# My Title

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University of E

Friday 24th February, 2017
Occasion

UNIVERSITY OF
NOTRE DAME
College of Science

# Outline

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

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# Beamer

## Features

This is a template and guide to `beamer` presentations.

- Process with either `pdflatex` or `latex+dvips`
- Standard LaTeX commands still work
- `tableofcontents` works
- Overlays & dynamic effects easily created
- Easy navigation through sections & subsections
- Many templates and examples included in package
- `article` style can be used to produce notes

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This means that all graphics have to be `eps` files.

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# 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}
```

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# Coloring Text

This a 2–stage process

- Define the color
  `\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>{Colors predefined in PSTRICKS}`

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## Subtitle: A Short Example

- Use `itemize` a lot–with `\pause`
- Use very short sentences or short phrases.

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\begin{itemize}
\item
  Use \texttt{itemize} a lot--with \pause
\item
  Use very short sentences or short phrases.
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You can create overlays. . .

- using the `\pause` command:
  - First item. (`\pause`)
  - Second item.
- using overlay specifications:
  - First item. (`\item<3->`)
  - Second item.(`\item<4>`)
- using the general `\uncover` command: (`\uncover<5->{\item First item...}`)
  - First item.
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# Uncover & alert

- Apple
- Peach
- Plum
- Orange

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

# Uncover & alert

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# Uncovering Equations

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

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

# Uncovering Equations

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\begin{aligned}
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# An example of replacement

This uses five overlays, each separate equations. . .

$$\frac{\mathrm{d}}{\mathrm{d}x}\frac{x+3}{(x-1)^2} =$$

alt is used to replace the first line and then visible, as opposed to uncover.

Alignment not ideal.

# An example of replacement

This uses five overlays, each separate equations. . .

$$\frac{\mathrm{d}}{\mathrm{d}x}\frac{x+3}{(x-1)^2}=\frac{(x-1)^2-2(x+3)(x-1)}{(x-1)^4}$$

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# An example of `align` with replacement

Three overlays, . . .

$$\textit{left} = \text{rhs 1}$$

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

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

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# 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. . .

$$\text{left} = \text{rhs 1}$$

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

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

$$\text{left} = \text{alternate rhs 2}$$

```
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```

# The align environment with replacement

$$\frac{\mathrm{d}}{\mathrm{d}x}\frac{x+3}{(x-1)^2} =$$

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

# The `align` environment with replacement

$$\frac{\mathrm{d}}{\mathrm{d}x}\frac{x+3}{(x-1)^2} = \frac{(x-1)^2 - 2(x+3)(x-1)}{(x-1)^4}$$

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# 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
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\end{tabular}
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```
\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.

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\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.

# 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>}
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     ....
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## Outline

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

# 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 $p$.

□

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# 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

# Outline

1 Structure

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# 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}
```

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# 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.

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# 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

$$\begin{tikzcd}
(X-A, N-A) \arrow[r, "a"] \arrow[d, "r"'] & (\tilde{\tilde{X}}, a) \arrow[d, "s"'] \\
(X, N) \arrow[r, dashed, "b"'] & (\tilde{\tilde{X}}, N)
\end{tikzcd}$$

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

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# Householder formula

The Householder formula below lets one compute $f(x_*) = 0$ for an arbitrary $f$.

$$x_{k+1} \mapsto \Phi_n(x_k) = x_k + (n-1)\frac{\left(\frac{1}{f(x_k)}\right)^{n-2}}{\left(\frac{1}{f(x_k)}\right)^{n-1}} + f(x_k)^{n+1} \quad \psi \tag{1}$$

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where $n \geq 2$ and $\psi$ is an arbitrary function.

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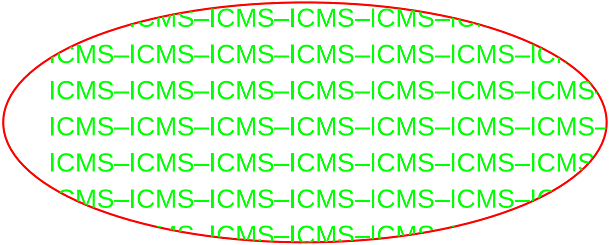
where $n \geq 2$ and $\psi$ is an arbitrary function.
Formula (1) gives an iteration of order $n$ converging towards $x_*$ such that: $f(x_*) = 0$.

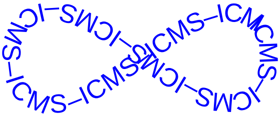
## Some PSTRICKS

Any practical use for this?


ICMS–ICMS–ICMS–ICMS–ICMS–ICMS–ICMS
ICMS–ICMS–ICMS–ICMS–ICMS–ICMS–ICMS–
ICMS–ICMS–ICMS–ICMS–ICMS–ICMS–ICMS

## Some more PSTRICKS

or this ...



```
\pstextpath{\psccurve[linestyle=none]%
(.5,0)(3.5,1)(3.5,0)(.5,1)}%
{\blue ICMS--ICMS--ICMS--ICMS--ICMS--ICMS--%
ICMS--ICMS--ICMS--ICMS--ICM}
```

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# Including Movies

```
*in preamble -> \usepackage{movie9}
\includemedia[width=2.5in,height=1.75in,showcontrols,p
            {}{sample.mp4}
```

Link to movie

You can try to “embed” the movie with the example text above (Note: The `.mp4` file must still reside in the same folder as the `pdf` file), but referencing it for the OS to play outside of the pdf reader will give the greatest compatibility.

# 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.

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  - Something you haven't solved[4].
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# References

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- Adam Parusiński and Piotr Pragacz. “Characteristic classes of hypersurfaces and characteristic cycles”. preprint. Jan. 1998 (cit. on pp. 94–97).

# Thank you!

Questions?

# Cantor's Theorem

**Theorem**

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**Proof.**

As shown by Cantor... □

◂ Return