

# L<sup>A</sup>T<sub>E</sub>X– Week 2

## 1 Writing a Quiz in L<sup>A</sup>T<sub>E</sub>X

To write a quiz, you usually need two things. First of all, you want to number the questions on the quiz. Second, you want to leave space between the questions for students to write the answers.

### 1.1 Lists

To make a list of things, you can use the commands `enumerate` or `itemize`. The `itemize` command makes an unnumbered list, with bullet points. The `enumerate` command makes a numbered list. The format is `\begin{enumerate}`

```
\item Type list item number 1 here.  
\item Type list item number 2 here.  
...  
\end{enumerate}
```

You can nest enumerated lists. For example, one of the items in an enumerated list can itself be an enumerated list. (Or an itemized list). See the example below:

```
\begin{enumerate}  
  \item Breakfast is my favorite meal.  
  \item Lunch is okay too.  
  \item For dinner, I like to have three things:  
    \begin{enumerate}  
      \item A vegetable  
      \item Some rice  
      \item Ice cream  
    \end{enumerate}  
  \item For dessert, maybe I will have more ice cream  
\end{enumerate}
```

1. Breakfast is my favorite meal.
2. Lunch is okay too.
3. For dinner, I like to have three things:

- (a) A vegetable
  - (b) Some rice
  - (c) Ice cream
4. For dessert, maybe I will have more ice cream

The tabs and spaces in the  $\text{\LaTeX}$  are not necessary. You could actually write the whole string of commands on one line, never hitting return or tab. However, if you made a mistake, you would never never find it and you would hate yourself. So use tabs and carriage returns to make your  $\text{\LaTeX}$  files more readable and clear.

`\Enumerate` will automatically default to numbering as 1., 2., 3., etc. Numbering differently is covered in the Extras section for this week.

## 1.2 Vertical Spaces

You can leave a space for students to write their answers by putting in a `\vspace` command. For example, try adding `\vspace{1.3in}` or `\vspace{3cm}` in between two of the items in a list.

```
\begin{itemize}
  \item Write your name in the space below:
\vspace{0.6in}
  \item What is  $\int_3^4 \theta^2 d\theta$ ?
\vspace{2cm}
\end{itemize}
```

- Write your name in the space below:

- What is  $\int_3^4 \theta^2 d\theta$ ?

Another nice way to add space is to use the `\vfill` command. This command will space out several things so that they are evenly spaced and fill the whole page. For example:

```
\begin{enumerate}
  \item  $2+2=?$ 
  \vfill
  \item  $7-8=?$ 
  \vfill
  \item  $8\times 7=?$ 
  \vfill
  \item  $63\div 9=?$ 
  \vfill
\end{enumerate}
```

1.  $2 + 2 = ?$

2.  $7 - 8 = ?$

3.  $8 \times 7 = ?$

4.  $63 \div 9 = ?$

## 2 Labelling and Referring to Numbered items

If you have numbered equations (or anything) in your document, you may wish to refer to those equations later. To do this you use `\label` to name the equation and `\ref` to refer to it later.

Example:

A very important equation due to Pythagoras and his followers is:

```
\begin{equation}\label{pythag}
a^2+b^2=c^2
\end{equation}
```

Everybody's favorite trig identity is

```
\begin{equation}\label{trig}
\sin^2 \theta + \cos^2 \theta = 1
\end{equation}
```

You may not realize that Equation `\ref{pythag}` and Equation `\ref{trig}` are actually equivalent.

A very important equation due to Pythagoras and his followers is:

$$a^2 + b^2 = c^2 \tag{1}$$

Everybody's favorite trig identity is

$$\sin^2 \theta + \cos^2 \theta = 1 \tag{2}$$

You may not realize that Equation 1 and Equation 2 are actually equivalent.

When you have added or changed labels and references, you must hit the `LATEX` button twice to make sure the references come up correctly.

## 3 Introduction to the Preamble

The preamble is where you can make global settings that apply to the entire document. There are several types of commands in the preamble.

First of all, you can include special packages with specialized commands. Use the `\usepackage` command. For example, I start all of my `LATEX` files with the following:

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

```
\usepackage{amssymb, amsmath}
```

Those three packages are ones that I use frequently. There are literally hundreds of packages out there, many of which come automatically pre-installed with your  $\text{\LaTeX}$  program.

The second thing you can do in the preamble is set margins and other parameters. You can include something like the following in the preamble of your  $\text{\LaTeX}$  files:

```
\textwidth = 6.5 in  
\textheight = 9 in  
\oddsidemargin = 0.0 in  
\evensidemargin = 0.0 in  
\topmargin = 0.0 in  
\headheight = 0.0 in  
\headsep = 0.0 in  
\parskip = 0.2in  
\parindent = 0.0in
```

Then, if I ever want to tweak the settings, I can go fiddle with the numbers. Notice that, for example, my `topmargin` on this file does not seem to be literally 0 inches. No,  $\text{\LaTeX}$  has predefined what it thinks are the best margin settings. Then the settings above can be used to adjust the pre-existing settings. For example, if I change the `topmargin` to `0.3in`, it will add 0.3 inches to the default margin setting. If I change `topmargin` to `-0.3in`, it will subtract 0.3 inches from the default margin setting. (I don't actually recommend these settings. Many people feel that it is wrong to make the `textwidth` and `textheight` so big.)

See page 119 of the Not So Short Introduction to  $\text{\LaTeX}$  for more information on the page layout.

Finally, one can define new environments and commands in the preamble. This is a topic for a later week.

## 4 Exercises

**Exercise 2.1:** Type a quiz with two questions. Leave space for your students to show their work.

## 5 Extras

### 5.1 Numbering Lists

If you do not like the way that Latex automatically numbers lists, you can modify it in a couple of ways.

One choice is to manually type whatever you want the items to be labelled by. For example, you can write

```
\begin{itemize}
  \item[(A)] this is the first item
  \item[(bee)] this is the second item
  \item[(see)] this is the third item
\end{itemize}
```

This method will give you

- (A) this is the first item
- (bee) this is the second item
- (see) this is the third item

The advantages are that you can put anything you want to head the items. The disadvantage is that  $\text{\LaTeX}$  will not automatically update the numbering for you.

A second choice is to use the following command before your enumerated list

```
\renewcommand{\theenumi}{\Roman{enumi}}
```

```
\begin{enumerate}
\item chocolate
\item peanut butter
\end{enumerate}
```

```
\renewcommand{\theenumi}{\arabic{enumi}}
```

- I. chocolate
- II. peanut butter

The `renewcommand` will set the enumerate counter to display as a Roman numeral. After I finished my list, I reset the counter to display in the usual way on later lists. Of course, you could always leave it in Roman numerals if you preferred.

The advantages are that  $\text{\LaTeX}$  will automatically make sure the items are numbered in order. Instead of `\Roman`, you can also use `\arabic`, `\roman`, `\Alph`, `\alph`. For the first level of a list, use `enumi`. For the next level, use `enumii`, and for the third use `enumiii`.