Learning LaTeX

Week 4: Presentations & `Beamer`

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1 Introductory Remarks

For classes and conferences, we all have a need for creating presentations. While the most common way to produce quick presentations these days is Microsoft PowerPoint, I would suggest LaTeX produces a much better, cleaner, and more professional looking presentation. And as with most other things in LaTeX, it sends a good signal to folks and also is simple to use on any computer as the presentation is in a PDF format.

As such, this week and next, we will be focused on creating clean, high-quality presentations in LaTeX, using the "Beamer" document class. While we will touch on many useful things and provide a good starting place, there is much more you can do and add to Beamer to create some good looking presentations. In a word, this is scratching the surface to all Beamer can do.

This week we will be focused on starting out and getting you acquainted with the basics of Beamer (e.g., frames, basic formatting, multiple slides, boxes, etc.). Next week, we will delve into more specifics and advanced formatting of presentations in LaTeX.

Our goals for today:

- Create a basic presentation using Beamer
- Add multiple frames
- Be familiar with the basics of Beamer

2 Basics of Beamer

We create presentations in LaTeX using a different document class or a package, *not* by opening a new program as we would in other programs (e.g., Microsoft Word ⇝ Microsoft PowerPoint). Though there are many classes for creating presentations, such as `Fancyslides`, `Powerdot` or `KOMA-script`, by far the most common is `Beamer`. This presentation tool is possible by changing our documentclass to "Beamer," then starting our document enivonrment to add information. So let's begin by typing the following,

```
\documentclass[11pt]{beamer}

\begin{document}


\end{document}
```

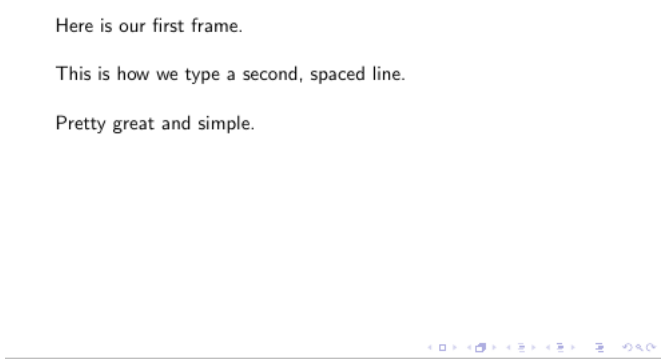
As there is nothing to compile, let's now turn to add information and material to our presentation. To do so, let's look at slides, or "frames."

To add information into a single slide, we simply start a frame environment, type whatever we want, and then end that environment. This gives us a single slide. Then, we repeat for however many frames we need for our presentation (*Note*: there are many ways to build and design slides, which we will get into in a bit).

So let's update our code with a single, simple frame,

```
\documentclass[11pt]{beamer}

\begin{document}

\begin{frame}
Here is our first frame. \\~\\

This is how we type a second, spaced line. \\~\\

Pretty great and simple.
\end{frame}

\end{document}
```

And this gives us a single slide with the information we included,



Now, let's say we wanted to add a title slide. To do so, we need to add the identifying information *prior* to starting the document (i.e., in our preamble). Then, *after* we begin the document environment, we create a new frame that tells LaTeX to make the information in the preamble the title for the whole presentation. To do so, let's type the following,

```
\documentclass[11pt]{beamer}

    \author{Phil} % Some basics; much more
    \title{Here is the Presentation Title}
    \subtitle{Interesting Subtitle}
    \institute{University of Houston}
    \date{\today}

\begin{document}

\begin{frame}
\maketitle
\end{frame}


\begin{frame}
Here is our first frame. \\~\\

This is how we type a second, spaced line. \\~\\

Pretty great and simple.
\end{frame}

\end{document}
```

This gives us our two frames: title and the original frame...

2.1 Building a Single Frame

Now that we have a title and basic frame, let's create multiple frames based on a *single* frame. We need to think of it this way, because we often add information a bullet at a time when presenting. Though you could build multiple frames manually (.e.g, a new frame environment for each new bullet), this can be a giant waste of time. Therefore, we will need to update twe things in our original presentation: a new frame environment within braces, and then the "pause" command after each line, denoting a new frame after that line. Let's type the following code to get started,

```
{
\begin{frame}
    Here is our second frame \\~\\ \pause

    Then, we have a second line \\~\\  \pause

    Now we have our final line, but all in a \textit{single} frame environment.
\end{frame}
}
```

Though the output is too large to place in this document, the output should be three separate slides, each adding the successive item, as you coded using the "pause" command.

2.2 Adding Frame Titles

To this point, we have only made simple, blank frames with information. Let's add a title to the frame to see the automatic formatting by LaTeX. Simply include the command, "frametitle"

along with the specific title to add it to the frame. Start with,

```
\begin{frame}
\frametitle{Now We Have a Title}

Here is our frame with a nice title.

\end{frame}
```

And this gives us,

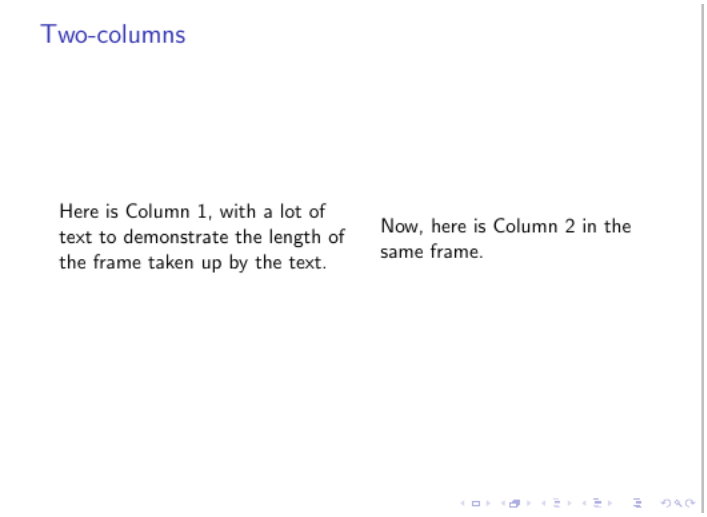
2.3 Multiple Columns

We are starting to get better presentations. Let's add to this by splitting a frame into multiple columns. To do so, we will work within the "columns" environment within our frame environment. Within this environment, we will specify the amount of columns we want by telling LaTeX the amount to split the frame by (e.g., for two columns, we split it by .5; for three columns we split the frame by .33, etc.).[1] Let's type the following to see how this works starting with two columns, three columns the same length, and then three columns different lengths,

```
\begin{frame}
\frametitle{Two-columns}

\begin{columns}

    \column{0.5\textwidth}
    Here is Column 1, with a lot of text
    to demonstrate the length of the frame
    taken up by the text.

    \column{0.5\textwidth}
    Now, here is Column 2 in the same frame.

\end{columns}
\end{frame}
```

[1] You could also vary the size of columns to make one small and the other large for example, as long as it adds up to 1. Try out options and different columns on your own.

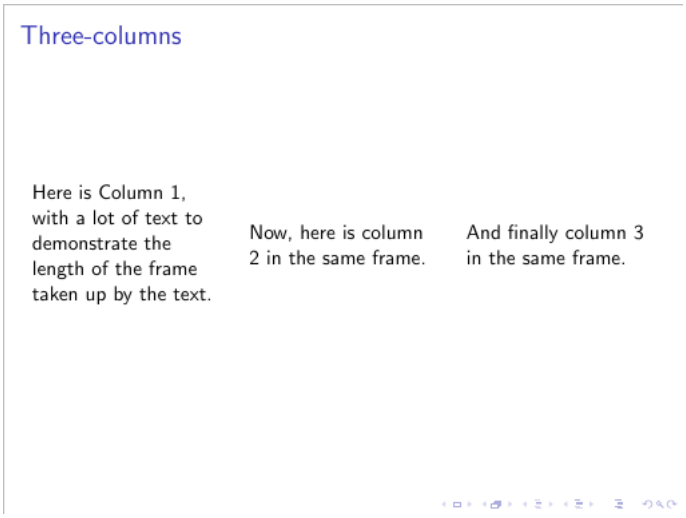
And this gives us a two-column frame as we expect,



Next, for three same-length columns type:

```
\begin{frame}
\frametitle{Three-columns}

\begin{columns}

    \column{0.33\textwidth}
    Here is Column 1, with a lot of text
    to demonstrate the length of the frame
    taken up by the text.

    \column{0.33\textwidth}
    Now, here is column 2 in the same frame.

    \column{0.33\textwidth}
    And finally column 3 in the same frame.

\end{columns}
\end{frame}
```

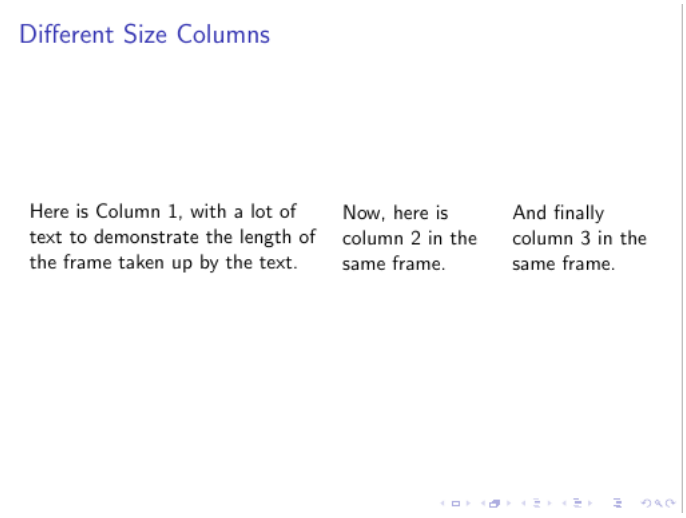
And this gives us a three-column frame,



And finally, for three columns, but of different lengths, type:

```
\begin{frame}
\frametitle{Different Size Columns}

\begin{columns}

    \column{0.5\textwidth}
    Here is Column 1, with a lot of text
    to demonstrate the length of the frame
    taken up by the text.

    \column{0.25\textwidth}
    Now, here is column 2 in the same frame.

    \column{0.25\textwidth}
    And finally column 3 in the same frame.

\end{columns}
\end{frame}
```

And this gives us a three-columns frame with different lengths,



2.4 Adding Figures, Tables, and Equations

Finally, to add Figures, Tables, and Equations in Beamer, you do this the same as you would in a document. This is a great feature of doing all work in LaTeX whereby you can easily move stuff from a paper to a presentation and vice versa, without changing or updating formatting (for the most part). Thus, given that we have already done all of these things, but for articles, we are going to do a quick overview of each showing their applicability in Beamer.

Let's start with Figures. Remember to include the "graphicx" package in your preamble, as well as setting your graphics path to where ever your image is stored to tell LaTeX where to pull it. Thus, remember to save your image (a PNG if possible) in that folder, with a name including no spaces or punctuation). Start with the following,

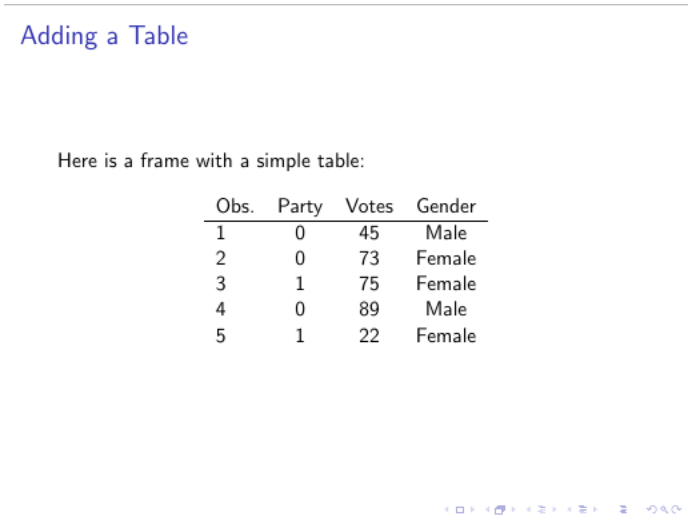
```
\documentclass[11pt]{beamer}
\usepackage{graphicx}
\graphicspath{/Users/bpwaggo/Dropbox/LaTeX Workshop Series/Week 4}

\begin{document}

\begin{frame}
\frametitle{Adding a Figure}

Here is a frame with a giant UH Seal:

\begin{figure}[!h]
    \includegraphics[scale=.5]{UHSEAL}
    \centering
\end{figure}

\end{frame}

\end{document}
```

Now we have our slide with a giant UH seal included (remember you can resize the image using the "scale" subcommand in brackets):

Next, let's add a table to our frame. To do so, remember we need the tabular environment exactly as before, only this time we include it within the frame environment. Start with the following,

```
\begin{frame}

\frametitle{Adding a Table}

Here is a frame with a simple table:

\begin{table}
    \centering
    \begin{tabular}{l c c c}
        Obs. & Party & Votes & Gender \\
            \hline
        1    & 0     & 45    & Male \\
        2    & 0     & 73    & Female \\
        3    & 1     & 75    & Female \\
        4    & 0     & 89    & Male \\
        5    & 1     & 22    & Female
    \end{tabular}
\end{table}

\end{frame}
```

And here is our frame with a simple table,



Adding a Table

Here is a frame with a simple table:

Obs.	Party	Votes	Gender
1	0	45	Male
2	0	73	Female
3	1	75	Female
4	0	89	Male
5	1	22	Female

Finally, let's see the inclusion of an equation in a frame, using the "equation" environment. Start with,

```
\begin{frame}

\frametitle{Adding an Equation}

Here is our slide with a simple equation. Note that
we are interested in displaying the equation, rather
than including it ``inline":

\[ 2x^2=\frac{y^n}{z^n}\]

\end{frame}
```

And here is our frame with a displayed equation, rather than "inline,"

Adding an Equation

Here is our slide with a simple equation. Note that we are interested in displaying the equation, rather than including it "inline":

$$2x^2 = \frac{y^n}{z^n}$$