1 Introduction

This course will introduce you to running LaTeX on a Unix system. The information about running the `latex` command will be system-specific, but the information about what to put in a LaTeX file (the majority of the course) will be generally applicable. LaTeX is available on a very wide variety of platforms, including Unix machines, VMS machines, IBM-PCs running MS-DOS, MS Windows, or OS/2, and Apple Macintoshes.

LaTeX is a document *description* language. It is sometimes called an "intensional" or "logical" markup language. It is designed to let you specify the *structure* of your document, rather than its appearance. The rules translating structure into appearance are called the "style" and are dealt with separately.

LaTeX is *not* a WYSIWYG ("what you see is what you get") text processor[1]. Rather, it is a batch system where a plain text file with LaTeX instructions in it is processed by a command (almost invariably called "`latex`") to produce an output file which can then be previewed or printed.

The course is only designed to get you *started*. Anything but the most simple use of LaTeX will require you to have easy access to the book written for the program by its author:

Title: "LaTeX—User's Guide and Reference Manual", Second edition

Author: Leslie Lamport

Published: Addison-Wesley, 1994

ISBN: 0-201-52983-1

LaTeX is easy to start to use, but hard to master. In particular, writing your own styles is very hard. See "The LaTeX Companion" for details:

Title: "The LaTeX Companion"

Authors: M. Goossens, F. Mittelbach, A. Samarin

Published: Addison-Wesley, 1993

[1] LaTeX is sometimes called YAFIYGI ("you asked for it; you got it").

ISBN: 0-201-54199-8

The only prerequisite for this course is knowing how to use a text editor on your system of choice.

This course will explain the basics of the LaTeX source for:

- Plain text
- Lists
- Tables
- Diagrams
- Mathematics

A note on versions: There are two versions of LaTeX currently in existence. These are LaTeX2.09 and LaTeX2ε. The latter is the current version and the version this course will cover. If you have the older version, gripe at your system administrator. If you have a large amount of work already done in the older version, don't worry. The newer version spots that the document is old-style and has a fairly good attempt at running in compatability mode. However, all documents you now produce should be in the new form.

We will start with a very simple example. Let us suppose we were going to typeset the book "Treasure Island". The opening paragraph of this book reads as follows:

```
   Squire Trelawney, Dr. Livesey, and the rest
of these gentlemen having asked me to write
down the whole particulars about Treasure
Island, from the beginning to the end,
keeping nothing back but the bearings of the
island, and that only because there is
treasure not yet lifted, I take up my pen in
the year of grace 17-, and go back to the
time when my father kept the "Admiral
Benbow" inn, and the brown old seaman, with
the sabre-cut, first took up his lodging
under our roof.
```

We add to this file two lines at the start and one at the end:

```
\documentclass{book}
\begin{document}
```
Squire Trelawney, Dr. Livesey,
...
lodging under our roof.
```
\end{document}
```

The three extra lines are LaTeX commands. These three all begin with a backslash and have an argument in curly brackets (often called "braces"). This is fairly typical for a LaTeX command.

We shall put this in a file `treasure.tex`. Now we need to process this file with the local LaTeX implementation. Here is an example from a Unix system:

```
$ latex treasure
This is TeX, Version 3.1415 (C version 6.1)
(treasure.tex
LaTeX2e <1994/06/01>
(/opt/TeX/lib/texmf/tex/latex2e/base/book.cls
Document Class: book 1994/06/02 v1.2s Standard LaTeX
document class
(/opt/TeX/lib/texmf/tex/latex2e/base/bk10.clo))
No file treasure.aux.
[1] (treasure.aux) )
Output written on treasure.dvi (1 page, 848 bytes).
Transcript written on treasure.log.
$
```

Three files are created by this run of the `latex` command:

`treasure.aux` is a file that can carry certain auxiliary information about the file being processed. In this simple case it contains a single line telling the system to take no special action. Examples of its more powerful use will be given in section 8.

`treasure.log` is a logging file with details of what LaTeX and the underlying TeX program did to process the file. This will not be referred to in the course; the important output will be printed to the screen.

`treasure.dvi` contains the true "output". This file contains a typeset document in "DeVice Independent" format.

This DVI file can then be previewed directly on an X-terminal by a program called `xdvi`; the command "`xdvi treasure`" will preview the document on the display. Alternatively, the DVI file can be converted into a device-dependent format. The most commonly desired format is PostScript. The command `dvips` converts a DVI file into a PostScript file. The command "`dvips treasure`" creates a file called `treasure.ps` containing the PostScript. This can then be printed to a PostScript printer with the `lpr` command, or previewed on the screen with a suitable PostScript interpreter like `ghostview`. (Syntax: "`ghostview treasure.ps`".) The output from the `treasure.tex` example is shown below:

> Squire Trelawney, Dr. Livesey, and the rest of these gentlemen having asked me to write down the whole particulars about Treasure Island, from the beginning to the end, keeping nothing back but the bearings of the island, and that only because there is treasure not yet lifted, I take up my pen in the year of grace 17-, and go back to the time when my father kept the ”Admiral Benbow” inn, and the brown old seaman, with the sabre-cut, first took up his lodging under our roof.

There are three problems with the output:

1. "Dr. Livesey" has *sentence* spacing.
2. The dash in "17-" is too short.
3. The leading quotation mark in ”Admiral Benbow” is wrong.

Each of these errors in the output has a simple fix in the input and each will be described in detail later:

1. `Dr.␣Livesey` becomes `Dr.~Livesey`.
2. `17-` becomes `17---`.
3. `"Admiral␣Benbow"` becomes ``` ``Admiral␣Benbow'' ```.

The new output is then as shown below:

> Squire Trelawney, Dr. Livesey, and the rest of these gentlemen having asked me to write down the whole particulars about Treasure Island, from the beginning to the end, keeping nothing back but the bearings of the island, and that only because there is treasure not yet lifted, I take up my pen in the year of grace 17—, and go back to the time when my father kept the "Admiral Benbow" inn, and the brown old seaman, with the sabre-cut, first took up his lodging under our roof.

The book is divided into chapters of which this is the first. If we wanted to do this in the document, we would add the following LaTeX command, just before the main text:

```
\chapter{The Old Sea-Dog at the
``Admiral Benbow''}
```
Squire Trelawney, Dr. Livesey...

The output of this is then:

1: The Old Sea-Dog at the "Admiral Benbow"

> Squire Trelawney, Dr. Livesey, and the rest of these gentlemen having asked me to write down the whole particulars about Treasure Island, from the beginning to the end, keeping nothing back but the bearings of the island, and that only because there is treasure not yet lifted, I take up my pen in the year of grace 17—, and go back to the time when my father kept the "Admiral Benbow" inn, and the brown old seaman, with the sabre-cut, first took up his lodging under our roof.

Notes:

- We did not have to explicitly number the chapter. LaTeX takes care of all the drudgery like that.
- You may not like the style of the chapter heading, but for now you have no control over it; that is the job of the style.