

Beamer By Example

Subtitle: Frankfurt Theme

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Outline

- 1 Structure
 - Features
 - Processing
 - Basics
 - Colour
- 2 Lists
 - Uncovering Text
 - Theorems/Proofs
 - Handouts
- 3 Fancy Bits
 - Columns
 - pstricks package
 - Movies



Sample Code

```

\documentclass{beamer}
\usetheme{Frankfurt}
Use \section{..} and \subsection{..} to create items
for the Table of Contents
The code for a frame is ...

\subsection{Basics}
\begin{frame}
\frametitle{Sample Code}
Frame content
.
\end{frame}

```



Colouring Text

This a 2–stage process

- Define the colour


```
\setbeamercolor{blue}{fg=blue!50}
```
- Use the colour


```
{\usebeamercolor[fg]{blue} Some blue text}
```

Some blue text
- or


```
\newcommand{\green}[1]{\usebeamercolor[fg]{green}#1}
```

```
\green{some green text}...some green text
```

```
\alert<4>{Colours predefined in PSTricks}
```



Uncover & alert

- Apple
 - Peach
 - Plum
 - Orange
- ```
\begin{itemize}[<+ | alert@+]
 \item Apple
 \item Peach
 \item Plum
 \item Orange
\end{itemize}
```



## Uncovering Equations

$$\begin{aligned}
 A &= B \\
 &= C \\
 &= D
 \end{aligned}$$

```
\begin{align*}
A &= \uncover<2->{B} \\
&\uncover<2->{=C} \\
&\uncover<3->{=D} \\
\end{align*}
```



### An example of replacement

This uses five overlays, each separate equations. . .

$$\begin{aligned} \frac{d}{dx} \frac{x+3}{(x-1)^2} &= \\ &= \frac{(x-1)^2 - 2(x+3)(x-1)}{(x-1)^4} \\ &= \frac{(x-1)((x-1) - 2(x+3))}{(x-1)^4} \\ &= \frac{((x-1) - 2(x+3))}{(x-1)^3} = -\frac{x+7}{(x-1)^3} \end{aligned}$$

`\alt` is used to replace the first line and then `\visible`, as opposed to `\uncover`. Alignment not ideal.



### An example of align with replacement

Three overlays, . . .

$$\begin{aligned} left &= rhs 1 \\ &= rhs 3 \end{aligned}$$

```
\begin{align*}
left&=\alt<1>{rhs1}{\text{alternate rhs}}\backslash
\visible<3->{\&=rhs3}
\end{align*}
```

Uses `\alt` and `\visible`, as opposed to `\uncover`. Alignment spoiled because alternative is longer than original.



## An example of align with replacement

Use of `\phantom` to add invisible text to 3rd overlay to ensure correct alignment when `\alt` string is longest...

$$\begin{aligned} \text{left} &= \text{rhs 1} \\ &= \text{rhs 3} \end{aligned}$$

```
\begin{align*}
\text{\text{left}}&=&
\alt<1>\text{\text{rhs 1}}\{\text{\text{alternate rhs 2}}\}\backslash
\visible<3->
\{&=\text{\text{rhs 3}}\phantom{\text{extra appended}}\}\backslash
\end{align*}
```



## The align environment with replacement

$$\begin{aligned} \frac{d}{dx} \frac{x+3}{(x-1)^2} &= \\ &= \frac{(x-1)^2 - 2(x+3)(x-1)}{(x-1)^4} \\ &= \frac{(x-1)((x-1) - 2(x+3))}{(x-1)^4} \\ &= \frac{((x-1) - 2(x+3))}{(x-1)^3} = -\frac{x+7}{(x-1)^3} \end{aligned}$$

`\alt` replaces the first line and then `\visible`, as opposed to `\uncover`. Alignment is fixed.



## Uncovering Rows

| Class | A | B | C | D |
|-------|---|---|---|---|
| X     | 1 | 2 | 3 | 4 |
| Y     | 3 | 4 | 5 | 6 |
| Z     | 5 | 6 | 7 | 8 |

```
\usepackage{colortbl}

\rowcolors[]{}{1}{blue!20}{red!10}
\begin{tabular}{l!{\vrule}cccc}\hline
Class & A & B & C & D\\\hline
X & 1 & 2 & 3 & 4 \\ \pause
Y & 3 & 4 & 5 & 6 \\ \pause
Z & 5 & 6 & 7 & 8
\end{tabular}
```



## Uncovering Columns

| Class | A | B | C | D |
|-------|---|---|---|---|
| X     | 1 | 2 | 3 | 4 |
| Y     | 3 | 4 | 5 | 6 |
| Z     | 5 | 6 | 7 | 8 |

```
\begin{tabular}%
{l!{\vrule}c<{\onslide<2->}%
c<{\onslide<3>}
c<{\onslide<4->}c}
....
\end{tabular}
```

`c<{decl.}` inserts decl. right after the entry for the column.



## Theorem and Proof

### Theorem

*There is no largest prime number*

### Proof.

- Suppose  $p$  ... the largest prime
- Let  $q$  be the product of the first  $p$  numbers
- Then  $q + 1$  is not divisible by any of them
- Thus  $q + 1$  is a prime number larger than  $p$ .



## Theorem and Proof-Code

```

\begin{theorem}
 There is no largest prime number
\end{theorem}

\begin{proof}
\begin{itemize}
\item Suppose p were the largest prime\pause
\item Let q be ... first p numbers\pause
\item Then $q+1$ is not divisible ...\pause
\item Thus $q+1$ is a prime ... p .\pause
\end{itemize}
\end{proof}

```



# Cantor's Theorem

**Theorem**  
 $\alpha < 2^\alpha$  for all ordinals  $\alpha$ .

[+ Proof details](#)

**Proof.**  
As shown by Cantor... □

[+ Return](#)



# Printing slides for handouts

With the header

```
\documentclass[t,handout]{beamer}
```

- (i) the `t` option specifies vertically aligned top frames
- (ii) all piecewise defined slides are aggregated into one.
- (iii) `\usepackage{enumerate}`  
...  
`\begin{enumerate}[<+>][i]`  
  `\item the \texttt{\blue{t}} option specifies .`  
  `\item all piecewise defined ....`  
`\end{enumerate}`



# Printing as article class

The header

```
\documentclass{article}
and package
\usepackage{beamerarticle}
```

cause the material to be typeset as a “normal” article—all frame references are ignored.



# Sample page

Outline

**Contents**

|          |                   |          |
|----------|-------------------|----------|
| <b>1</b> | <b>Structure</b>  | <b>1</b> |
| 1.1      | Features          | 1        |
| 1.2      | Basics            | 1        |
| 1.3      | Colour            | 1        |
| <b>2</b> | <b>Lists</b>      | <b>2</b> |
| 2.1      | Uncovering Text   | 2        |
| 2.2      | Theorems/Proofs   | 5        |
| 2.3      | Handouts          | 6        |
| <b>3</b> | <b>Fancy Bits</b> | <b>6</b> |
| 3.1      | Columns           | 6        |
| 3.2      | patricks package  | 7        |
| 3.3      | Movies            | 8        |

**1 Structure**

**1.1 Features**

**Beamer**

Written by Till Tantau while completing his PhD.

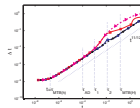


## Graphics & Text Side by Side

```

\begin{columns}[b]
 \begin{column}{.25\textwidth}
 \includegraphics[width=1.3in]{FILE.eps}
 \end{column}
 \begin{column}{.75\textwidth}
 text column
 \end{column}
\end{columns}

```

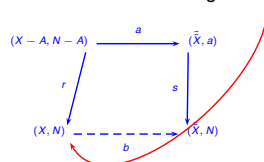


[We actually use semiverbatim & incremental alerts.]



## Diagrams

A small diagram with a few lines of  $\LaTeX$ . At the 2nd overlay we can add a link from one to another using **PSTRICKS**



```

\blue \rnode{START}{\textsc{PStricks}}
...
\visible<2>{\ncurve%
[linecolor=red,angleA=270,angleB=300]{START}{c}}

```







## Summary

- The **first main message** of your talk in one or two lines.
- The **second main message** of your talk in one or two lines.
- Perhaps a **third message**, but not more than that.
  
- Outlook
  - Something you haven't solved.
  - Something else you haven't solved.



## Cantor's Theorem

### Theorem

$\alpha < 2^\alpha$  for all ordinals  $\alpha$ .

• Proof details

### Proof.

As shown by Cantor...



• Return



## For Further Reading I



A. Author.

*Handbook of Everything.*  
Some Press, 1990.



S. Someone.

On this and that.  
*Journal of This and That*, 2(1):50–100, 2000.



D.F. Griffiths

Beamer By Example

<http://www.maths.dundee.ac.uk/~dfg/talks.shtml>

