

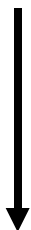
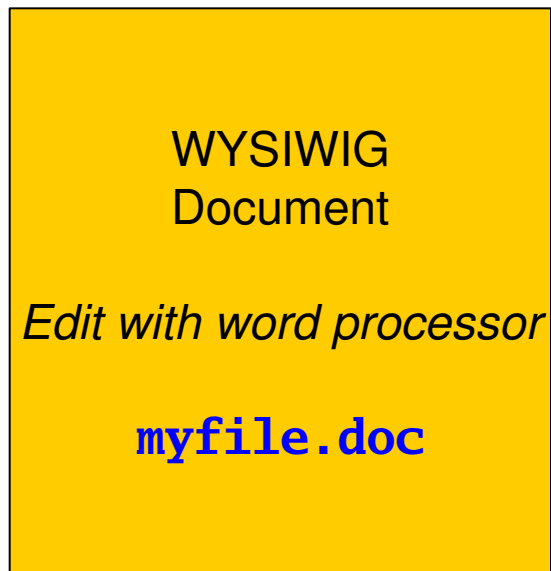
# Goals for This Lecture:

- Understand the basics of how to use the LaTeX typesetting system
- We will take a quick tour through some of the main features of LaTeX

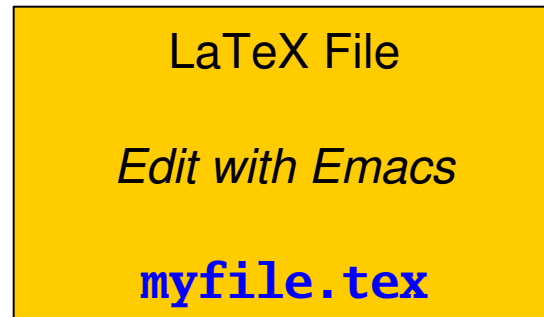
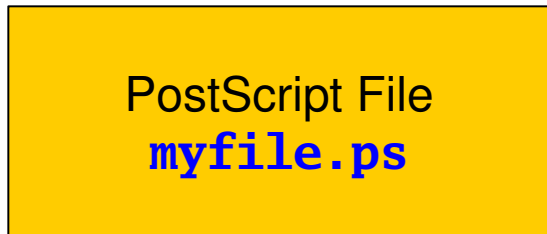
# What is LaTeX?

- LaTeX (pronounced “Lah-Tek” not “Lay-Techs”) is a typesetting system
  - Created by Leslie Lamport
  - Based on the lower-level TeX typesetting system created by Donald Knuth
- Not a word processing system
  - i.e not Word, Word Perfect, etc.
- Widely used by the entire Physics/Astronomy/Math/CS community
- Many journals now require papers to be submitted in LaTeX format
- Has mathematical typesetting capabilities that are far superior to anything else that exists
  - Much faster than GUI and WYSIWYG systems
- Has built-in cross-referencing, indexing, table-of-contents, capabilities

# How Do We Use Latex?



*Export to  
Postscript*



*latex myfile.tex*



*dvips -o myfile.ps myfile.dvi*



# “Hello World in LaTeX

- The file hellow.tex:

```
\documentclass[12pt]{article}  
\begin{document}  
Hello World!  
\end{document}
```

- The LaTeX file is transformed into a DVI file by the command:  
>**latex hellow.tex**
- The DVI file can be viewed by with the xdvi command:  
>**xdvi hellow.dvi**
- The DVI file can be transformed to a printable Postscript file using the dvips command:  
>**dvips -o hellow.ps hellow**

# A few basic rules of LaTeX

- LaTeX commands begin with a backslash “\”
- Text must be placed between the `\begin{document}` and the `\end{document}` commands
- The `\begin{}` and `\end{}` commands define LaTeX environments
  - “document” is an environment
  - We’ll see a few more environments later
- Paragraphs of text are formed by a blank line in the \*.tex file
- Page breaks (creation of a new page) are automatic

# Typesetting Math in LaTeX

- Method 1 -- use the equation environment:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

Newton's second law is

```
\begin{equation}
```

$F=ma.$

```
\end{equation}
```

Or it can be expressed as

```
\begin{equation}
```

$a = F/m.$

```
\end{equation}
```

```
\end{document}
```

# Typesetting Math in LaTeX

- Method 2 – inline equations using math-mode:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

Newton's second law is

$F=ma$ . Or it can be expressed as

$a = F/m$ .

```
\end{document}
```

# Typesetting Math in LaTeX

- Producing subscripts and superscripts:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

```
\begin{equation}
```

```
x = x_0 + a t^2 /2
```

```
\end{equation}
```

and

```
\begin{equation}
```

```
v = v_{0} e^{t/t_0}.
```

```
\end{equation}
```

```
\end{document}
```

# Typesetting Math in LaTeX

- Greek letters:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

```
\begin{equation}
```

```
\alpha = \beta + \gamma + \delta
```

```
\end{equation}
```

and

```
\begin{equation}
```

```
G^{\mu\nu} = 8\pi T^{\mu\nu}.
```

```
\end{equation}
```

```
\end{document}
```

- The commands for most greek letters are spelled like they sound

# Typesetting Math in LaTeX

- Fractions:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

```
\begin{equation}
```

```
F_{grav} = \frac{-GMm}{r^2}
```

```
\end{equation}
```

```
\begin{equation}
```

```
\frac{dx}{dt} = v
```

```
\end{equation}
```

```
\end{document}
```

- Fractions are produced with the `\frac{}{}` command

# Typesetting Math in LaTeX

- Special symbols:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

```
\begin{equation}
```

```
\gamma = \int_0^1 (\sin x^2 + \log x) dx
```

```
\end{equation}
```

```
\begin{equation}
```

```
\gamma \approx \sum_{i=0}^{i=N} ( \sin x_i^2 + \log x_i)
```

```
\Delta x_i
```

```
\end{equation}
```

```
\end{document}
```

- There are lots of special symbols. See the tutorials for the definitions

# Typesetting Math in LaTeX

- Delimiters:

```
\documentclass[12pt]{article}
```

```
\begin{document}
```

```
\begin{equation}
```

```
A = \left[ \left( B+C \right) + D \right]
```

```
\end{equation}
```

```
\end{document}
```

- There are lots of delimiters. See the tutorials for definitions.

# Embedding Postscript files into LaTeX

- Including encapsulated postscript files:

```
\documentclass[12pt]{article}
\usepackage{epsfig}
\begin{document}

\begin{figure}
\epsfig{file=plot1.eps}
\caption{A plot of speed versus time}
\end{figure}

\end{document}
```

- There are lots of options for the EPSFIG package. Read the documentation.

# Assignment

- Work through the LaTeX tutorials that are linked to on the course web page.