

\LaTeX workshop: Beamer

Frederick Yin

TechJI

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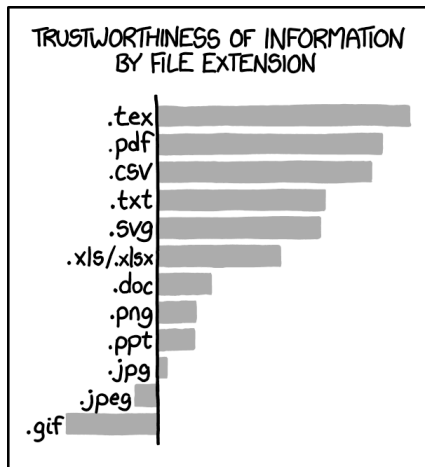
Blocks

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Why beamer?

- ▶ Content-centric
- ▶ Math typesetting
- ▶ Looks professional
- ▶ Reuse \LaTeX you wrote earlier



Randall Munroe, "File Extensions",
<https://xkcd.com/1301/>

Beamers 101

Instead of article, the first lines goes:

```
1 \documentclass{beamer}
```

Then metadata:

```
1 \title{\LaTeX\ workshop: Beamers}  
2 \author{Frederick Yin}  
3 \institute{TechJI}  
4 \date{2023}
```

Then the document:

```
1 \begin{document}  
2 % frames  
3 \end{document}
```

Beamers 101

Instead of article, the first lines goes:

```
1 \documentclass{beamer}
```

Then metadata:

```
1 \title{\LaTeX\ workshop: Beamers}  
2 \author{Frederick Yin}  
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```

Then the document:

```
1 \begin{document}  
2 % frames  
3 \end{document}
```

DIY 1

In diy.tex, fill in your name, then compile.

Frames

A beamer is made of many **frames**:

```
1 \begin{frame}{Title}
2   Frame content
3 \end{frame}
```

Or alternatively

```
1 \begin{frame}
2   \frametitle{Title}
3   Frame content
4 \end{frame}
```

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Multicolumn

```
1 \begin{columns}
2   \begin{column}{0.5\textwidth}
3     % ...
4   \end{column}
5   \begin{column}{0.3\textwidth}
6     And that's how this frame
7     was made!
8   \end{column}
9 \end{columns}
```

And that's how this frame was made!

Note

This is a beamer feature, **not** the same thing as the multicols environment in an article.

Alignment option

Add option `t` to top-align:

```
1 \begin{columns}[t]
2   \begin{column}{0.5\textwidth}
3     % ...
4   \end{column}
5   \begin{column}{0.3\textwidth}
6     % ...
7   \end{column}
8 \end{columns}
```

All options:

- ▶ `c` — center
- ▶ `t` — top
- ▶ `T` — different top ¹
- ▶ `b` — bottom

¹See section 12.7 of beamer docs.

Alignment option

Add option `t` to top-align:

```
1 \begin{columns}[t]
2   \begin{column}{0.5\textwidth}
3     % ...
4   \end{column}
5   \begin{column}{0.3\textwidth}
6     % ...
7   \end{column}
8 \end{columns}
```

All options:

- ▶ `c` — center
- ▶ `t` — top
- ▶ `T` — different top ¹
- ▶ `b` — bottom

DIY 2

Divide frame “ □□□□, □□⟨⟨□□⟩⟩ ” into two columns.

¹See section 12.7 of beamer docs.

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Sections

Use sections to outline your presentation.

```
1 \section{}  
2 % Frames  
3 \subsection{}  
4 % More frames
```

DIY 3

Group the lab report into sections, then compile and observe.

Table of Contents

Insert this frame where you want a Table of Contents (usually right after title page):

```
1 \begin{frame}{Table of Contents}  
2   \tableofcontents  
3 \end{frame}
```

Table of Contents

Insert this frame where you want a Table of Contents (usually right after title page):

```
1 \begin{frame}{Table of Contents}
2   \tableofcontents
3 \end{frame}
```

Or automatically insert one before each section:

```
1 \AtBeginSection[]{
2   \begin{frame}{Table of Contents}
3     \tableofcontents[currentsection]
4   \end{frame}
5 }
```

(In the preamble, before beginning of document)

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Blocks

Some block environments always need a title:

Like this default block

```
1 \begin{block}{Like this default block}  
2 \end{block}
```

Or this alertblock

```
1 \begin{alertblock}{Or this alertblock}  
2 \end{alertblock}
```


Blocks

Others have a default title, but you can elaborate:

Example

This example does not tell you what it's about...

```
1 \begin{example}  
2 \end{example}
```

Example (with a description)

But this one does!

```
1 \begin{example}[with a description]  
2 \end{example}
```

Blocks

Apart from example, we have examples, definition, definitions, theorem, proof, and corollary, with similar syntax.

```
1 \begin{something}[optional description]
2     % Block content
3 \end{something}
```

DIY 4

Put each paragraph in a block you think is suitable.

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Pauses

“Overlay” is just a fancy way of saying “hiding part of the frame”. The simplest way is `\pause`:

```
1 \begin{frame}
2   \begin{itemize}
3     \item To be, or --- next slide, please ---
4     \pause
5     \item not to be, that is the question.
6   \end{itemize}
7 \end{frame}
```

Pauses

“Overlay” is just a fancy way of saying “hiding part of the frame”. The simplest way is `\pause`:

```
1 \begin{frame}
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6   \end{itemize}
7 \end{frame}
```

Slide 1

- To be, or — next slide, please —

Pauses

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4     \pause
5     \item not to be, that is the question.
6   \end{itemize}
7 \end{frame}
```

Slide 2

- ▶ To be, or — next slide, please —
- ▶ not to be, that is the question.

Pauses

“Overlay” is just a fancy way of saying “hiding part of the frame”. The simplest way is `\pause`:

```
1 \begin{frame}
2   \begin{itemize}
3     \item To be, or --- next slide, please ---
4     \pause
5     \item not to be, that is the question.
6   \end{itemize}
7 \end{frame}
```

- ▶ To be, or — next slide, please —
- ▶ not to be, that is the question.

Problem: not very customizable

Overlay specifications

Solution: “overlay specifications” (aka angle brackets)

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```
1 \begin{frame}
2   \begin{itemize}
3     \item<1> Shall I compare thee to a summer's day? Thou art
4       --- next slide, please ---
5     \item<2-> more lovely, and --- next slide, please ---
6     \item<3-> more temperate.
7   \end{itemize}
8 \end{frame}
```

Overlay specifications

Solution: “overlay specifications” (aka angle brackets)

```
1 \begin{frame}
2   \begin{itemize}
3     \item<1> Shall I compare thee to a summer's day? Thou art
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7   \end{itemize}
8 \end{frame}
```

Slide 1

- ▶ Shall I compare thee to a summer's day? Thou art — next slide, please —

Overlay specifications

Solution: “overlay specifications” (aka angle brackets)

```
1 \begin{frame}
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6     \item<3-> more temperate.
7   \end{itemize}
8 \end{frame}
```

Slide 2

- ▶ more lovely, and — next slide, please —

Overlay specifications

Solution: “overlay specifications” (aka angle brackets)

```
1 \begin{frame}
2   \begin{itemize}
3     \item<1> Shall I compare thee to a summer's day? Thou art
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6     \item<3-> more temperate.
7   \end{itemize}
8 \end{frame}
```

Slide 3

- ▶ more lovely, and — next slide, please —
- ▶ more temperate.

Overlay specifications

Solution: “overlay specifications” (aka angle brackets)

```
1 \begin{frame}
2   \begin{itemize}
3     \item<1> Shall I compare thee to a summer's day? Thou art
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7   \end{itemize}
8 \end{frame}
```

- ▶ Shall I compare thee to a summer's day? Thou art — next slide, please —
- ▶ more lovely, and — next slide, please —
- ▶ more temperate.

Problem: requires manual work, even for simplest effect

Incremental specifications

Author of beamer knew this, and came up with **incremental specifications**:

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Author of beamer knew this, and came up with **incremental specifications**:

```
1 \begin{frame}
2   \begin{itemize}
3     \item<+> ...
4     \item<+> ...
5   \end{itemize}
6 \end{frame}
```

Incremental specifications

Author of beamer knew this, and came up with **incremental specifications**:

```
1 \begin{frame}
2   \begin{itemize}
3     \item<+> ...
4     \item<+> ...
5   \end{itemize}
6 \end{frame}
```

Slide 1

- ▶ It is a truth universally acknowledged, that a single man in possession of — next slide, please —

Incremental specifications

Author of beamer knew this, and came up with **incremental specifications**:

```
1 \begin{frame}
2   \begin{itemize}
3     \item<+> ...
4     \item<+> ...
5   \end{itemize}
6 \end{frame}
```

Slide 2

- ▶ It is a truth universally acknowledged, that a single man in possession of — next slide, please —
- ▶ a good fortune, must be in want of — next slide, please —

Incremental specifications

Author of beamer knew this, and came up with **incremental specifications**:

```
1 \begin{frame}
2   \begin{itemize}
3     \item<+> ...
4     \item<+> ...
5   \end{itemize}
6 \end{frame}
```

Slide 3

- ▶ It is a truth universally acknowledged, that a single man in possession of — next slide, please —
- ▶ a good fortune, must be in want of — next slide, please —
- ▶ a wife.

Incremental specifications

Author of beamer knew this, and came up with **incremental specifications**:

```
1 \begin{frame}
2   \begin{itemize}
3     \item<+> ...
4     \item<+> ...
5   \end{itemize}
6 \end{frame}
```

- ▶ It is a truth universally acknowledged, that a single man in possession of — next slide, please —
- ▶ a good fortune, must be in want of — next slide, please —
- ▶ a wife.

Problem: even this is too much work

Incremental specifications

They knew.

Incremental specifications

They knew. The previous example is equivalent to

```
1 \begin{frame}
2   \begin{itemize}[<+>->]
3     \item ...
4     \item ...
5   \end{itemize}
6 \end{frame}
```

<+> explained

How does <+> work?

- ▶ Counter called `beamerpauses`
- ▶ `\pause` adds 1 to `beamerpauses`
- ▶ Things like `<2->` do not
- ▶ `+` expands to current value of `beamerpauses`, then adds 1
- ▶ `<+>` expands to `<1->`, `<2->`, etc
- ▶ Unless you `\paused`

<+> explained

How does <+> work?

- ▶ Counter called `beamerpauses`
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- ▶ Things like `<2->` do not
- ▶ `+` expands to current value of `beamerpauses`, then adds 1
- ▶ `<+>` expands to `<1->`, `<2->`, etc
- ▶ Unless you `\paused`

DIY 5

Follow instructions in `diy.tex` to create your own overlays.

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Aspect ratio

Beamers are 4:3 by default. Switch to 16:9 with

```
1 \documentclass[aspectratio=169]{beamer}
```

Page size (mm):

- ▶ 4:3 — 128×96
- ▶ 16:9 — 160×90

This means vertical content *might* overflow. Better settle on an aspect ratio from the beginning.

Formulas

Works as you would expect in an article, except:

Consistent

```
1 \int x^2 \mathsf{d} x
```

$$\int x^2 dx$$

rm = Roman; sf = sans-serif

Not so much

```
1 \int x^2 \mathrm{d} x
```

$$\int x^2 dx$$

Dirty hack

Too many `\mathrm`s to replace? Try

```
1 \renewcommand{\mathrm}{\mathsf}
```

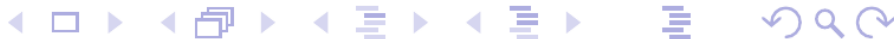
Fragile frames

If you include code, you have to tell beamer that this frame is “fragile”.

```
1 \begin{frame}[fragile]
2   % Content that contains code
3 \end{frame}
```

Remove navigation symbols

In the bottom right of your DIY slides are the navigation symbols:



This line removes them:

```
1 \setbeamertemplate{navigation symbols}{{}}
```

Why?

- ▶ Distracting clutter
- ▶ Manuel hates them
- ▶ Have you ever *used* it?

Further reading / References

- ▶ The beamer user guide:
<http://mirrors.ctan.org/macros/latex/contrib/beamer/doc/beameruserguide.pdf>
 - ▶ Multicolumn: §12.7
 - ▶ Sections: §10.2
 - ▶ Blocks: §12.3
 - ▶ Overlays: §9
- ▶ L^AT_EX workshop by Liu Yihao:
https://github.com/SJTU-UMJI-Tech/LaTeX/blob/master/build/c5_beamer.pdf

Thanks!