Beamer 프레젠테이션 활용

LaTeX 기초 강좌 (2008년 가을, 공주대학교)

이응신

Rechner Korea Co. Ltd. ((주) 레시너코리아)

Part I

Beamer 소개

차 례

1 Introduction

2 Beamer의 구성

3 Beamer의 템플릿

4 Beamer의 기능

5 Blocks

6 그래프와 그림

7 기타

좋은 프레젠테이션이란?

슬라이드의 구성 위주로

- 적당한 그림, 그래프, 도해
- 일관성(consistency)
- 요란스럽지 않은 애니메이션 효과
- 항목 표시를 적당하게 (5 - 6 개 이하로)
- 완전하지 않은 문장으로: 키워드, 구 (절)

프레젠테이션 비교: PPT와 Beamer

	PPT	Beamer

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	PPT	Beamer
	WYSIWYG	Text (Markup)

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초급	쉽다	어렵다
중급	재미있다	재미있다
고급	짜증난다	쉽다

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사용 용도	효과	내용
	가끔 발표	규칙적으로/자주

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기반	MS Office	LaTeX
쉬운 작성	(PowerPoint)	(LyX)

Screen Presentation Tools

PDF based solutions

AxPoint, Beamer, foiltex, HA-prosper, ifmslide, IPE, KeyJnote, pdfscreen, PPower4, Prosper, rayslides, ReportLab/PythonPoint, seminar, slidenotes, slideshow, TeXPower, web

HTML based solutions

DocBook dbslide, DocBook slides, latex2slides

Other solutions

DFBPoint, mechapoint, mgp-MagicPoint

왜 Beamer?

- 많은 사람들이 이용
- 개발자의 지속적인 기능 향상
- 다양한 기능과 세부 조절 옵션이 좋음 / 뛰어난 메뉴얼
- “Für alle, die die Schönheit von Wissenschaft anderen zeigen wollen.”

Markup 언어: HTML & Beamer(TEX)

HTML

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=EUC-KR">
<title>Korean TeX Users Group</title>
<link rel="stylesheet" href="css/2col_rightNav.css" type="text/css">
<style type="text/css"></style>
</head>
<body>
Hello world!
</body>
</html>
```

Beamer

```
\documentclass[8pt,compress,slidetop,hyperref={unicode},t]{beamer}
\usepackage{amstex,verbatim}
\mode<presentation>
{\usetheme{Frankfurt}
\usecolortheme[named=olive]{structure}
  \usefonttheme[onlymath]{serif}}
\title{Beamer 프레젠테이션 활용}
\begin{document}
\begin{frame}{start}
Hello world!
\end{frame}
\end{document}
```

- HTML (editor) ► interpreter+browser (IE/FireFox/Chrome)
- Beamer (editor) ► compile (pdfLaTeX)► browser (Adobe Reader/SumatraPDF/Foxit Reader)

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Beamer 구성: Preamble(Head)

```
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\mode<presentation>
{
\usecolortheme[named=olive]{structure}
\usefonttheme[onlymath]{serif}
   \setbeamercovered{transparent}
}

\usepackage{verbatim}
\usepackage{tikz}

\title{Beamer presentation}\subtitle{}
\author{Till Tantau}
\date[]{}
\institute[]{}

\AtBeginSection[]
{
\begin{frame}<beamer>
\frametitle{차 례}
\tableofcontents[currentsection,hideallsubsections]
    \end{frame}
}
```

Beamer 구성: Body

```
\begin{document}

\begin{frame}
\titlepage
\end{frame}

\begin{frame}
\frametitle{test 1}
예제 1
\end{frame}

\begin{frame}
\frametitle{test 2}
예제 2
\end{frame}

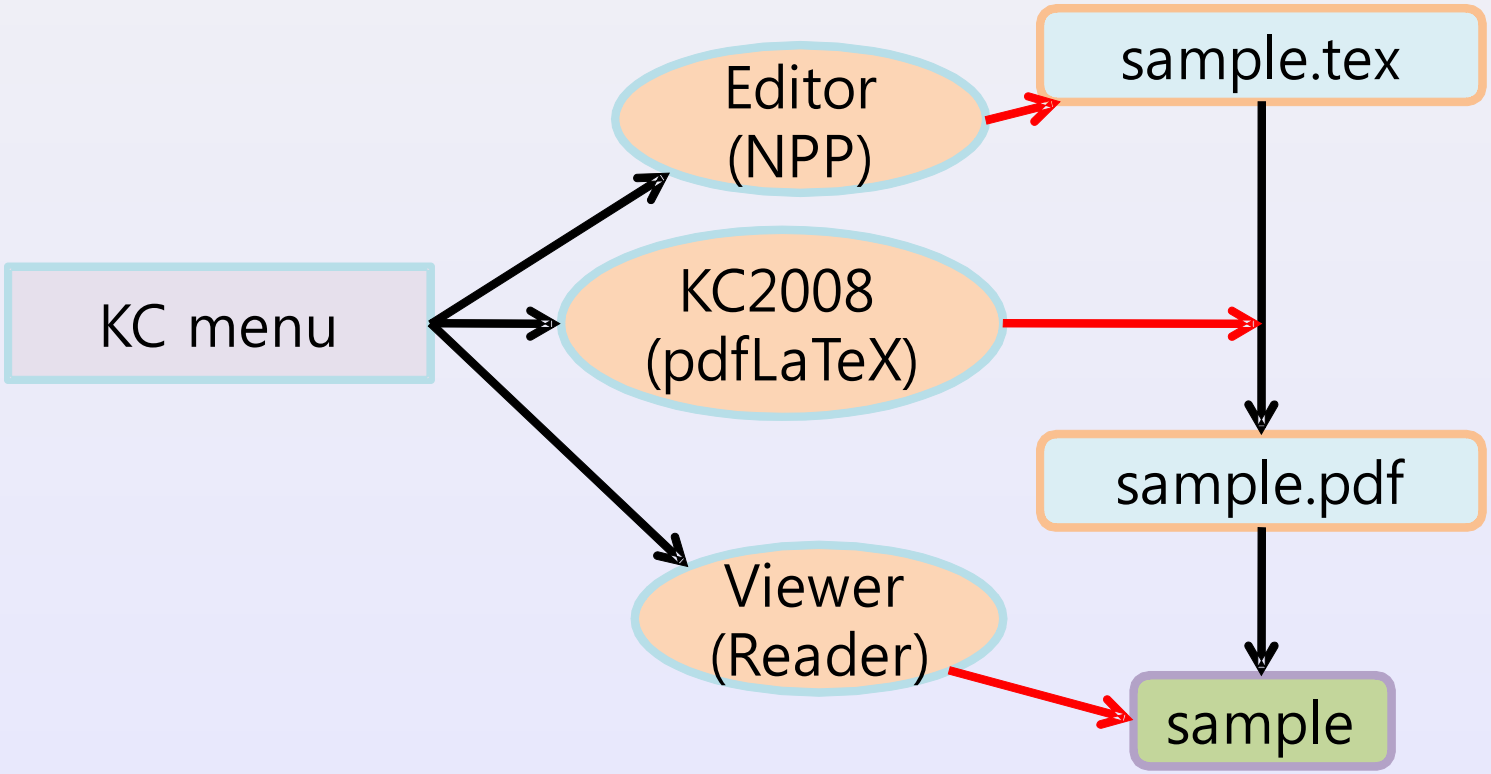
\end{document}
```

시작화면

슬라이드 1

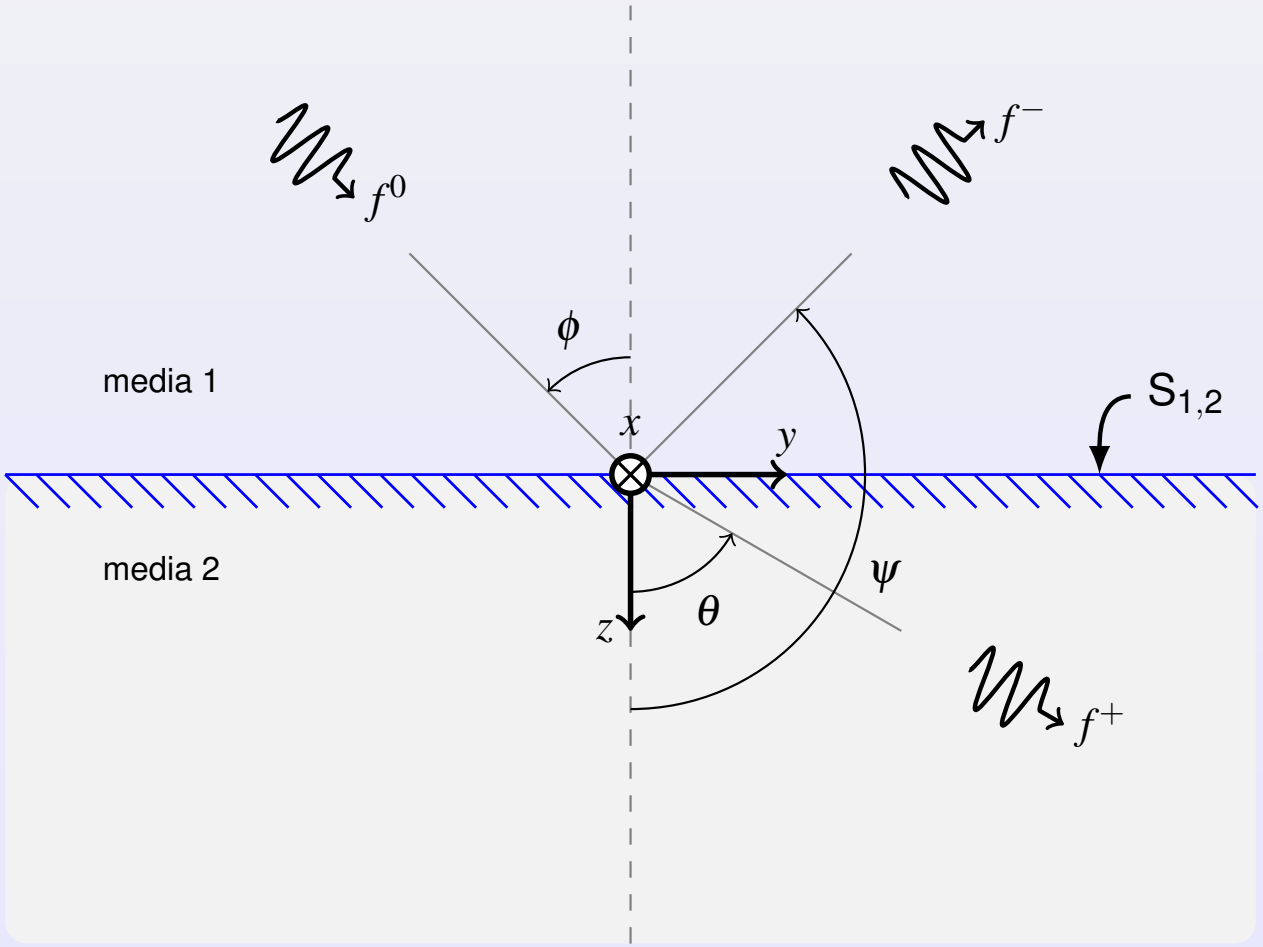
슬라이드 2

작업 흐름도


KC menu
Editor
(NPP)
KC2008
(pdfLaTeX)
Viewer
(Reader)
sample.tex
sample.pdf
sample

예제 1

간단한 예제: 빛의 반사와 굴절



예제 2

간단한 에니메이션: 교집합

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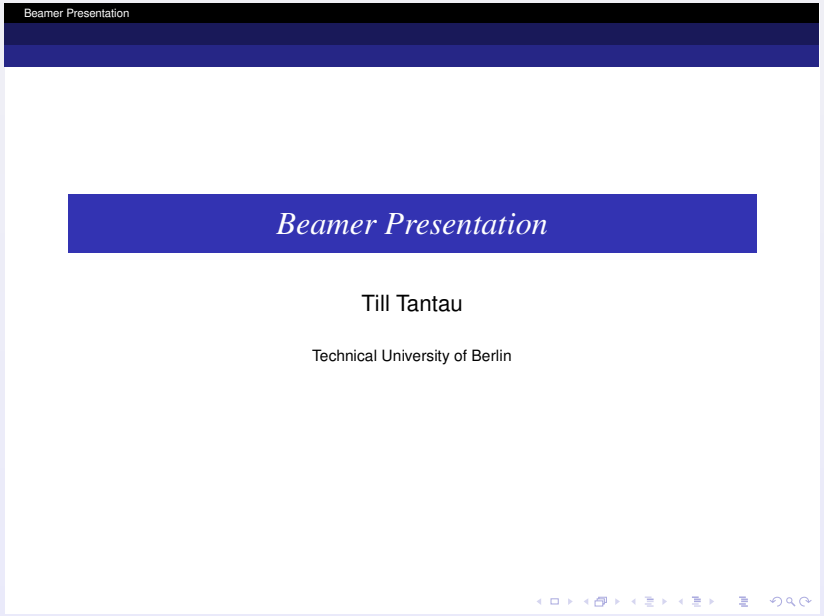
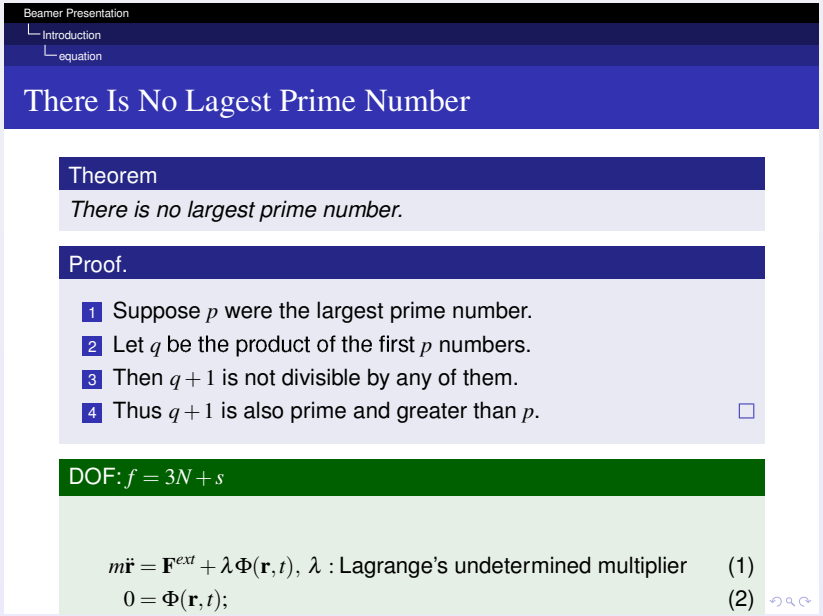
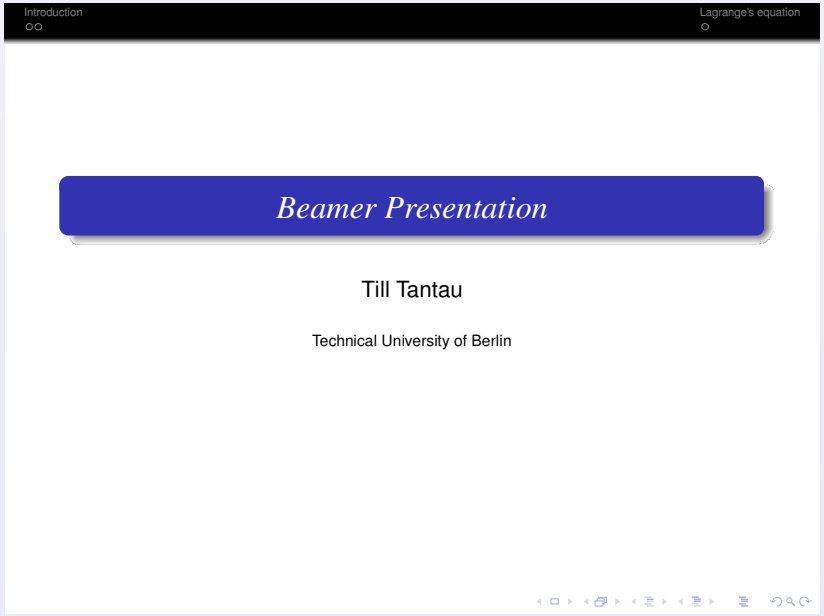
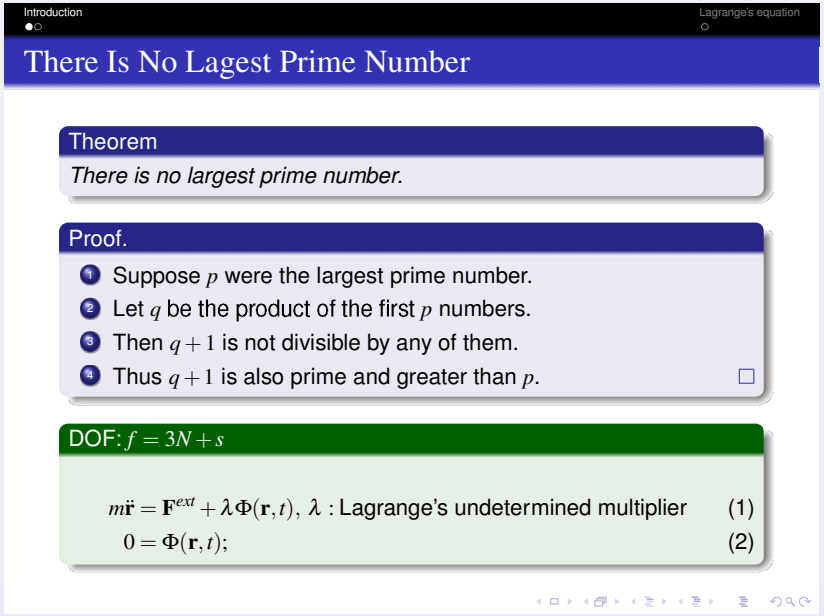
Templates & Skins (theme): Antibes





Templates & Skins (theme): Frankfurt





Templates & Skins (theme): Madrid

Beamer Presentation

Till Tantau

Technical University of Berlin

There Is No Lagest Prime Number

Theorem

There is no largest prime number.

Proof.

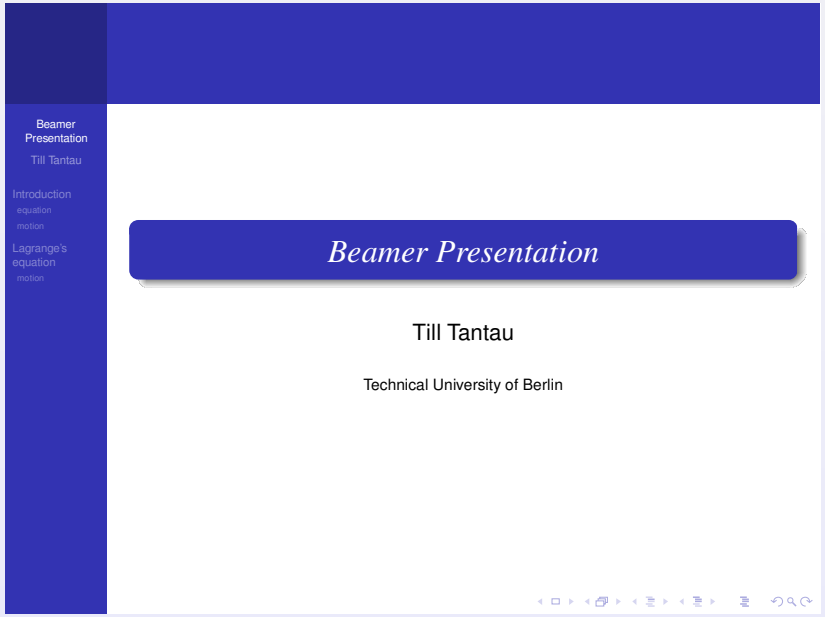
1. Suppose p were the largest prime number.
2. Let q be the product of the first p numbers.
3. Then $q+1$ is not divisible by any of them.
4. Thus $q+1$ is also prime and greater than p. □

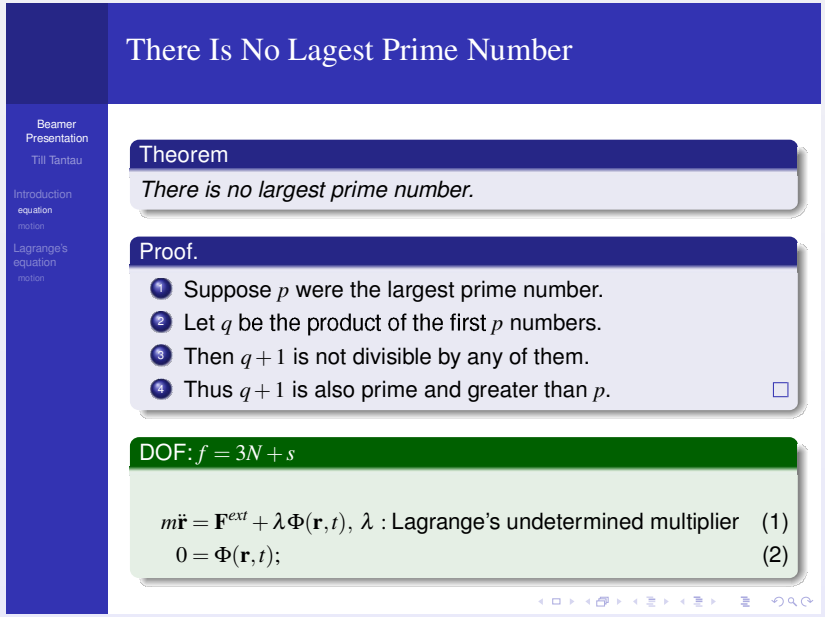
DOF: $f = 3N + s$

$$m\ddot{\mathbf{r}} = \mathbf{F}^{ext} + \lambda\Phi(\mathbf{r},t),\ \lambda : \text{Lagrange's undetermined multiplier} \quad (1)$$

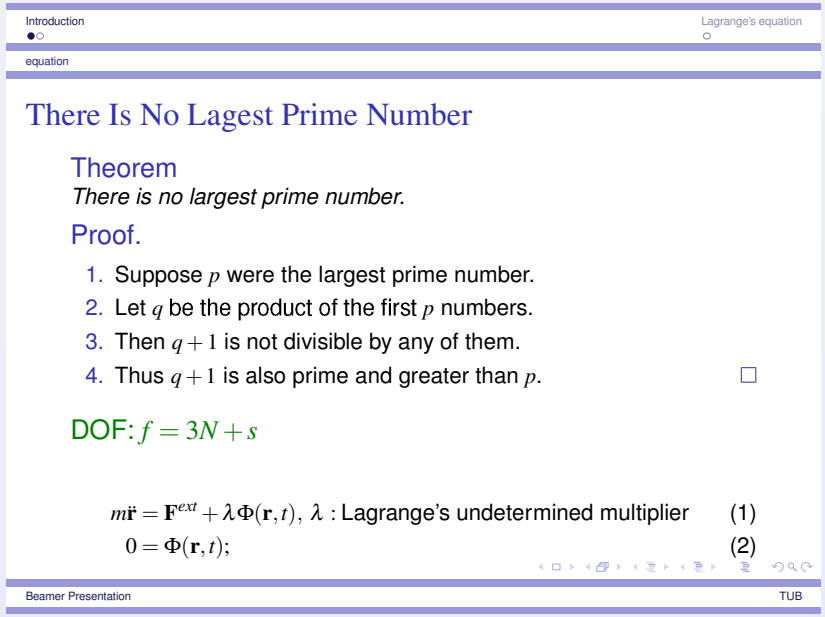
$$0 = \Phi(\mathbf{r},t); \quad (2)$$

Templates & Skins (theme): PaloAlto





Templates & Skins (theme): Szeged



Templates & Skins (theme): UMBC4

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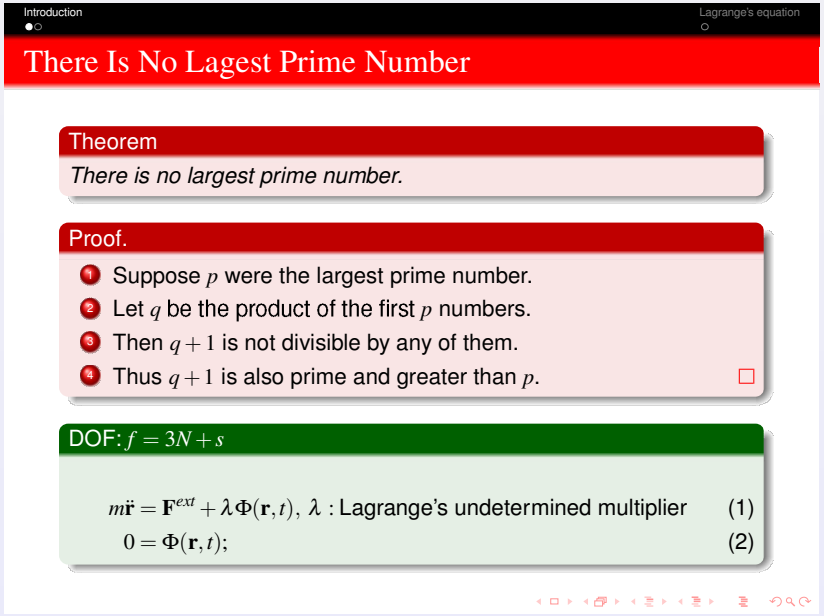
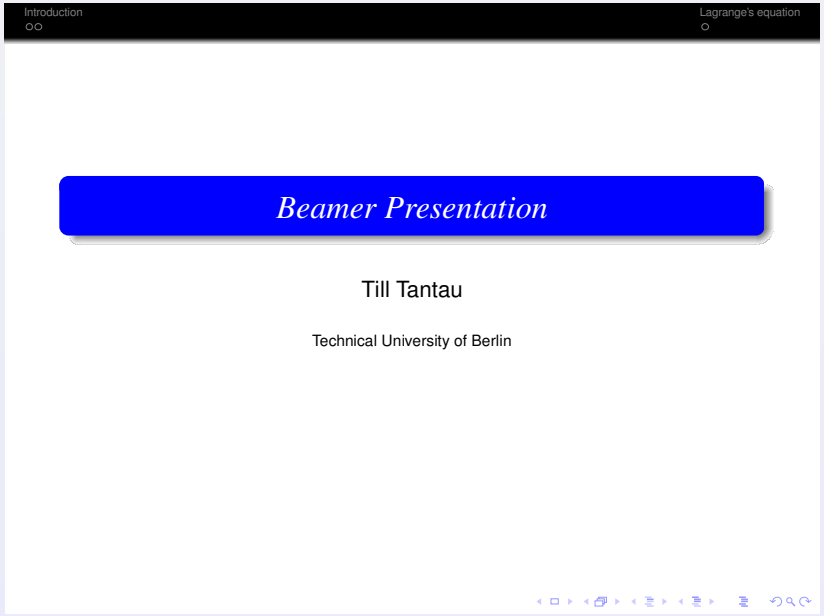
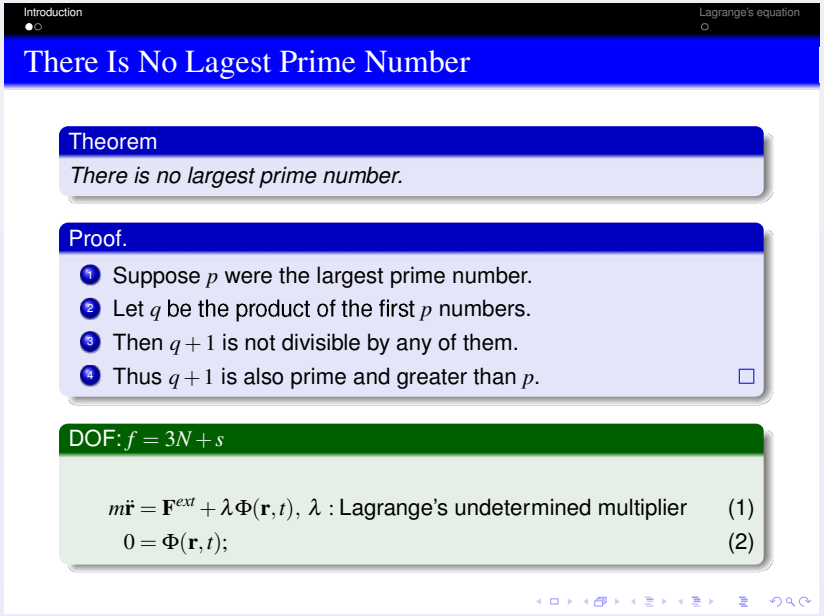
Templates & Skins (colortheme): red (theme: Frankfurt)

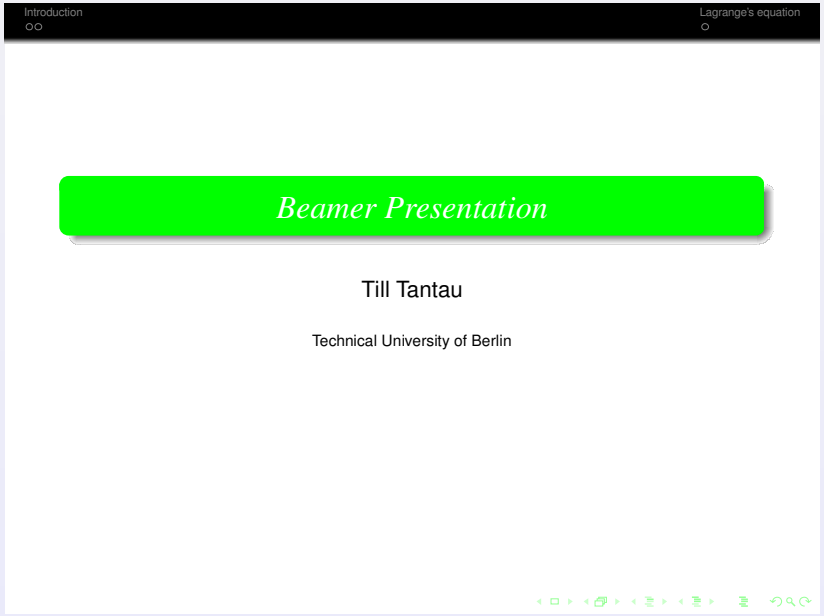


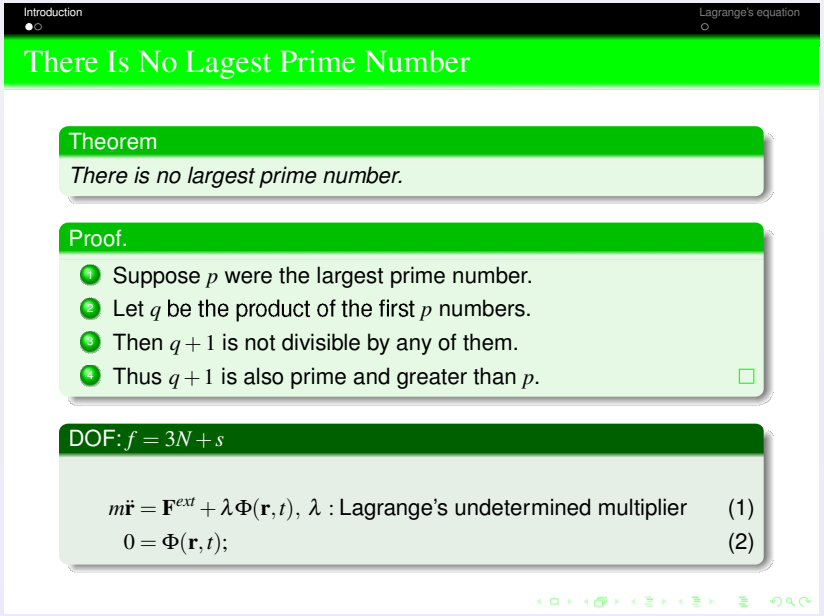
Templates & Skins (colortheme): blue (theme: Frankfurt)



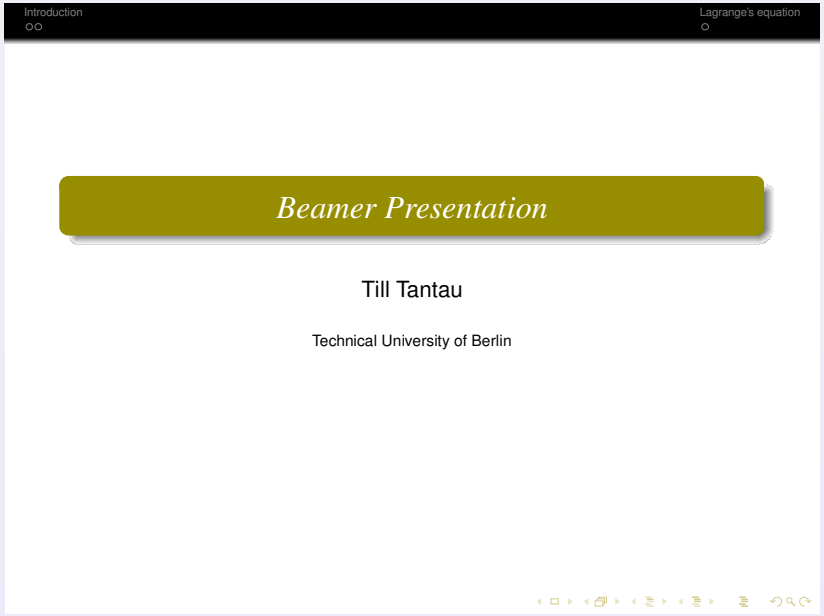


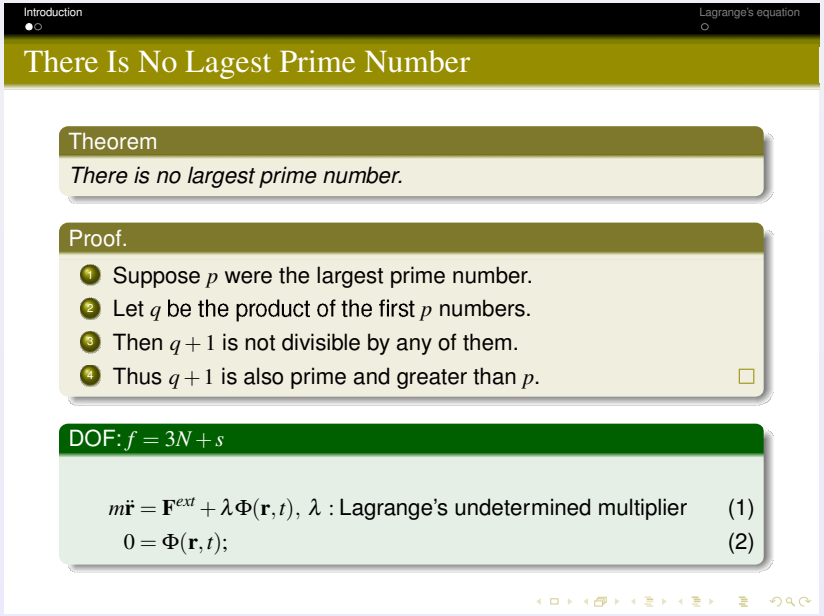
Templates & Skins (colortheme): green (theme: Frankfurt)



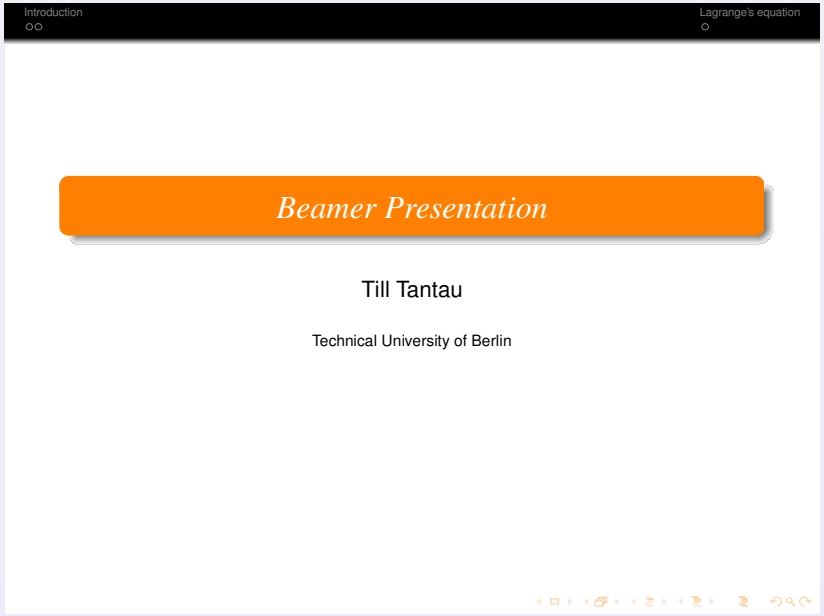


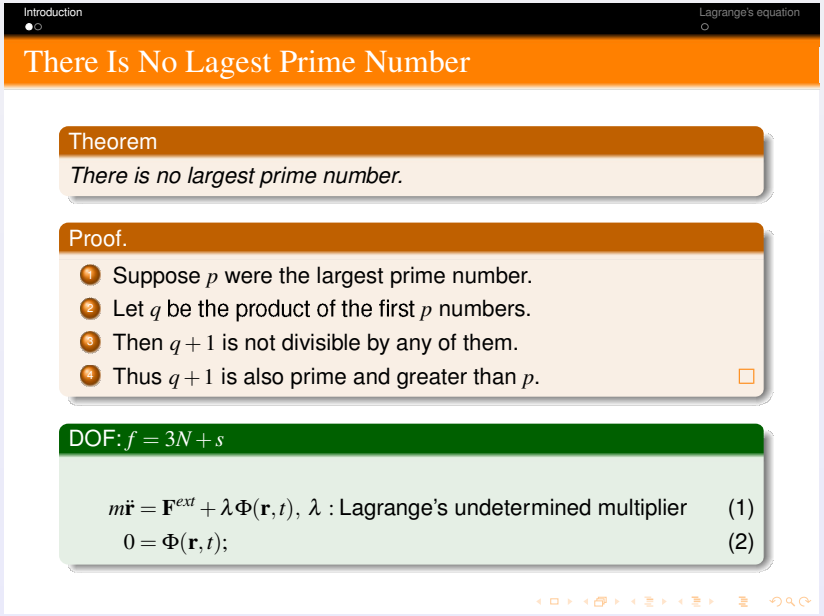
Templates & Skins (colortheme): olive (theme: Frankfurt)



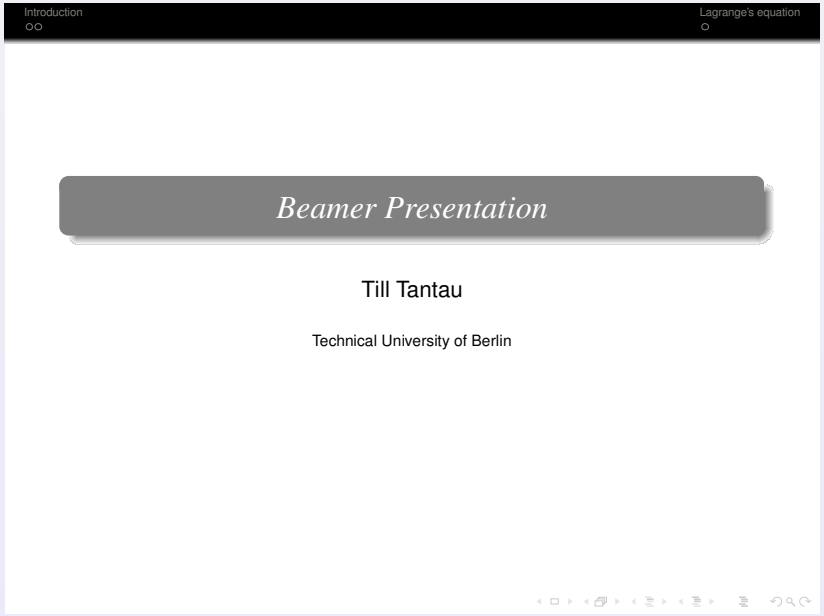


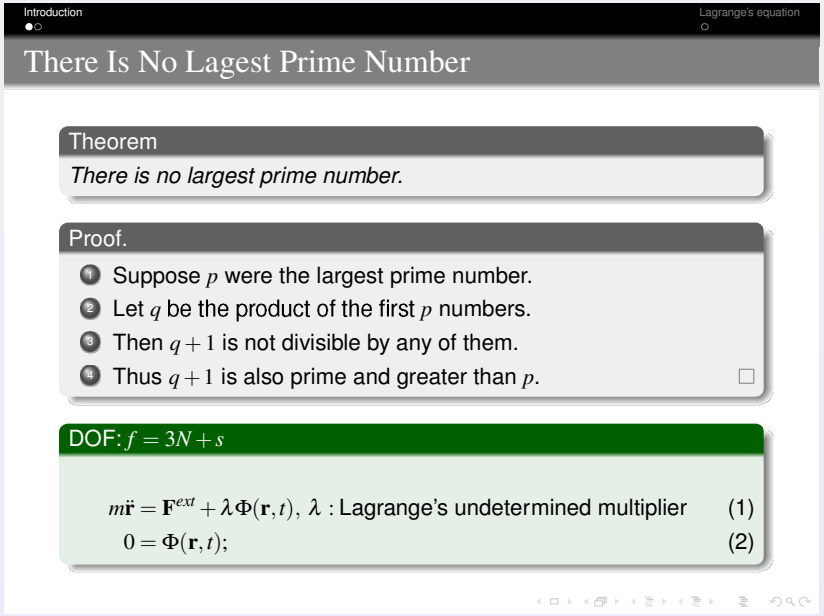
Templates & Skins (colortheme): orange (theme: Frankfurt)





Templates & Skins (colortheme): gray (theme: Frankfurt)





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List: 목록

1. 항목 별 목록
   - 첫 번째 항목
   - 두 번째 항목
   - 세 번째 항목

source code

```
\begin{itemize}
\item 첫 번째 항목
\item 두 번째 항목
\item 세 번째 항목
\end{itemize}
```

2. 번호 별 목록
   1. 첫 번째 항목
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Overlay 1: 항목 별로 차례로 보이기

해당 번호에 해당하는 순서에 나타남

```
\begin{itemize}
\item<2-> Every thing
\item<3-> that has
\item<4-> beginning
\item<5-> has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

해당 번호를 세밀하게 조정

```
\begin{itemize}
\item<7-8> Every thing
\item<8-9> that has
\item<9-> beginning
\item<10-> has end.
\end{itemize}
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- beginning
- has end.

Overlay 1: 항목 별로 차례로 보이기

해당 번호에 해당하는 순서에 나타남

```
\begin{itemize}
\item<2-> Every thing
\item<3-> that has
\item<4-> beginning
\item<5-> has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

해당 번호를 세밀하게 조정

```
\begin{itemize}
\item<7-8> Every thing
\item<8-9> that has
\item<9-> beginning
\item<10-> has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Overlay 2: 해당 항목에서 멈추기

pause 이용해서 멈추기

```
\begin{itemize}
\pause\item Every thing
\pause\item that has
\pause\item beginning
\pause\item has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Overlay 2: 해당 항목에서 멈추기

pause 이용해서 멈추기

```
\begin{itemize}
\pause\item Every thing
\pause\item that has
\pause\item beginning
\pause\item has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Overlay 2: 해당 항목에서 멈추기

pause 이용해서 멈추기

```
\begin{itemize}
\pause\item Every thing
\pause\item that has
\pause\item beginning
\pause\item has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Overlay 2: 해당 항목에서 멈추기

pause 이용해서 멈추기

```
\begin{itemize}
\pause\item Every thing
\pause\item that has
\pause\item beginning
\pause\item has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

Overlay 2: 해당 항목에서 멈추기

pause 이용해서 멈추기

```
\begin{itemize}
\pause\item Every thing
\pause\item that has
\pause\item beginning
\pause\item has end.
\end{itemize}
```

- Every thing
- that has
- beginning
- has end.

수학 공식

$$\mathbf{F}^{ext} = -\nabla V(\mathbf{q}) + \mathbf{F}^{NC} = -\mathbf{g}^i \frac{\partial V}{\partial q^i} + \mathbf{F}^{NC}, \tag{1}$$

$$L(\mathbf{q}, \dot{\mathbf{q}}, t) = T(\mathbf{q}, \dot{\mathbf{q}}, t) - V(\mathbf{q}), \tag{2}$$

$$\frac{d}{dt}\frac{\partial L}{\partial \dot{q}^j} - \frac{\partial L}{\partial q^j} = 0 \tag{3}$$

source code

```
\begin{align}
\mathbf{F}^{ext}
&=-\nabla V(\mathbf{q})+\mathbf{F}^{NC}
= -\mathbf{g}^i\frac{\partial V}{\partial q^i}
+ \mathbf{F}^{NC},\\
L(\mathbf{q}, \dot{\mathbf{q}},t)
&= T(\mathbf{q}, \dot{\mathbf{q}},t)-V(\mathbf{q}), \\
\frac{d}{dt}\frac{\partial L}{\partial \dot{q}^j}
&-\frac{\partial L}{\partial q^j}=0
\end{align}
```

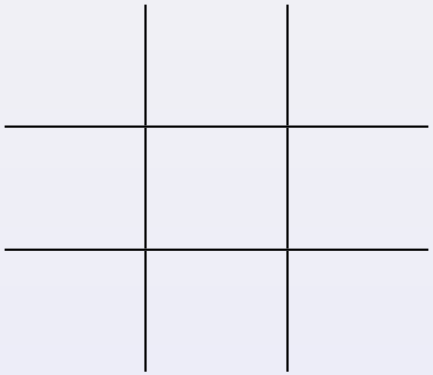
Table

p	q	and
T	T	T
T	F	F

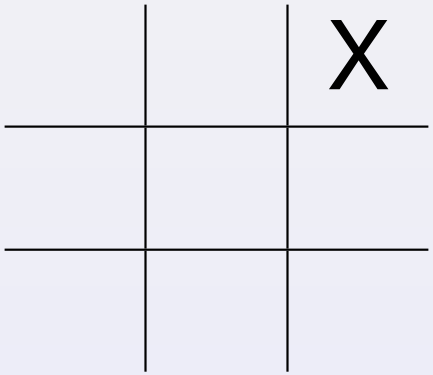
source code

```
\begin{tabular}{|cc|c|} \hline
$p$ & $q$ & and\\ \hline \hline
T & T & T\\
T & F & F\\\hline
\end{tabular}
```

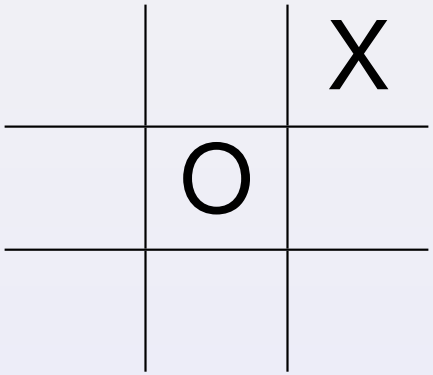
Tic-Tac-Toe via `tabular`



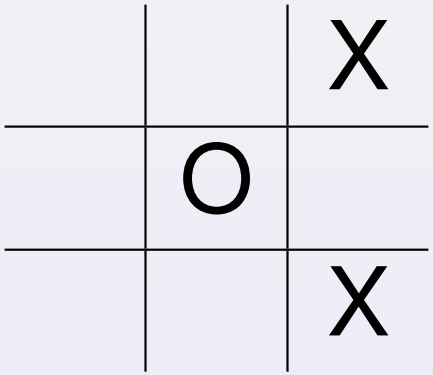
Tic-Tac-Toe via `tabular`



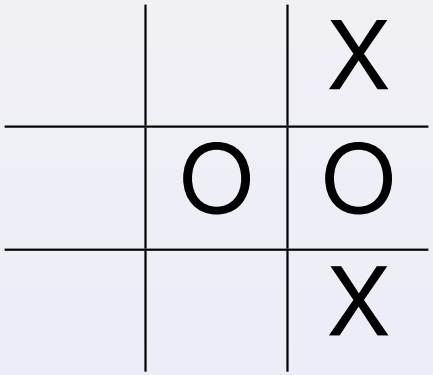
Tic-Tac-Toe via `tabular`



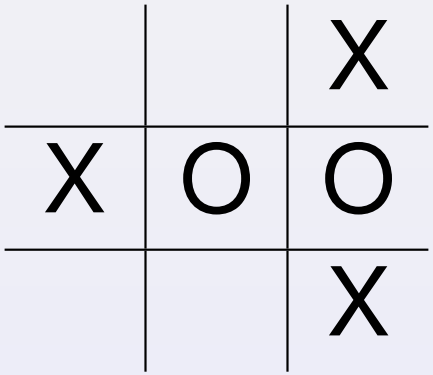
Tic-Tac-Toe via `tabular`



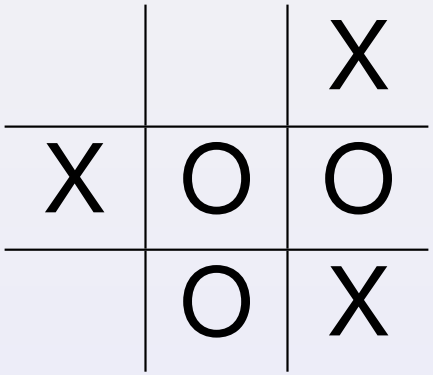
Tic-Tac-Toe via `tabular`



Tic-Tac-Toe via `tabular`



Tic-Tac-Toe via `tabular`



Tic-Tac-Toe via `tabular`

	X	X
X	O	O
	O	X

Tic-Tac-Toe via `tabular`

O	X	X
X	O	O
	O	X

Tic-Tac-Toe via `tabular`

O	X	X
X	O	O
X	O	X

차 례

1 Introduction

2 Beamer의 구성

3 Beamer의 템플릿

4 Beamer의 기능

5 Blocks

6 그래프와 그림

7 기타

blocks

Beamer에는 미리 정해 놓은 3개의 블럭이 있다.

standard block

```
\begin{block}{standard block}.....\end{block}
```

example block

```
\begin{exampleblock}{example block}.....
\end{exampleblock}
```

alert block

```
\begin{alertblock}{alert block}.....
\end{alertblock}
```

수학 공식을 증명할 때

Beamer에는 미리 정해 놓은 여러 개의 수학 공식 증명하는 블럭이 있다.

Definition

```
\begin{definition}{title}.....
\end{definition}
```

Lemma

```
\begin{lemma}{title}.....
\end{lemma}
```

Theorem

```
\begin{theorem}{title}.....
\end{theorem}
```

Proof.

```
\begin{proof}{title}.....%\qedhere
\end{proof}
```

□

차 례

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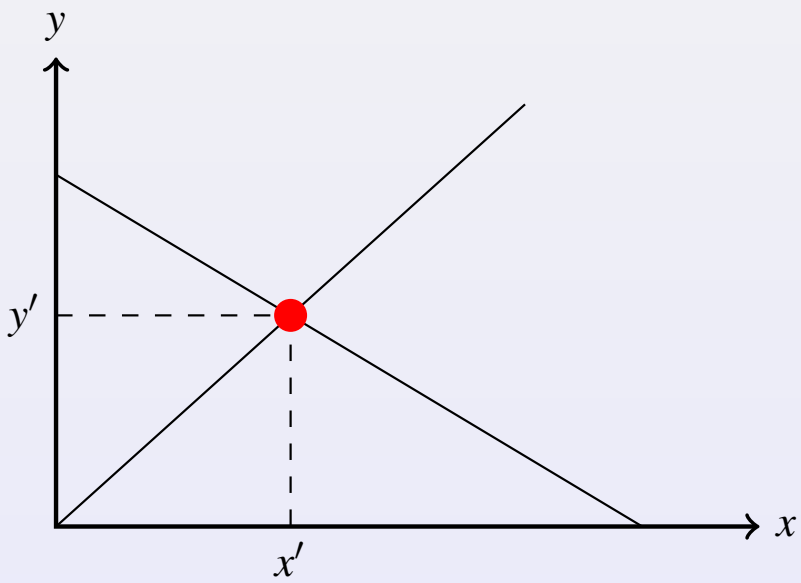
그림 삽입하기 1: 직접 그리기(프로그래밍)




```
\begin{tikzpicture}[scale=1.5]
    \draw [<->,thick] (0,2) node (yaxis) [above] {$y$}
        |- (3,0) node (xaxis) [right] {$x$};
    \draw (0,0) coordinate (a_1) -- (2,1.8) coordinate (a_2);
    \draw (0,1.5) coordinate (b_1) -- (2.5,0) coordinate (b_2);
    \coordinate (c) at (intersection of a_1--a_2 and b_1--b_2);
    \draw[dashed] (yaxis |- c) node[left] {$y'$}
        -| (xaxis -| c) node[below] {$x'$};
    \fill[red] (c) circle (2pt);
\end{tikzpicture}
```

그림 삽입하기 2: pdf, png, jpg, jpeg 불러오기

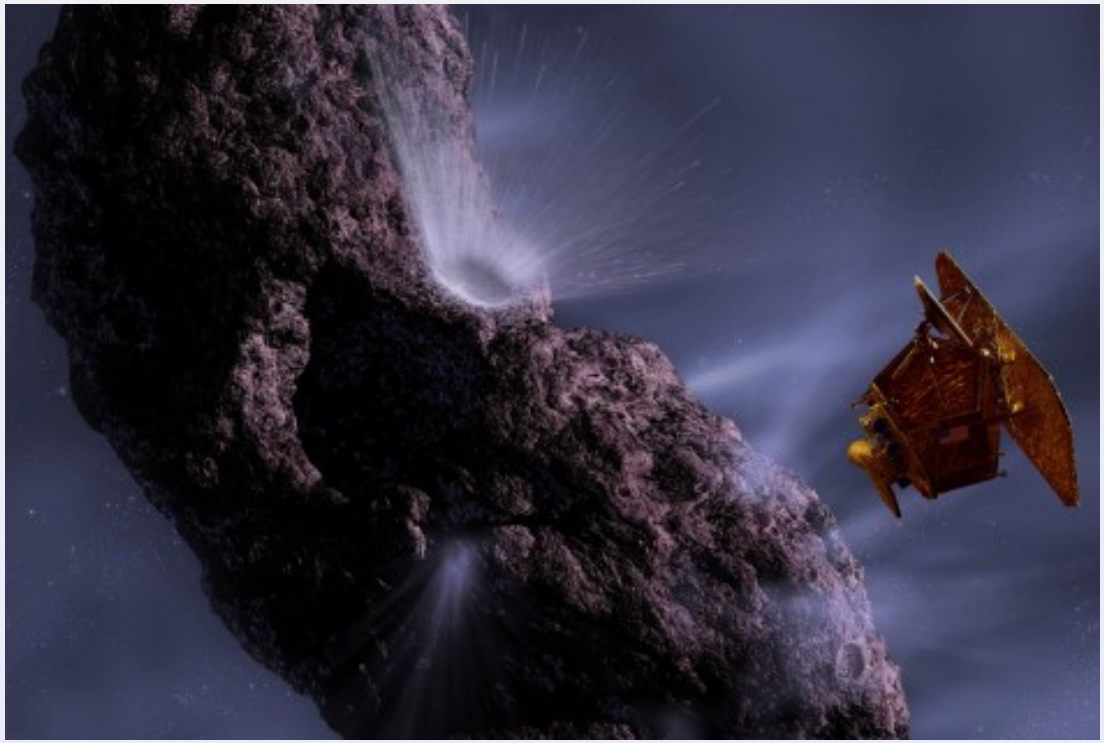


Figure: 그림 예제

source code

```
\begin{figure}
\includegraphics[width=7cm]{figure.jpg}
%\caption{그림 예제}
\end{figure}
```

동영상 재생

Movie

차 례

1 Introduction

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장, 절 명령과 구조

주의 사항

- 장(chapter), 절(section) 명령은 프레임 환경 밖에서 선언해야 한다.

```
\chapter{Beamer class}
\section{Beamer usage}
\subsection{introduction}
\begin{frame}
장(chapter), 절(section) 명령은 프레임 환경 밖에서 선언해야 한다.
\end{frame}
```

슬라이드 전환 때 사용하는 효과

Slide Transitions only work in full screen mode in Acrobat Reader !

Example (examples for Slide Transitions)

This line is shown on each slide of slide transitions

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배경 화면 색깔 정하기

source code

```
{\setbeamercolor{background canvas}{bg=green!40}
\begin{frame}
\frametitle{배경 화면 색깔 정하기}
\end{frame} }
```

배경 화면 색깔 정하기 2

source code

```
{\setbeamercolor{normal text}{bg=}
\setbeamertemplate{background canvas}
[vertical shading][top=red!60, bottom=white!30]
\setbeamertemplate{background}[grid]
\begin{frame}
\frametitle{배경 화면 색깔 정하기 2}
\end{frame} }
```

배경 화면 색깔 정하기 3

source code

```
{\setbeamertemplate{background canvas}
[vertical shading][top=blue,middle=red,bottom=yellow,midpoint=0.5]
\begin{frame}
\frametitle{배경 화면 색깔 정하기 3}
\end{frame} }
```

글씨체 변경

common text commands

`\emph{Sample Text}`	*Sample Text*
`\textbf{Sample Text}`	**Sample Text**
`\textit{Sample Text}`	*Sample Text*
`\textsl{Sample Text}`	*Sample Text*
`\alert{Sample Text}`	Sample Text
`\textrm{Sample Text}`	Sample Text
`\textsf{Sample Text}`	Sample Text
`\color{green} Sample Text`	Sample Text
`\structure{Sample Text}`	Sample Text

글씨 크기 변경: 8pt 기준

```
{\tiny 글씨}
{\scriptsize 글씨}
{\footnotesize 글씨}
{\small 글씨}
{\normalsize 글씨}
{\large 글씨}
{\Large 글씨}
{\LARGE 글씨}
{\huge 글씨}
{\Huge 글씨}
```

글씨

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글씨

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Part II

*Beamer*로 간단한 예제 만들기

실습 예제

- 표지 만들기
- 항목별 표시: 항목(bullet), 번호(number)
- overlay 만들기
- 기타 효과

Part III

유용한 사례

차 례

8 Poster

9 Handout

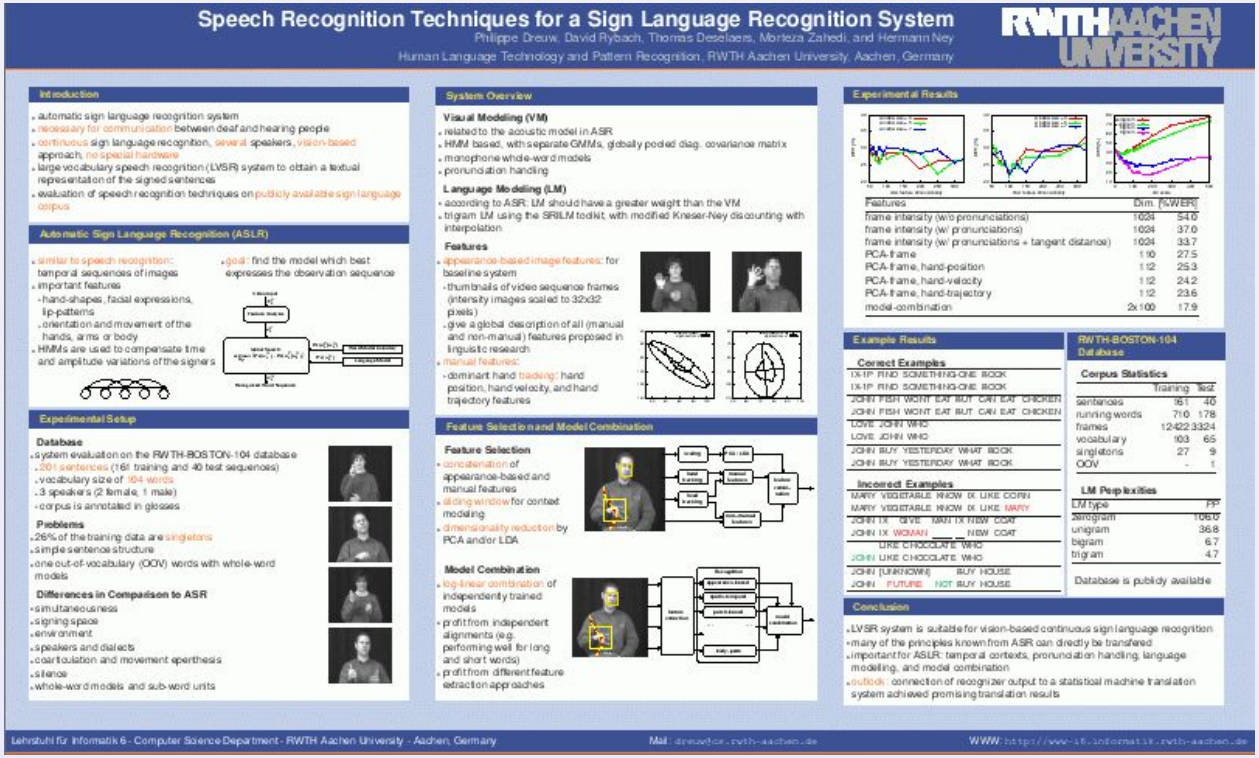
10 Note

11 Multiple screen

12 PDF manual

13 강의록에서 Beamer

Poster 만들기




```
\documentclass[a0paper]{beamer}
\usetheme{Boadilla}
\usepackage{pgfpages}
\pgfpagesuselayout{resize to}[a0paper,border shrink=5mm,landscape]
%\usepackage[orientation=landscape,size=custom,width=70,height=40,scal
\setbeamertemplate{navigation symbols}{}
\setbeamertemplate{frametitle}[default][center]
\setbeamerfont{frametitle}{size=\huge}
```

차 례

8 Poster

9 Handout

10 Note

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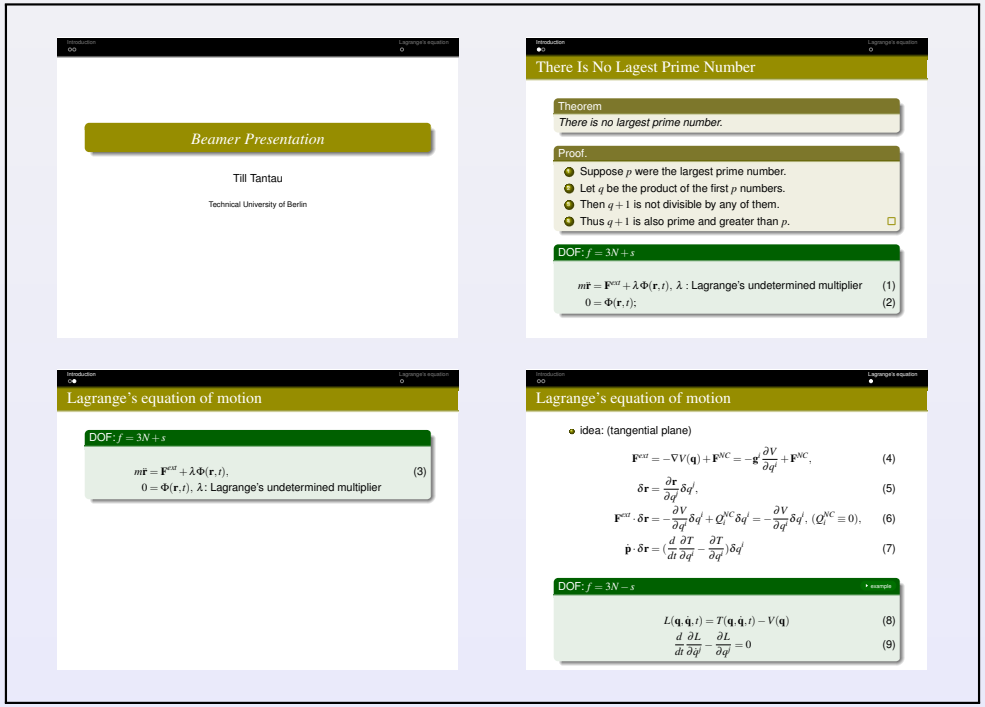
12 PDF manual

13 강의록에서 Beamer

handout: 종이로 발표 내용을 찍어낼 때 (네 개 슬라이드를 A4 한 장에)




```
\documentclass[handout]{beamer}
......
\usepackage{pgfpages}
\pgfpagesuselayout{4 on 1}[a4paper,landscape,border shrink=5mm]
```

차 례

8 Poster

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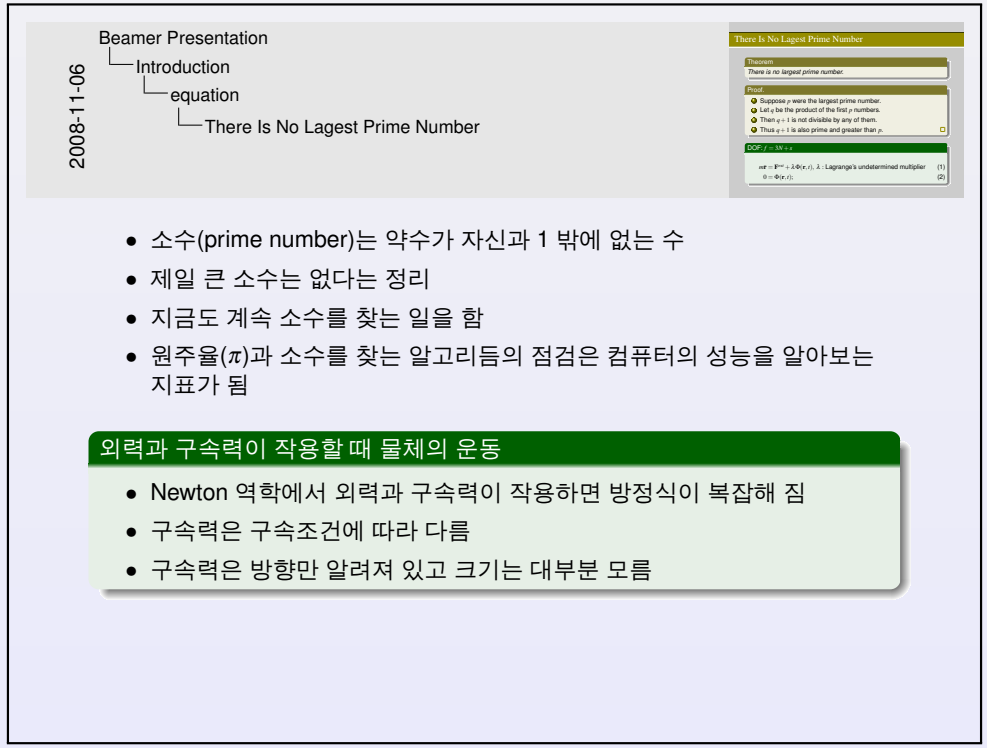
10 Note

11 Multiple screen

12 PDF manual

13 강의록에서 Beamer

note: 해당 슬라이드에 대한 설명




```
\setbeameroption{show notes}     % 발표할 슬라이드와 note를 모두
%\setbeameroption{show only notes} % note 만 보여줄 때
......
\begin{frame}
...
\note{ note에 들어갈 내용
}
\end{frame}
```

차 례

8 Poster

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10 Note

11 Multiple screen

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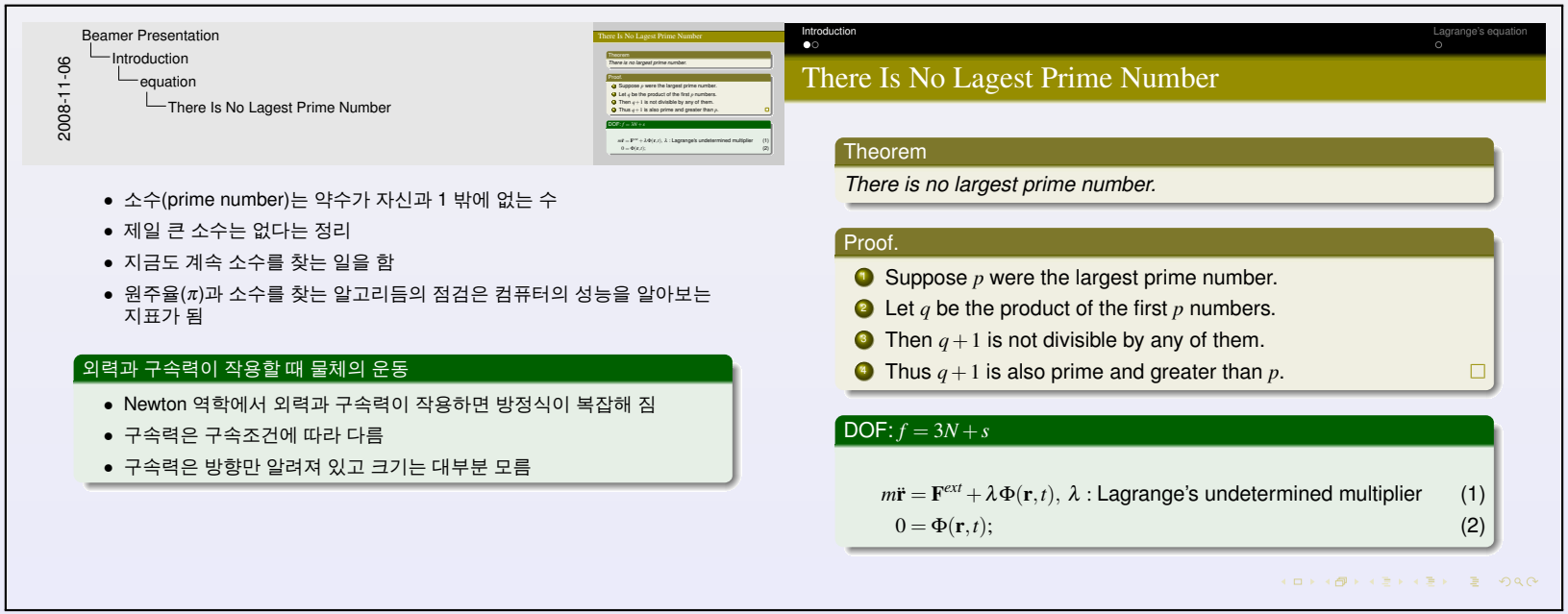
13 강의록에서 Beamer

Multiple screens: dual screen



- 왼쪽은 발표자용 모니터에, 오른쪽은 프로젝터를 통해 관객들에게
- 왼쪽은 번역본, 오른쪽은 외국어 원본
- 왼쪽은 테이블이나 실험용 데이터 등, 오른쪽은 그래프
- 왼쪽은 현재 나오는 슬라이드, 오른쪽은 다음 슬라이드

```
\setbeameroption{show notes on second screen=left}
```

- 아직 Windows에서는 지원이 부족함

차 례

8 Poster

9 Handout

10 Note

11 Multiple screen

12 PDF manual

13 강의록에서 Beamer

PDF 메뉴얼을 원문에서 직접 인용

Beamer manual에서 해당 페이지를 그대로 인용

```
{
%\setbeamercolor{background canvas}{bg=}
\includepdf[pages=190-191]{beameruserguide_307.pdf}
}
```

- 단, 슬라이드 바깥에서 해당 인용 페이지를 설정해야 한다.

21 Creating Handouts and Lecture Notes

During a presentation it is very much desirable that the audience has a *handout* or even *lecture notes* available to it. A handout allows everyone in the audience to individually go back to things he or she has not understood.

Always provide handouts *as early as possible*, preferably weeks before the talk. Do *not* retain the handout till the end of the talk.

The BEAMER package offers two different ways of creating special versions of your talk; they are discussed in the following. The first, easy, way is to create a handout version by adding the `handout` option, which will cause the document to be typeset in `handout` mode. It will "look like" a presentation, but it can be printed more easily (the overlays are "flattened"). The second, more complicated and more powerful way is to create an independent "article" version of your presentation. This version coexists in your main file.

21.1 Creating Handouts Using the Handout Mode

The easiest way of creating a handout for your audience (though not the most desirable one) is to use the `handout` option. This option works exactly like the `trans` option. An elaborated example of different overlay specifications for the presentation, the handout, and the transparencies can be found in the file `beamerexample1.tex`.

`\documentclass[handout]{beamer}`

Create a version that uses the `handout` overlay specifications.

You might wish to choose a different color and/or presentation theme for the handout.

When printing a handout created this way, you will typically wish to print at least two and possibly four slides on each page. The easiest way of doing so is presumably to use `pgfpages` as follows:

```
\usepackage{pgfpages}
\pgfpagesuselayout{2 on 1}[a4paper,border shrink=5mm]
```

Instead of `2 on 1` you can use `4 on 1` (but then you have to add `landscape` to the list of options) and you can use, say, `letterpaper` instead of `a4paper`.

21.2 Creating Handouts Using the Article Mode

In the following, the "article version" of your presentation refers to a normal TEX text typeset using, for example, the document class `article` or perhaps `llncs` or a similar document class. This version of the presentation will typically follow different typesetting rules and may even have a different structure. Nevertheless, you may wish to have this version coexist with your presentation in one file and you may wish to share some part of it (like a figure or a formula) with your presentation.

In general, the article version of a talk is better suited as a handout thann a handout created using the simple `handout` mode since it is more economic and can include more in-depth information.

21.2.1 Starting the Article Mode

The article mode of a presentation is created by specifying `article` or `book` or some other class as the document class instead of `beamer` and by then loading the package `beamerarticle`.

The package `beamerarticle` defines virtually all of BEAMER's commands in a way that is sensible for the `article` mode. Also, overlay specifications can be given to commands like `\textbf` or `\item` once `beamerarticle` has been loaded. Note that, except for `\item`, these overlay specifications also work: by writing `\section<presentation>{Name}` you will suppress this section command in the article version. For the exact effects overlay specifications have in `article` mode, please see the descriptions of the commands to which you wish to apply them.

`\usepackage[`⟨*options*⟩`]{beamerarticle}`

Makes most BEAMER commands available for another document class.

The following ⟨*options*⟩ may be given:

- activeospecchars will leave the character code of the pointed brackets as specified by other packages. Normally, BEAMER will turn off the special behaviour of the two characters < and >. Using this option, you can reinstall the original behaviour at the price of possible problems when using overlay specifications in the article mode.
- noamsthm will suppress the loading of the amsthm package. No theorems will be defined.
- notheorem will suppress the definition of standard environments like theorem, but amsthm is still loaded and the \newtheorem command still makes the defined environments overlay-specification-aware. Using this option allows you to define the standard environments in whatever way you like while retaining the power of the extensions to amsthm.
- envcountsect causes theorem, definitions and the like to be numbered with each section. Thus instead of Theorem 1 you get Theorem 1.1. I recommend using this option.
- noxcolor will suppress the loading of the xcolor package. No colors will be defined.

Example:

```
\documentclass{article}
\usepackage{beamerarticle}
\begin{document}
\begin{frame}
  \frametitle{A frame title}
  \begin{itemize}
  \item<1-> You can use overlay specifications.
  \item<2-> This is useful.
  \end{itemize}
\end{frame}
\end{document}
```

There is one remaining problem: While the article version can easily TEX the whole file, even in the presence of commands like \frame<2>, we do not want the special article text to be inserted into our original BEAMER presentation. That means, we would like all text *between* frames to be suppressed. More precisely, we want all text except for commands like \section and so on to be suppressed. This behaviour can be enforced by specifying the option ignorenonframetext in the presentation version. The option will insert a \mode* at the beginning of your presentation.

The following example shows a simple usage of the article mode:

```
\documentclass[a4paper]{article}
\usepackage{beamerarticle}
%\documentclass[ignorenonframetext,red]{beamer}

\mode<article>{\usepackage{fullpage}}
\mode<presentation>{\usetheme{Berlin}}

% everyone:
\usepackage[english]{babel}
\usepackage{pgf}

\pgfdeclareimage[height=1cm]{myimage}{filename}

\begin{document}

\section{Introduction}

This is the introduction text. This text is not shown in the
presentation, but will be part of the article.

\begin{frame}
  \begin{figure}
    % In the article, this is a floating figure,
    % In the presentation, this figure is shown in the first frame
    \pgfuseimage{myimage}
  \end{figure}
\end{frame}
```

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13 강의록에서 Beamer

강의록에서 Beamer 만들기

전략

- article (book) class에서 Beamer에 필요한 패키지 설정
- 슬라이드를 만들 부분에

  `\begin{frame}...\end{frame}`
- article 설정을 주석처리하고

  `\documentclass[ignorenonframetext]{beamer}`
- 슬라이드를 만듦

source code: main.tex

```
%\documentclass[a4paper]{article}
\usepackage{beamerarticle}
\mode<article>{\usepackage{fullpage}}
\mode<presentation>{\usetheme{Berlin}}
\usepackage{pgf}
\pgfdeclareimage[height=5cm]{myimage}{flowchart}
\begin{document}
\section{Introduction}
This is the introduction text. This text is not shown in the
presentation, but will be part of the article.
```

강의록에서 Beamer 만들기

continued... source code: main.tex

```
This text is once more not shown in the presentation.

\section{Main Part}
While this text is not shown in the presentation,
the section command also applies to the presentation.
We can add a subsection that is only part
of the article like this:
\subsection<article>{Article-Only Section}
With some more text.

\begin{frame}
This text is part both of the article and of the presentation.
\begin{itemize}
\item This stuff is also shown in both version.
\item This too.
\only<article>{\item This particular item is only part
of the article version.}
\item<presentation:only@0> This text is also only part of the article.
\end{itemize}
\end{frame}

\end{document}
```

강의록과 Beamer 두 개의 결과물 얻기

강의록: main.article.tex

- 앞의 원본 강의록에서 주석처리한 파일을 main.tex라고 함
- 새로운 파일: main.article.tex를 만듦

```
\documentclass[a4paper]{article}
\input{main.tex}
```

- pdfLaTeX로 컴파일하면 원래 강의록이 만들어 짐

Beamer: main.beamer.tex

- 첫 줄에 Beamer 클래스를 정의하는 줄을 삽입
- 새로운 파일: main.beamer.tex를 만듦

```
\documentclass[ignorenonframetext]{beamer}
\input{main.tex}
```

- pdfLaTeX로 컴파일하면 새로운 프레젠테이션 Beamer가 만들어 짐

기타

- 강의록에 Beamer의 해당 슬라이드 삽입
- Beamer에 다른 클래스(HA-Prosper, Seminar 등)의 슬라이드 삽입
- Foil로 출력하기/Beamer에 삽입하기 (FoilTeX)