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Presentations in LaTeX

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Outline

Presentations: why LaTeX?

- tidy and professional presentations
- easy to make with BEAMER class and standard LaTeX commands
- appearance defined by several themes, styles and options
  - 28 themes and 17 colors
  - https://hartwork.org/beamer-theme-matrix/
- support for overlays and dynamic effects
- output is a PDF-file: avoid problems at conferences due to different PowerPoint versions
- creation of presentation, handouts and articles from the same source

Presentations in LaTeX

- same rules and commands of other LaTeX documents (articles, books, reports)
- main structure is divided into Preamble:

```
\documentclass[...]{beamer}
\usepackage[english]{babel}
...
```

- and Main Part:

```
\begin{document}
...
\end{document}
```

- user guide: `https://github.com/josephwright/beamer`
  - "only" 247 pages

Your first LaTeX slide

Example

```
\documentclass{beamer}
\usetheme{Copenhagen}
\begin{document}

\begin{frame}
Here is my first slide in \LaTeX
\end{frame}

\end{document}
```

Your first LaTeX slide: outcome

Here is my first slide in LaTeX

Outline

Document class

\documentclass[...]{beamer}

- Font Size: 8pt, 9pt, 10pt, 11pt, 12pt, 14pt, 17pt, 20pt
- automatically loads other LaTeX packages: `xcolor`, `amsmath`, `amsthm`, `calc`, `geometry`, `hyperref`
- can create handouts without overlays

```
\documentclass[handout]{beamer}
\usepackage{pgfpages}
\mode<handout>{\pgfpagesuselayout{2 on 1}[a4paper]}
```

- you can print as article

```
\documentclass[]{article}
\usepackage{beamerarticle}
```

Title page

- this is where you define title, authors, institutions, ...

```
\title[Short Title]{Long Title}
\subtitle{Subtitle}
\author[Short Authors]{
Author1\inst{1} \and Author2\inst{2}}
\institute[Short Uni]{
\inst{1}%
Department A1 \\
University XX
\and
\inst{2}%
Department A2 \\
University YY}
\date[]{Conference or Date}
```

- short versions of title, authors, ... used in headline or footline

Title page

Example

```
\documentclass{beamer}
\usetheme{Copenhagen}
\title[Short Title]{My first presentation in \LaTeX}
\subtitle{Learning the \texttt{BEAMER} class}
\author[Author1, Author2]{
Author1\inst{1} \and Author2\inst{2}}
\institute[Universities XX and YY]{
\inst{1}%
Department A1 \\
University XX \and
\inst{2}%
Department A2 \\
University YY}
\date[]{Conference - Date}

\begin{document}
\begin{frame}[plain]   % this is your TITLE PAGE
\titlepage
\end{frame}

\begin{frame}
Here is my first slide in \LaTeX
\end{frame}
\end{document}
```

Title page: outcome

My first presentation in LaTeX

Learning the BEAMER class

Author1[1] Author2[2]

[1]Department A1
University XX

[2]Department A2
University YY

Conference - Date

Logo, navigation bar, transparency

- To insert a logo at the upper right corner of your slides

```
\addtobeamertemplate{frametitle}{}{
\begin{textblock*}{100mm}(.7\textwidth,-2cm)
\includegraphics[scale=0.12]{Logo}
\end{textblock*}
}
```

- it is tidier not to show the navigation bar

```
\beamertemplatenavigationsymbolsempty
```

- if you prefer partially visible overlays

```
\setbeamercovered{transparent}
```

Frame numbers

- `\setbeamertemplate{footline}[frame number]`
- or custom your own specification, for example:

```
\setbeamertemplate{footline}{
\leavevmode
\hbox{
\begin{beamercolorbox}[wd=.5\paperwidth,ht=2.25ex,dp=1ex,center]
{author in head/foot}%\usebeamerfont{author in head/foot}\insertshortauthor
\end{beamercolorbox}%
\begin{beamercolorbox}[wd=.5\paperwidth,ht=2.25ex,dp=1ex,center]
{title in head/foot}%
\usebeamerfont{title in head/foot}\insertshorttitle~~~~\insertframenumber
\end{beamercolorbox}
}
}
```

Outline

Frames

- a presentation consists of a series of frames
- each frame may consist of several slides/overlays
- a frame is like one "page" of the presentation

`\begin{frame}[..]{Title}{Subtitle} .. \end{frame}`

Options:

- `plain`: no headline, footline, sidebars
- `squeeze`: squeeze all vertical spaces (this slide)
- `shrink=0..100`: shrink everything by n percent
- `b`, `c` or `t`: vertically align at bottom, center or top
- `label= ...`: for reusing frame with `\againframe`

Structure

- use the standard `\section{}` and `\subsection{}` commands between frames
- they are hyperlinked, and they generally appear on sidebars or headline
- they appear in the `\tableofcontents`, but I discourage its use (in short presentations) $\Rightarrow$ it's a loss of important time!!
- do not use too many (4 sections are enough for short presentations)

Example

Here I have defined four sections, visible in the headline

Lists

- lists are very useful: `\begin{itemize} .. \end{itemize}` or `\begin{enumerate} .. \end{enumerate}`
- use multiple times!!
- set space between bullets with `\usepackage{setspace}` and `\begin{itemize} \setlength\itemsep{1em} ...`
- can easily create sub-lists by nesting one in another `\begin{itemize} .. \begin{itemize} .. \end{itemize} .. \end{itemize}`
  - like here (`itemize`)
    1. and here (`enumerate`)
- personalize appearance in Preamble:

```
\setbeamertemplate{itemize item}{...}
\setbeamertemplate{itemize subitem}{...}
\setbeamertemplate{enumerate item}{...}
```

Frames & lists

Example

```
\begin{frame}
\frametitle{The Research Questions}
Our main research questions are:
\bigskip
\begin{itemize}
\setlength\itemsep{1em}
\item is there any relationship between xx and yy?
\begin{itemize}
\item even controlling for zz?
\end{itemize}
\item if so, has the relationship changed over time?
\end{itemize}
\end{frame}
```

Frames & lists: outcome

The Research Questions

Our main research questions are:

- is there any relationship between xx and yy?
  - even controlling for zz?
- if so, has the relationship changed over time?

Changing font size

If you need to change the font size within a slide:

- `\tiny` is the smallest font
- `\scriptsize` is still very small
- `\small` is a small font
- `\normalsize` is the standard font
- `\large` increases your font
- `\Large` is a large font
- `\Huge` is just huge!

Block, alertblock & exampleblock

Block

Could be useful to highlight something

Alert block

Not really different from a block (can be used to contrast)

Example

Could be useful to show an example

- personalize appearance in Preamble:
  `\setbeamertemplate{blocks}[rounded][shadow=true]`

Overlays

Creating overlays

1. using overlay specifications

Example

```
\begin{itemize}
\item<1-> from first layer on
\item<3> only in the 3. layer
\item<2,4-> in the 2., 4. and all further layers
\end{itemize}
```

- from first layer on

Overlays

Creating overlays

1. using overlay specifications

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Overlays

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Overlays

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Overlays

Creating overlays

2. using the \pause command

Example

```
The command ‘‘pause" \pause allows to construct
simple overlays
```

The command “pause”

Overlays

Creating overlays

2. using the \pause command

Example

```
The command ‘‘pause" \pause allows to construct
simple overlays
```

The command “pause” allows to construct simple overlays

Overlays

Creating overlays

3. using the \uncover command

Example

```
Here you can decide
\uncover<2>{what and when to uncover}
```

Here you can decide

Overlays

Creating overlays

3. using the \uncover command

Example

```
Here you can decide
\uncover<2>{what and when to uncover}
```

Here you can decide what and when to uncover

Overlays

- several commands, lists, blocks and images allow an overlay specification

Overlays

- several commands, lists, blocks and images allow an overlay specification

```
\begin{block}<2-4>{Overlay block}
\begin{itemize}
\item<2-3> Appears only on the second
\textbf<3>{and third} layer
\item<4> \only<4> {only in the last slide}
\end{itemize}
\end{block}
```

Overlay block

- Appears only on the second and third layer

Overlays

- several commands, lists, blocks and images allow an overlay specification

```
\begin{block}<2-4>{Overlay block}
\begin{itemize}
\item<2-3> Appears only on the second
\textbf<3>{and third} layer
\item<4> \only<4> {only in the last slide}
\end{itemize}
\end{block}
```

Overlay block

- Appears only on the second **and third** layer

Overlays

- several commands, lists, blocks and images allow an overlay specification

```
\begin{block}<2-4>{Overlay block}
\begin{itemize}
\item<2-3> Appears only on the second
\textbf<3>{and third} layer
\item<4> \only<4> {only in the last slide}
\end{itemize}
\end{block}
```

Overlay block

- only in the last slide

Formulas - option I

```
\begin{equation}
y = \beta_0 + \beta_1x + \epsilon\,,\,\,\,
\epsilon \sim \mathcal{N}(0,\,\sigma^{2})\,.
\end{equation}
```

$$y = \beta_0 + \beta_1 x + \epsilon\,,\ \epsilon \sim \mathcal{N}(0,\,\sigma^2) \tag{1}$$

Formulas - option II

```
Suppose that $y$ follows a quadratic function of $x$,
that is:
$$
y = \alpha_0 + \alpha_1x + \alpha_2x^2
$$
```

Suppose that y follows a quadratic function of x, that is:

$$y = \alpha_0 + \alpha_1 x + \alpha_2 x^2$$

Formulas: colors

Go back

```
Suppose that $y$ follows a quadratic function of $x$,
that is:
$$
y = {\color<1>{red}\alpha_0} +
{\color<1-2>{blue}\alpha_1}x +
{\color<2>{green}\alpha_2}x^2
$$
```

Suppose that y follows a quadratic function of x, that is:

$$y = \alpha_0 + \alpha_1 x + \alpha_2 x^2$$

Formulas: colors

Go back

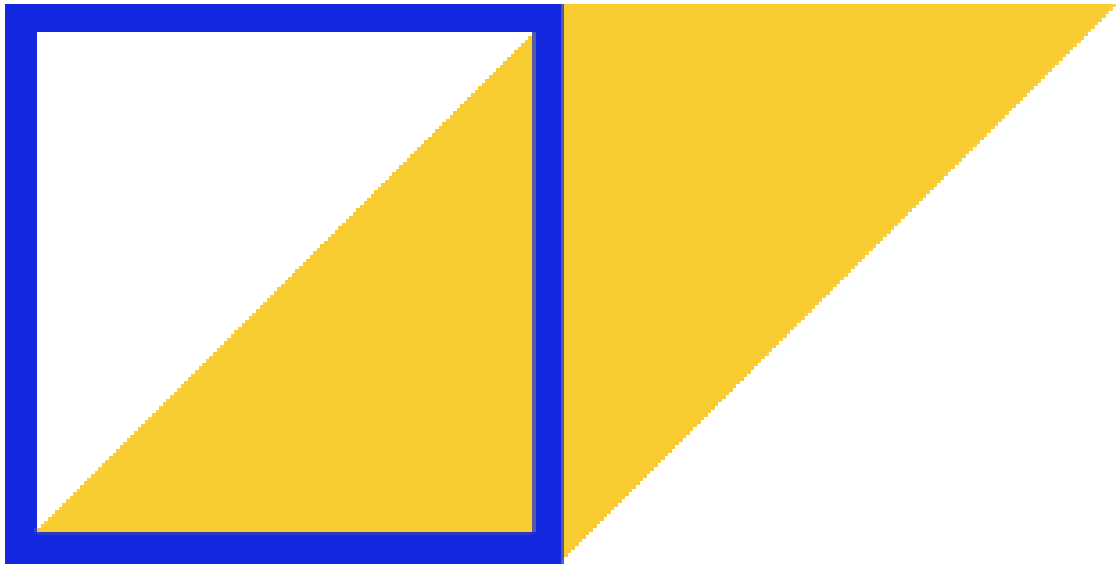
```
Suppose that $y$ follows a quadratic function of $x$,
that is:
$$
y = {\color<1>{red}\alpha_0} +
{\color<1-2>{blue}\alpha_1}x +
{\color<2>{green}\alpha_2}x^2
$$
```

Suppose that y follows a quadratic function of x, that is:

$$y = \alpha_0 + \alpha_1 x + \alpha_2 x^2$$

Images

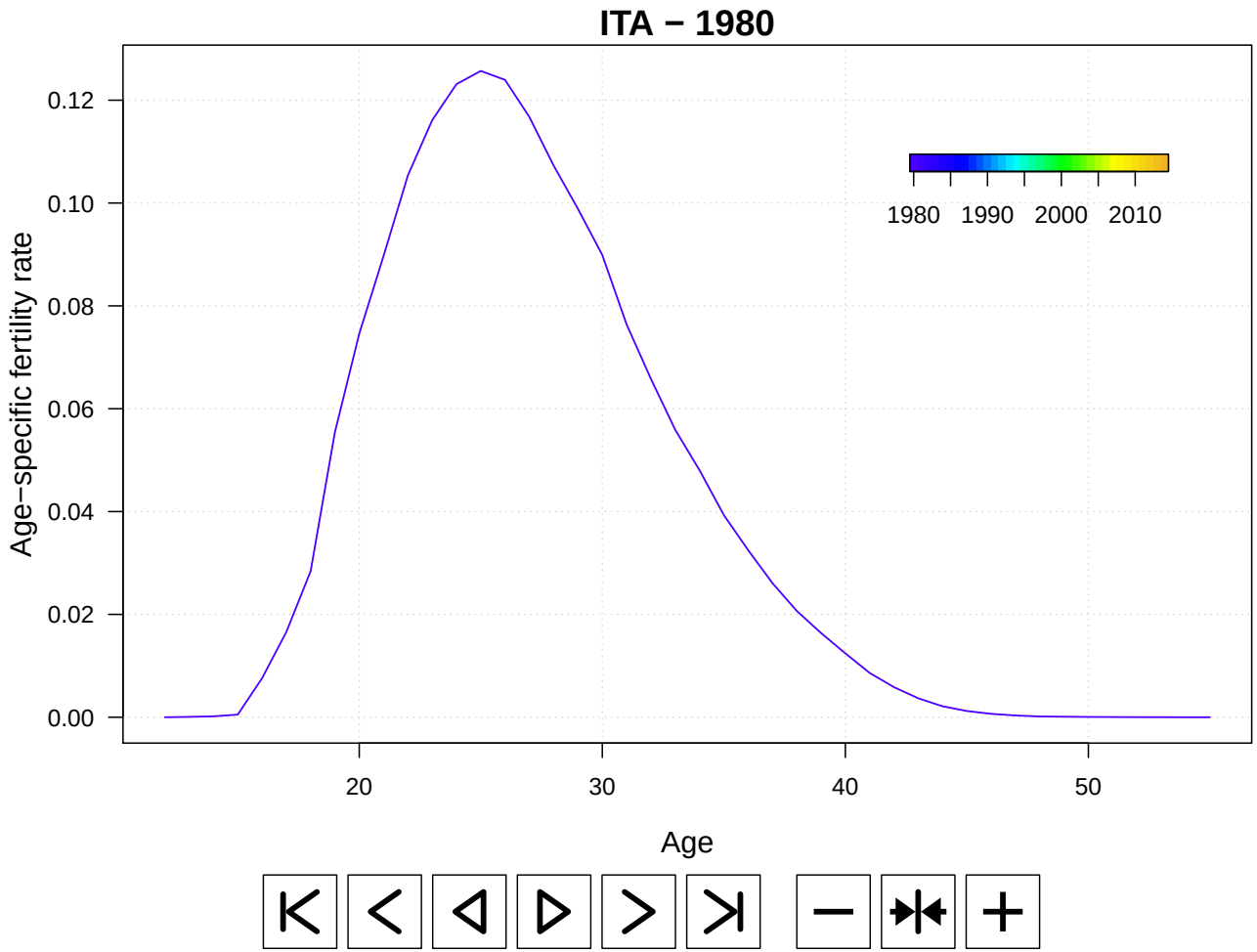
```
\begin{center}
% if file in the same folder of your .tex file
\includegraphics[scale=.7]{EDSDLogo.pdf}
% if file in folder different from your .tex file
\includegraphics[scale=.7]{FolderName/EDSDLogo.pdf}
\end{center}
```



Images: animation

Go back

BEAMER supports animation images: \animategraphics



Images: animation

`\animategraphics[<options>]{frame rate}{file}{first}{last}`

- Preamble: `\usepackage{animate}`
- need to create a multipage PDF file (next frame)
- Options:
  - `autoplay`: start animation after the page has opened
  - `loop`: animation restarts immediately after the end
  - `palindrome`: animation plays forwards and backwards
  - `step`: step through animation by mouse-click
  - `controls`: shows control buttons below the animation widget
- make sure to open file with Adobe Acrobat Reader (or the animation will fail)!!

Animations using R

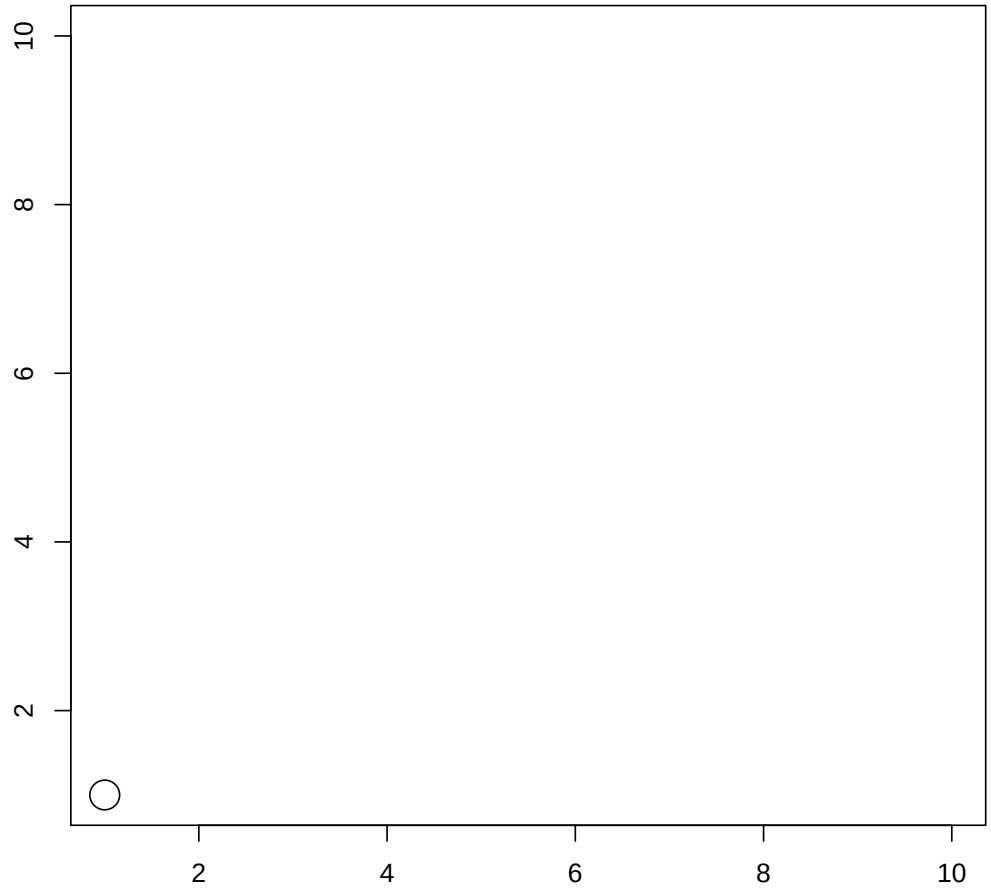
In R

```
rm(list=ls(all=TRUE))
n <- 10
setwd("your presentation directory")
pdf("AnimFig.pdf")
for (i in 1:n){
plot(1:i,1:i,pch=1:i,col=1:i,cex=2.5,xlab="",
ylab="",xlim=c(1,n),ylim=c(1,n))
}
dev.off()
```

In LaTeX

```
\animategraphics[controls,autoplay,loop,scale=0.4]{3}
{AnimFig}{0}{10}
```

Animations using R: outcome



Tables

You may need to show tables in your presentation:

Example

```
\begin{frame}
\begin{table}[]
\begin{tabular}{l|rr}
\textbf{City} & \textit{Population} &
\textit{Density}  \\
\hline
Odense     & 178210  & 590/km$^2$  \\
Copenhagen & 777218  & 4400/km$^2$
\end{tabular}
\end{table}
\end{frame}
```

Tables: outcome

City	*Population*	*Density*
Odense	178210	590/km^2
Copenhagen	777218	4400/km^2

Tables with booktabs

Example

```
\usepackage{booktabs,colortbl}
\definecolor{my-green}{RGB}{0,128,0}
...
\begin{frame}
\begin{table}
\centering
\caption{Tennis players and their achievements}
\begin{tabular}{lrrr}
\toprule
\multicolumn{1}{c}{Player} & \multicolumn{1}{c}{Grand Slam} &
\multicolumn{1}{c}{Year-End} & \multicolumn{1}{c}{Total} \\
\midrule
\rowcolor{my-green} Federer & 20 & 6 & 99 \\
Nadal & 17 & 0 & 80 \\
Djokovic & 15 & 5 & 73 \\
\bottomrule
\end{tabular}
\end{table}
\end{frame}
```

Tables with booktabs: outcome

Table: Tennis players and their achievements

Player	Grand Slam	Year-End	Total
Federer	20	6	99
Nadal	17	0	80
Djokovic	15	5	73

Columns

\begin{columns} .. \end{columns}

You can create columns of custom size

Example

```
\begin{columns}
\begin{column}[c]{5cm}
You can include lists,
images, blocks, formulas,
etc..
\end{column}
\begin{column}[c]{0.25\linewidth}
You can have as many as you want
\end{column}
\end{columns}
```

You can include lists, images, blocks, formulas, etc..

You can have as many as you want

Hyperlinks

- insert `\hypertarget{Anim}{}` into a frame or `\hypertarget<2>{CFor2}{}` to target the second layer of a frame
- then add hyperlinks to jump to the targets:

Hyperlinks

- insert `\hypertarget{Anim}{}` into a frame or `\hypertarget<2>{CFor2}{}` to target the second layer of a frame
- then add hyperlinks to jump to the targets:
  - `\hyperlink{Anim}`
    `{\beamergotobutton{go to Animation Figure}}`

Hyperlinks

- insert `\hypertarget{Anim}{}` into a frame or `\hypertarget<2>{CFor2}{}` to target the second layer of a frame
- then add hyperlinks to jump to the targets:
  - `\hyperlink{CFor2}`
    `{\beamergotobutton{go to Color Formula 2}}`

▸ go to Color Formula 2

Outline

Suggestions for short conference presentations

- use short sentences and not too much text
- no need for Table of Contents: it's always the same, you lose important time
- use `itemize` a lot
- images better than tables
- use short and informative frame titles (do not repeat section headings)
- do not read the slides word-for-word
- **practice** (with time!) your talk beforehand...
  - ... and then practice again ☺

References & inspirations for this class

- Giancarlo Camarda slides "Introduction to LaTeX"
  `https://sites.google.com/site/carlogiovannicamarda/teaching/latex`
- Meik Hellmund slides "The Beamer class for LaTeX"
  `http://www.math.uni-leipzig.de/~hellmund/latex.html`
- Joseph Wright user guide "The BEAMER class"
  `https://github.com/josephwright/beamer`

For questions, comments or bugs: `ugofilippo.basellini@ined.fr`