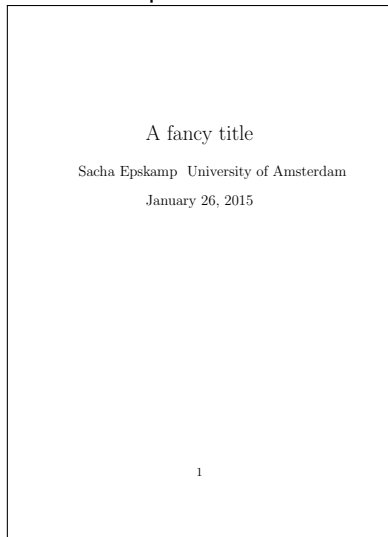
Preamble Example

.tex file:

```
1  \documentclass{article}
2  \title{A fancy title}
3  \author{Sacha Epskamp \\ University
   ↳ of Amsterdam}
4  \date{\today}
5
6  \begin{document}
7  \maketitle
8
9  \end{document}
```

.pdf file:

A fancy title

Sacha Epskamp University of Amsterdam

January 26, 2015

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Abstract

.tex file:

```
1  \documentclass{article}
2  \title{A fancy title}
3  \author{Sacha Epskamp}
4  \affiliation{University of Amsterdam
   ↳}
5  \date{\today}
6
7  \begin{document}
8  \maketitle
9
10 \begin{abstract}
11 This is the abstract
12 \end{abstract}
13
14 Here begins the first paragraph.
15 \end{document}
```

.pdf file:

A fancy title

Sacha Epskamp University of Amsterdam

January 26, 2015

Abstract
This is the abstract
Here begins the first paragraph.

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Loading Packages

- ▶ LaTeX can be extended through many packages
- ▶ Packages are stored online at CTAN. Google "CTAN packagename" for documentation on a certain package
- ▶ To use a package, it must first be installed on your computer
  - ▶ If you did a full install, this is probably already the case (do not forget to update your distribution each year or so)
  - ▶ Otherwise the package need to be installed. MiKTeX can do this automatically (although download might be slow) and for the other distributions you can look at the installation guide
- ▶ Secondly, the package must be loaded in the LaTeX document
- ▶ Loading a package can enable new commands, change commands and even fundamentally change the way a document looks

Loading Packages

Packages can be with the \usepackage command:

`\usepackage [ option 1 , option 2 , . . . ] {  PACKAGE  }`

- ▶ Most packages do not have options
- ▶ Packages can conflict with other packages
- ▶ In general it is best to not load packages you don't need
- ▶ Some packages however are so commonly used that they should always be loaded. In this course it is assumed these are loaded

Common Packages

Package	Description	
amsmath	Advanced math extensions	*
amssymb	Mathematical symbols	*
graphicx	Needed to include pictures	*
babel	Sets the language of the document through an option	*
geometry	Manages the document margins and papersize through option	*
apa	Comes with the apa documentclass	
apacite	Citing using bibTEX in APA style	
beamer	Creates presentations	

* Recommended to load in every document

Sectioning

- There are several commands to properly section your document
- This is useful for adding titles, making a table of contents and cross referencing
- A section is defined by a single command
- A type of section may not be available in certain documentclasses
- Sectioning automatically numbers the sections

Sectioning

Section commands:

Command	Level	Comment
\part{ name }	-1	Not in letters
\chapter{ name }	0	Only in Books and Reports
\section{ name }	1	Not in letters
\subsection{ name }	2	Not in letters
\subsubsection{ name }	3	Not in letters
\paragraph{ name }	4	Not in letters
\subparagraph{ name }	5	Not in letters

Sectioning

A single experiment APA research paper:

Command	Examples
\section{ name }	Methods, Results, Discussion
\paragraph{ name }	Participants, Materials, Procedure

Note: Not the title

Sectioning

An APA paper with multiple experiments

Command	Examples
\section{ name }	Experiment 1, ..., General discussion
\subsection{ name }	Methods, Results, Discussion
\paragraph{ name }	Participants, Materials, Procedure

Note: Not the title

Sectioning Example

.tex file:

```
1  \documentclass{article}
2  \begin{document}
3  Once upon a time someone had to do a
   ↳ research on the effect of
   ↳ psychosis amongst grasshoppers.
   ↳ This was very important!
4
5  \section{Methods}
6
7  \paragraph{participants} Ten
   ↳ grasshoppers.
8
9  \paragraph{Materials} A computer and
   ↳ halugenic drugs.
10
11 \section{Results}
12
13 Taking drugs made grasshoppers
   ↳ significantly more psychotic ($p <
   ↳ 0.05$).
14
15 \section{Discussion}
16
17 Grasshoppers should actively avoid
   ↳ taking halugenic drugs.
18
19 \end{document}
```

.pdf file:

Once upon a time someone had to do a research on the effect of psychosis amongst grasshoppers. This was very important!

1 Methods

participants Ten grasshoppers.

Materials A computer and halugenic drugs.

2 Results

Taking drugs made grasshoppers significantly more psychotic ($p < 0.05$).

3 Discussion

Grasshoppers should actively avoid taking halugenic drugs.

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Sectioning

- ▶ To omit numbering you can add an asterisk to the command. E.g. \section*{ name }
- ▶ A table of contents can be added with the \tableofcontents command
    - ▶ This might require two runs of pdfLATEX to work
- ▶ To start the appendices you can use the \appendix command. Sectioning will continue afterwards in letters

Sectioning Example

.tex file:

```
1  \documentclass{article}
2  \begin{document}
3  \tableofcontents
4  \section{This is a Section}
5  \subsection{This is a subsection}
6  \paragraph{paragraph} With some text
   ↳ here maybe
7
8  \section{Another Section}
9
10 \appendix
11
12 \section{This is an appendix}
13 \end{document}
```

.pdf file:

Contents

1   This is a Section

1.1   This is a subsection

2   Another Section

paragraph   With some text here maybe

A   This is an appendix

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Including figures

- With the graphicx package we can use the command \includegraphics to import figures
- This can be a number of different types of files
    - jpg
    - png
    - pdf
    - eps
- Options can be used to specify the size of the image

\includegraphics[option1=value, option2=value, ...]{filename}

Including figures

Options:

`width=xx`	Set preferred width to xx (default in inches)
`height=xx`	Set preferred height to xx
`keepaspectratio=true`	Keeps aspect ratio, can also be false
`scale=xx`	Scaling factor
`angle=xx`	Rotate by xx degrees
`page=xx`	Select what page to include from multipage pdf

Often you want to make width and height proportional to text width and height. This can be done with e.g. `0.8\textwidth`

Including Figures

LaTeX code: Output:

```
1 \ includegraphics {uva.png}
```

Including Figures

LaTeX code:

Output:

```
1 \begin{center}
2 \ includegraphics {uva.png}
3 \end{center}
```

Including Figures

LaTeX code: Output:

```
1  \begin{center}
2  \ includegraphics [width=0.3\
   ↳textwidth]{uva.png}
3  \end{center}
```

Tables

- Tables can be created with the `tabular` environment
- This requires one argument that specifies each column, indicated with a `l` for left aligned, `c` for right aligned, `r` for right aligned or `p{width}` for a column of fixed width
- Vertical lines are created in this argument with a `|` symbol
- Horizontal lines are created with the `\hline` command
- Cells are separated with the `&` command
- rows are separated with the `\\` command

Tables

LaTeX code:

Output:

```
1  \begin{tabular}{ ll }
2  First  Column & Second Column
   ↳ \\
3  \hline
4  1 & 2 \\
5  3 & 4  \\
6  5 & 6
7  \end{tabular}
```

First Column	Second Column
1	2
3	4
5	6

Tables

LaTeX code:

Output:

```
1  \begin{tabular}{|l|l|}
2  \hline
3  First  Column & Second Column
   ↳\\
4  \hline
5  1 & 2 \\
6  3 & 4  \\
7  5 & 6 \\
8  \hline
9  \end{tabular}
```

First Column	Second Column
1	2
3	4
5	6

Tables

LaTeX code:

Output:

```
1  \begin{tabular}{|p{0.2\
   ↳textwidth}|p{0.6\textwidth}|}
2  \hline
3  First  Column & Second Column
   ↳\\
4  \hline
5  1 & 2 \\
6  3 & 4  \\
7  5 & 6 \\
8  \hline
9  \end{tabular}
```

First Column	Second Column
1	2
3	4
5	6

Floats

- Including a figure and tables at exactly a certain place in the text can make it look unprofessional
- Furthermore we want to add captions to figures and tables
- A float environment is a special kind of environment that can hold a figure or table and sort of floats through your document to find a good place to end up
- This is usually near the place you specified the float, but at the top or bottom of a page or in another way your documentclass specifies it
- The float environment for figures is `figure` and for tables is `table`

Floats

In general:

```
\begin{ FLOAT }[placement options]
\centering
% Code for figure or table
\caption{ }
\label{ }
\end{ FLOAT }
```

Floats

For figures:
```
\begin{figure}[placement options]
\centering
\includegraphics{  }
\caption{  }
\label{  }
\end{figure}
```

Floats

For tables:

```latex
\begin{table}[placement options]
\centering
% Code for tabular
\caption{ }
\label{ }
\end{table}
```

Floats

Placement options:

Specifier	Permission
h	Try to place float approximately at this point in text
t	Float can be placed at top of pages
b	Float can be placed at bottom of page
H	From `float` package, places float exactly here

Only do this when your text is complete

Floats

- The \caption command is used to add a caption to the float
- the \label command is used in referencing
    - \label{key} stores the float under some key, this can then be referenced in the text with \ref{key}
    - To get this right, run pdfLATEX twice
    - Note that \label should come after \caption

Floats Example

.tex file:

```
1 \documentclass{article}
2 \usepackage{graphicx}
3 \begin{document}
4 Figure \ref{fig:uva}
  shows the UvA logo.
5 \begin{figure}
6 \centering
7 \includegraphics[width
  =0.5\textwidth]{uva.png
  }
8 \caption{The UvA logo}
9 \label{fig:uva}
10 \end{figure}
11 \end{document}
```

.pdf file:

Figure 1: The UvA logo

Figure 1 shows the UvA logo.

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Contact Details

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