

# Introduction to L<sup>A</sup>T<sub>E</sub>X

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*Prepared with L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub>*

<http://www.stat.auckland.ac.nz/~kwan022/latex.php>

# Agenda

- From T<sub>E</sub>X to L<sup>A</sup>T<sub>E</sub>X.
- To L<sup>A</sup>T<sub>E</sub>X or not to L<sup>A</sup>T<sub>E</sub>X
- Microsoft Word v.s. L<sup>A</sup>T<sub>E</sub>X
- Typesetting in L<sup>A</sup>T<sub>E</sub>X
- Typesetting Mathematics in L<sup>A</sup>T<sub>E</sub>X
- L<sup>A</sup>T<sub>E</sub>X Graphics
- On-line Resources
- References

## What is T<sub>E</sub>X?

- Donald E. Knuth started implementing the T<sub>E</sub>X engine in the late 70s.
- Released in 1982 with some enhancement from the original version.
- The version is converging to  $\pi$  and is now 3.14159.
- Pronounced as *Tech*, not *Tax*. In ASCII, written as TeX.

## What is L<sup>A</sup>T<sub>E</sub>X?

- A macro package built on top of Knuth's T<sub>E</sub>X engine.
- Originally written by Leslie Lamport.
- Now maintained by Frank Mittelbach.
- Pronounced as *Lay-tech* or *Lah-tech*. In ASCII, LaTeX.
- L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> is pronounced as *Lay-tech two e*, and typed as LaTeX2e

## In the Human World...

- A human author writes a manuscript and sends it to a publishing company.
- One of the book designers will decide a *layout*, e.g. page margins, fonts, headings...etc.
- The book designer records the instructions in the manuscript.
- The manuscript is sent to a typesetter.
- The typesetter types the manuscript according to the instructions.

## In the L<sup>A</sup>T<sub>E</sub>X World...

- L<sup>A</sup>T<sub>E</sub>X is the book designer.
- T<sub>E</sub>X is the typesetter.
- **YOU** are the author.
- **YOU** will give L<sup>A</sup>T<sub>E</sub>X instructions – L<sup>A</sup>T<sub>E</sub>X Commands.
- **VERY** different to the WYSIWYG (MS Word, StarOffice) approach.

## To L<sup>A</sup>T<sub>E</sub>X or not to L<sup>A</sup>T<sub>E</sub>X

*If you want good layout, need math formulas, or many graphs/tables, using LaTeX is worth it, some might say essential. If you don't need any of that, and must have a WYSIWIG editor, you might be able to struggle and get by with Word plus a bibliography program like Endnote.*

<http://gomez.physics.lsa.umich.edu/~mph/physics/thesis/tradeoffs.html>

## Common (WRONG) Assumptions

Many unskilled authors often make some wrong assumptions:

- MS Word is good because I can easily use some 50 odd fonts in my manuscript.
- MS Word is good because I can make my manuscript look good artistically with minimal effort.
- MS Word is good because I can easily add lots of photos/pictures throughout my article.

All these assumptions are aimed at the *aesthetics*.



## The Truth

- Your document/article/thesis is to be stored in the library and read by people, NOT hung up in a picture/art gallery.
- *Readability* and *understandability* is far more important than how beautiful your work is.
- With WYSIWYG tools, people can, and do make documents aesthetically good-looking, but with little or no consistency in structure.
- L<sup>A</sup>T<sub>E</sub>X prevents this common mistake by *forcing* authors to declare the **logical** structure, L<sup>A</sup>T<sub>E</sub>X then chooses the most suitable layout.

## Advantages

- Professionally crafted layouts are available.
- Supports typesetting of mathematics in a convenient way.
- All mathematics are in ASCII, and interpreted at run-time. Thus reducing the  $\text{\LaTeX}$  file size.
- Only need to learn a few *easy-to-understand* commands.
- Force you to concentrate on the structure and logic, not the aesthetics, of your document.
- Many **free** add-on packages.

- Highly portable and FREE!
- Compatible with almost ALL hardware and platforms.
- FREE PDF conversion!

## Disadvantages

- Does not work well for people who care only about aesthetics, not the contents.
- The design of a whole new layout is difficult, and takes LOTS of time.
  - But almost always one can use the default template, such as article, report...etc.
- Very hard to write unstructured and disorganised articles that looks beautiful.

# Basic Structure

A L<sup>A</sup>T<sub>E</sub>X document always has the basic structure:

```
\documentclass[options]{format}  
\begin{document}  
...  
\end{document}
```

For example:

```
\documentclass[a4paper, 11pt]{article}  
\title{This is a Title}  
\author{Here is an Author}  
\begin{document}  
\maketitle  
...  
\end{document}
```

# Use Contributed Packages

In Java:

```
import java.util.*;
```

In L<sup>A</sup>T<sub>E</sub>X:

```
\usepackage{url}
```

## Commonly Used Packages

```
\usepackage{alltt}  
\usepackage{amsmath}  
\usepackage{amsfonts}  
\usepackage{amssymb}  
\usepackage{color}  
\usepackage{enumerate}  
\usepackage{graphicx}  
\usepackage{longtable}  
\usepackage{xspace}  
\usepackage{url}
```

# Viewing your L<sup>A</sup>T<sub>E</sub>X Documents

Save your file with a `.tex` extension (e.g. `foo.tex`), then there are two ways:

1. In command line (DOS-Prompt):

- `latex foo`
- `pdflatex foo`

2. Use Emacs or XEmacs with AuCT<sub>E</sub>X!



# Fonts

Table 1: Fonts Style

<b>L<sup>A</sup>T<sub>E</sub>X</b> Font Styles	<b>L<sup>A</sup>T<sub>E</sub>X</b> Markup
plain roman text	<code>\textrm{}</code>
<b>boldface text</b>	<code>\textbf{}</code>
<i>italic text</i>	<code>\textit{}</code>
<i>slanted text</i>	<code>\textsl{}</code>
SMALL CAPITALS	<code>\textsc{}</code>
sans serif text	<code>\textsf{}</code>
typewriter text	<code>\texttt{}</code>

The font declarations can be nested, for example:

```
\textit{\textbf{University of Auckland}}
```

will produce *University of Auckland*.

## **itemize Environment**

- Department of Statistics
- Department of Mathematics
- Department of Computer Science

```
\begin{itemize}  
\item Department of Statistics  
\item Department of Mathematics  
\item Department of Computer Science  
\end{itemize}
```

## **enumerate Environment**

1. Department of Statistics
2. Department of Mathematics
3. Department of Computer Science

```
\begin{enumerate}  
  \item Department of Statistics  
  \item Department of Mathematics  
  \item Department of Computer Science  
\end{enumerate}
```

# Centered Displays

Department of Statistics  
Department of Mathematics  
Department of Computer Science

is produced by:

```
\begin{center}  
  Department of Statistics \\  
  Department of Mathematics \\  
  Department of Computer Science  
\end{center}
```

## Other Alignments

Department of Statistics

Department of Mathematics

Department of Computer Science

Department of Statistics

Department of Mathematics

Department of Computer Science

# Alignments L<sup>A</sup>T<sub>E</sub>X Codes

```
\begin{flushleft}  
  Department of Statistics \\  
  Department of Mathematics \\  
  Department of Computer Science  
\end{flushleft}
```

```
\begin{flushright}  
  Department of Statistics \\  
  Department of Mathematics \\  
  Department of Computer Science  
\end{flushright}
```

## Quotations

The *quote* environment provides quoted paragraphs. The material in the environment is typeset with slightly indented margins and offset from the surrounding text.

```
\begin{quote}
```

```
Short quotes can be included between  
quotation marks, but longer quotes  
should be included in a ``quote''  
environment.
```

```
\end{quote}
```

There are also two other environments for providing quotation: *quotation*, which indents paragraphs (quote does not) and *verse*, which can be used for poetry.



## **verbatim Environment**

The *verbatim* environment provides a way of presenting verbatim text. All characters are treated literally and are presented in a typewriter font. This is useful for presenting the text of computer programs or for showing the output they produce.

The output of verbatim environments is printed flush against the left-hand margin. It can be useful to embed a verbatim environment within a quote environment to make it stand out a little more.

## Tables

L<sup>A</sup>T<sub>E</sub>X has extensive facilities for typesetting tables. The *tabular* environment provides the simplest way to produce a table.

	Won	Lost
Team New Zealand	0	5
Alinghi	5	0

This describes a table with three columns. The first is left justified and the remaining two are right justified. A center environment is used to center the table.

```

\begin{center}
\begin{tabular}{lrr}
& Won & Lost & \\
Team New Zealand & 0 & 5 & \\
Alinghi & 5 & 0 & \\
\end{tabular}
\end{center}

```

# Column Format Specifications

The simplest column format specifications are:

<code>l</code>	a left justified column
<code>c</code>	a centered column
<code>r</code>	a right justified column
<code> </code>	a vertical line at this position
<code>@{text}</code>	material to be inserted at this position in each row
<code>p{wd}</code>	a paragraph of width <code>wd</code> (e.g. <code>4cm</code> )
<code>*{num}{cols}</code>	equivalent to <code>num</code> copies of <code>cols</code> .

The add-on package `array` adds additional column formats as well as the ability to define new ones.

## Spanning Multiple Columns

Within each data row it is possible to provide a data element which spans several columns of the table using a `\multicolumn` directive.

```
\multicolumn{cols}{align}{text}
```

This indicates that the next `cols` columns should be spanned and that the alignment should be `align`. The data to appear in the combined “cell” is given by `text`.

`\multicolumn` is most commonly used for placing titling information in a table.

## A Tricky Example

Uses `@{}` to align on a decimal point and `\multicolumn` to provide a column heading.

```
\begin{tabular}{c r @{.} l}  
Pi expression      &  
\multicolumn{2}{c}{Value} \\  
\hline  
$\pi$              & 3.1416 \\  
$\pi^{\pi}$        & 36.46 \\  
$(\pi^{\pi})^{\pi}$ & 80662.7 \\  
\end{tabular}
```

Produces:

Pi expression	Value
$\pi$	3.1416
$\pi^\pi$	36.46
$(\pi^\pi)^\pi$	80662.7

## Advice on Tables

- Novice users tend to overdo the use of lines in tables. If you examine a well-typeset book you will find that tables generally use a minimal number of lines.
- There are a number of extension packages which will provide additional table capabilities.

*array* – increased flexibility for the basic tabular macro.

*dcolumn* – alignment of numbers on decimal points.

*tabularx* – automatic calculation of column widths.

*supertab* – multipage tables.

*longtable* – sophisticated multipage tables.



## Basic Packages for Maths

It is strongly recommended that you have:

```
\usepackage{amsmath}  
\usepackage{amsfonts}  
\usepackage{amssymb}
```

in your preamble region. These three packages allow you to use the features provided by the AMS (American Mathematical Society).

## Inline v.s. Displayed

- Mathematics in L<sup>A</sup>T<sub>E</sub>X can be displayed in two ways:
  - Inline mathematics/equations
  - Displayed equations
- An example of inline equation:  $\sum_{i=1}^n i = \frac{n(n+1)}{2}$
- An example of displayed equation:

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

## Inline Mathematics

- Enclosed by two dollar signs.

- 

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$

- Do **not** use inline mode for complex equations.

## Displayed Equations

- Surrounded by either `\[ \]` or `\begin{displaymath} \end{displaymath}`

- Either

```
\[  
\sum^{n}_{i =1}{i} = \frac{n(n + 1)}{2}  
\]
```

- Or

```
\begin{displaymath}  
\sum^{n}_{i =1}{i} = \frac{n(n + 1)}{2}  
\end{displaymath}
```

# Matrices

An  $n \times p$  matrix:

$$\mathbf{X} = \begin{bmatrix} x_{11} & \cdots & x_{1p} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{np} \end{bmatrix}$$

# Matrices

```
\[  
\mathbf{X} = \left[  
  \begin{array}{ccc}  
    x_{11} & \cdots & x_{1p} \\  
    \vdots & \ddots & \vdots \\  
    x_{n1} & \cdots & x_{np}  
  \end{array}  
\end{array}  
\right]  
\]
```

# Matrix Multiplication

A linear model with parameters,  $\beta_1, \dots, \beta_p$ :

$$E(\mathbf{Y}) = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1p} \\ x_{21} & x_{22} & \cdots & x_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{np} \end{bmatrix} \begin{bmatrix} \beta_1 \\ \vdots \\ \beta_p \end{bmatrix}$$

# Matrix Multiplication

A linear model with parameters,

```

$$\begin{matrix} \beta_1, & \dots, & \beta_p: \\ E\left(\mathbf{Y}\right) = \\ \left[ \begin{array}{cccc} x_{11} & x_{12} & \dots & x_{1p} \\ x_{21} & x_{22} & \dots & x_{2p} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \dots & x_{np} \end{array} \right] \end{matrix}$$

```



```
\left[  
  \begin{array}{c}  
    \beta_1 \\\  
    \vdots \\\  
    \beta_2  
  \end{array}  
\right]  
\]
```

## Aligned Equations

$$\begin{aligned}(a+b)^2 &= (a+b)(a+b) \\ &= a^2 + ab + ab + b^2 \\ &= a^2 + 2ab + b^2\end{aligned}\tag{1}$$

## Aligned Equations

```
\begin{eqnarray}
  \label{eq:complete}
  (a + b)^2 & = & (a + b)(a + b) \nonumber\\
            & = & a^2 + ab + ab + b^2 \nonumber\\
            & = & a^2 + 2ab + b^2
\end{eqnarray}
```

If using `eqnarray*` then the equations will not be numbered.

# Maths Mode Accents

Table 2: Math Mode Accents.

$\hat{a}$	<code>\hat{a}</code>	$\check{a}$	<code>\check{a}</code>	$\tilde{a}$	<code>\tilde{a}</code>
$\grave{a}$	<code>\grave{a}</code>	$\dot{a}$	<code>\dot{a}</code>	$\ddot{a}$	<code>\ddot{a}</code>
$\bar{a}$	<code>\bar{a}</code>	$\vec{a}$	<code>\vec{a}</code>	$\widehat{A}$	<code>\widehat{A}</code>
$\acute{a}$	<code>\acute{a}</code>	$\breve{a}$	<code>\breve{a}</code>	$\widetilde{A}$	<code>\widetilde{A}</code>

# Lower Greek Letters

Table 3: Lowercase Greek Letters.

$\alpha$	<code>\alpha</code>	$\theta$	<code>\theta</code>	$o$	<code>o</code>	$\upsilon$	<code>\upsilon</code>
$\beta$	<code>\beta</code>	$\vartheta$	<code>\vartheta</code>	$\pi$	<code>\pi</code>	$\phi$	<code>\phi</code>
$\gamma$	<code>\gamma</code>	$\iota$	<code>\iota</code>	$\varpi$	<code>\varpi</code>	$\varphi$	<code>\varphi</code>
$\delta$	<code>\delta</code>	$\kappa$	<code>\kappa</code>	$\rho$	<code>\rho</code>	$\chi$	<code>\chi</code>
$\epsilon$	<code>\epsilon</code>	$\lambda$	<code>\lambda</code>	$\varrho$	<code>\varrho</code>	$\psi$	<code>\psi</code>
$\varepsilon$	<code>\varepsilon</code>	$\mu$	<code>\mu</code>	$\sigma$	<code>\sigma</code>	$\omega$	<code>\omega</code>
$\zeta$	<code>\zeta</code>	$\nu$	<code>\nu</code>	$\varsigma$	<code>\varsigma</code>		
$\eta$	<code>\eta</code>	$\xi$	<code>\xi</code>	$\tau$	<code>\tau</code>		

# Upper Greek Letters

Table 4: Uppercase Greek Letters.

$\Gamma$	<code>\Gamma</code>	$\Lambda$	<code>\Lambda</code>	$\Sigma$	<code>\Sigma</code>	$\Psi$	<code>\Psi</code>
$\Delta$	<code>\Delta</code>	$\Xi$	<code>\Xi</code>	$\Upsilon$	<code>\Upsilon</code>	$\Omega$	<code>\Omega</code>
$\Theta$	<code>\Theta</code>	$\Pi$	<code>\Pi</code>	$\Phi$	<code>\Phi</code>		

# Binary Relations

Table 5: Binary Relations

You can produce corresponding negations by adding a `\not` command as prefix to the following symbols.

$<$	<code>&lt;</code>	$>$	<code>&gt;</code>	$=$	<code>=</code>
$\leq$	<code>\leq</code> or <code>\le</code>	$\geq$	<code>\geq</code> or <code>\ge</code>	$\equiv$	<code>\equiv</code>
$\ll$	<code>\ll</code>	$\gg$	<code>\gg</code>	$\dot{=}$	<code>\doteq</code>
$\prec$	<code>\prec</code>	$\succ$	<code>\succ</code>	$\sim$	<code>\sim</code>
$\preceq$	<code>\preceq</code>	$\succeq$	<code>\succeq</code>	$\simeq$	<code>\simeq</code>
$\subset$	<code>\subset</code>	$\supset$	<code>\supset</code>	$\approx$	<code>\approx</code>

$\subseteq$	<code>\subseteq</code>	$\supseteq$	<code>\supseteq</code>	$\cong$	<code>\cong</code>
$\sqsubset$	<code>\sqsubset</code> <sup>a</sup>	$\sqsupset$	<code>\sqsupset</code> <sup>a</sup>	$\Join$	<code>\Join</code> <sup>a</sup>
$\sqsubseteq$	<code>\sqsubseteq</code>	$\sqsupseteq$	<code>\sqsupseteq</code>	$\bowtie$	<code>\bowtie</code>
$\in$	<code>\in</code>	$\ni$	<code>\ni</code> , <b><code>\owns</code></b>	$\propto$	<code>\propto</code>
$\vdash$	<code>\vdash</code>	$\dashv$	<code>\dashv</code>	$\models$	<code>\models</code>
$ $	<code>\mid</code>	$\parallel$	<code>\parallel</code>	$\perp$	<code>\perp</code>
$\smile$	<code>\smile</code>	$\frown$	<code>\frown</code>	$\asymp$	<code>\asymp</code>
:	:	$\notin$	<code>\notin</code>	$\neq$	<code>\neq</code> or <b><code>\ne</code></b>

<sup>a</sup>Use the `latexsym` package to access this symbol



# Binary Operators

Table 6: Binary Operators.

$+$	<code>+</code>	$-$	<code>-</code>		
$\pm$	<code>\pm</code>	$\mp$	<code>\mp</code>	$\triangleleft$	<code>\triangleleft</code>
$\cdot$	<code>\cdot</code>	$\div$	<code>\div</code>	$\triangleright$	<code>\triangleright</code>
$\times$	<code>\times</code>	$\setminus$	<code>\setminus</code>	$\star$	<code>\star</code>
$\cup$	<code>\cup</code>	$\cap$	<code>\cap</code>	$*$	<code>\ast</code>
$\sqcup$	<code>\sqcup</code>	$\sqcap$	<code>\sqcap</code>	$\circ$	<code>\circ</code>

$\vee$  `\vee` , `\lor`

$\oplus$  `\oplus`

$\odot$  `\odot`

$\otimes$  `\otimes`

$\triangle$  `\bigtriangleup`

$\triangleleft$  `\lhd` <sup>*a*</sup>

$\trianglelefteq$  `\unlhd` <sup>*a*</sup>

$\wedge$  `\wedge` , `\land`

$\ominus$  `\ominus`

$\oslash$  `\oslash`

$\bigcirc$  `\bigcirc`

$\nabla$  `\bigtriangledown`

$\triangleright$  `\rhd` <sup>*a*</sup>

$\trianglerighteq$  `\unrhd` <sup>*a*</sup>

$\bullet$  `\bullet` `\bullet`

$\diamond$  `\diamond`

$\uplus$  `\uplus`

$\blacksquare$  `\amalg`

$\dagger$  `\dagger`

$\ddagger$  `\ddagger`

$\wr$  `\wr`

# BIG Operators

Table 7: BIG Operators.

$\Sigma$	<code>\sum</code>	$\bigcup$	<code>\bigcup</code>	$\bigvee$	<code>\bigvee</code>	$\bigoplus$	<code>\bigoplus</code>
$\prod$	<code>\prod</code>	$\bigcap$	<code>\bigcap</code>	$\bigwedge$	<code>\bigwedge</code>	$\bigotimes$	<code>\bigotimes</code>
$\coprod$	<code>\coprod</code>	$\bigsqcup$	<code>\bigsqcup</code>			$\bigodot$	<code>\bigodot</code>
$\int$	<code>\int</code>	$\oint$	<code>\oint</code>			$\biguplus$	<code>\biguplus</code>

## T<sub>E</sub>X and Graphics

T<sub>E</sub>X was designed as a general layout engine. It works by manipulating abstractions called boxes and glue.

Boxes are used to represent characters, words and paragraphs; and glue represents the space between these objects.

T<sub>E</sub>X itself has no idea what each box in a document contains. The actual drawing the contents is left to another program called a *device driver* (such as `xdvi` or `dvips`).

From T<sub>E</sub>X's standpoint, a graphic is just another kind of box to be incorporated into a document.

## PostScript Graphics

The PostScript language created by Adobe Systems is the most commonly used description of graphics. Almost all graphics programs can produce Postscript output.

T<sub>E</sub>X device drivers are able to take PostScript graphics descriptions and use them to draw images, either on paper or on screen.

You are thus free to use almost any graphics program to create graphics which can be incorporated directly into L<sup>A</sup>T<sub>E</sub>X documents.

# The L<sup>A</sup>T<sub>E</sub>X Graphics Package

A wide set of graphics capabilities can be accessed by using one of the two L<sup>A</sup>T<sub>E</sub>X graphics packages — either **graphics** or **graphicx**.

These two packages provide equivalent functionality, but the **graphicx** package is simpler to use. It's the one we will cover.

The package is loaded by placing the statement:

```
\usepackage{graphicx}
```

in your document preamble.

## Inserting Graphics

Suppose that we have a correctly sized graph written into a file called **figure.eps**. To incorporate it in a centered display, all we need to do is to type:

```
\begin{center}  
  \includegraphics{figure}  
\end{center}
```

You can use the **flushleft**, **flushright** and **quote** environments to place your figure differently on the page.

Notice that you do not need to specify the “extension” of the file. **L<sup>A</sup>T<sub>E</sub>X** understands what kind of extensions are suitable.

## Scaling Graphs

If at all possible you should create your graphs the correct size to be inserted into the document. This makes font sizes much easier to control.

If this is not possible, you can control the size of graphs with the using an option to `\includegraphics`.

```
\usepackage[scale=2]{figure}  
\usepackage[width=5cm]{figure}  
\usepackage[width=3in]{figure}  
\usepackage[width=\textwidth]{figure}
```

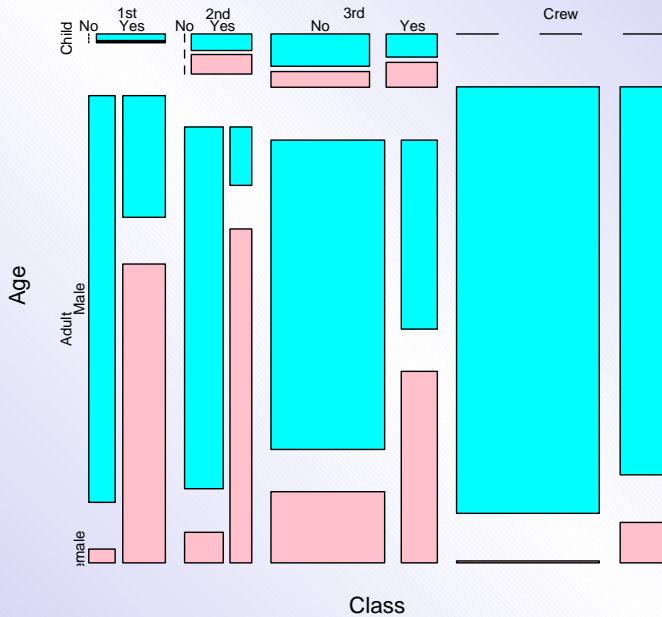


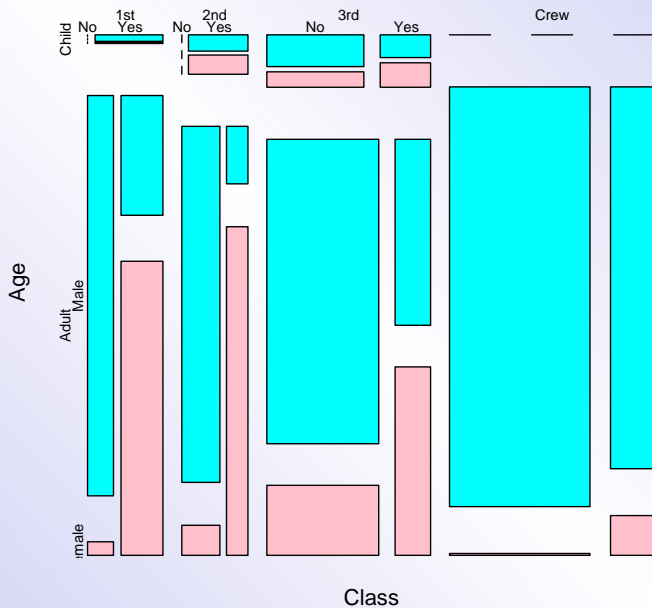
## An example

The graph was incorporated into this L<sup>A</sup>T<sub>E</sub>X document with the statements:

```
\begin{center}  
  \includegraphics[scale=0.7]{Titanic}  
  \includegraphics[width=\textwidth]{Titanic}  
\end{center}
```

The two scalings lead to different sized plots.





## Using Graphics

- When you `latex` your document, graphics must be in:
  - POSTSCRIPT (PS), or
  - Encapsulated POSTSCRIPT (EPS)
- When you `pdflatex` your document, graphics must be in:
  - JPEG, or
  - PDF, or
  - PNG

## Graphics Format Conversion

- All good graphical drawing software support different graphics format.
- Convert using a **free** photoshop clone: **The GIMP!**.

## On-line Resources

- LaTeX Project Homepage  
<http://www.latex-project.org/>
- Claus Dethlefsen's LaTeX, Emacs for your PC  
<http://www.math.auc.dk/~dethlef/Tips/introduction.html>
- MikTeX <http://www.miktex.org/>
- Presentation Packages [http://www.math.uakron.edu/~dpstory/pdf\\_present.html](http://www.math.uakron.edu/~dpstory/pdf_present.html)

## References

- **FREE stuff for Beginners:**

- The (Not So) Short Introduction to  $\text{\LaTeX}$  2 $\epsilon$  ;  
<http://www.ctan.org/tex-archive/info/lshort/english/>
- Using Imported Graphics in  $\text{\LaTeX}$  2 $\epsilon$   
<ftp://ctan.tug.org/tex-archive/info/epslatex.pdf>
- $\text{\LaTeX}$  2 $\epsilon$  for authors,  
<ftp://ftp.tex.ac.uk/tex-archive/macros/latex/base/usrguide.tex>.
- Beginner's  $\text{\LaTeX}$ , <http://www.silmaril.ie/downloads/documents/beginlatex.pdf>.

- A list of LOTS of other stuff, <http://www-h.eng.cam.ac.uk/help/tpl/textprocessing/>.

- **Beginners to Intermediate Users:**

- LaTeX: A document Preparation System, User's guide and Reference manual; *Leslie Lamport* (US\$40)

- **Beginners to Advanced Users:**

- The LaTeX Companion. *Michel Goossens, Frank Mittelbach, Alexander Samarin.* (US\$40.)
- The LaTeX Web Companion: Integrating Tex, Html and Xml. *Michel Goossens et. al.* (US\$40)
- The LaTeX Graphics Companion: Illustrating Documents with TeX and Postscript(R) *Michel*



*Goossens et. al.* (US\$48)

- **Advanced Users:**

- The T<sub>E</sub>Xbook; *Donald Ervin Knuth* (US\$43)