(Almost) all you need to know about referencing using LaTeX

Barrie Cooper

October 15, 2015

Contents

1 Introduction

One of the advantages of typesetting documents using LaTeX is that it can keep track of your references for you without a great deal of effort on your part. This document will not "explain" how to reference using LaTeX — rather, by comparing the `tex` file and `bib` file with this `pdf` file you should be able to glean many of the important referencing commands available to you.

2 Referencing sections, pages, theorems and equations

The key to referencing using LaTeX is to set "marks" in the `tex` file using `\label` commands and then to use the appropriate referencing commands to call the section, page, theorem and equation numbers as required.

To see this work effectively, I will need to flesh out the content of this document a little! To this end, a couple of important mathematical results follow in which I have secretly embedded "marks" for LaTeX to find when I reference them later.

Theorem 2.1. *Consider a right-angled triangle and let c denote the length of the edge opposite the right-angle (the hypotenuse) and let a and b denote the lengths of the remaining two edges in either order. Then*

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

Definition 2.2. Let p be a natural number. We say that p is *prime* if the following statement holds for all natural numbers a and b:

> "if p divides the product ab then it must divide one of the factors a or b".

Theorem 2.3 (The Fundamental Theorem of Arithmetic)**.** *Let $n \geq 2$ be a natural number. Then n can be written as a product of prime numbers in a unique way (up to reordering the factors).*

We return to this later in Section 4 on Page 2, when I will reference the elements using appropriate commands.

3 Referencing books, journals and websites

The brief for Investigation 1 details how referencing in the paper should work in principle — we explore how to do this in practice using LaTeX. You can do this manually, but perhaps the best way is to use a little program called BibTeX to manage your references for you. The way this works is that you create a `bib` file containing a database of references and you call these in your document as required using the `\cite` command. When

LaTeX is called it will search through the list of references in the document and produce a secondary file that lists everything it needs to reference and whether it requires a page number, section number, an entry from the biblographical database or something else. You then need to run `bibtex` to allow LaTeX to insert the entries from the database into the document at the correct point. Finally, you run LaTeX twice so that it gets all the references right! So, in short, to compile a document so that it gets the references correct you need to run it through the `latex` and `bibtex` programs in the following order:

> `latex`, `bibtex`, `latex`, `latex`

That may sound complicated but quickly it becomes second nature. The output will look something like the following (but check out the `tex` file to see how the referencing commands work!):

> John Conway [Con76, Con77] first introduced a rigorous notion of a mathematical game as an extension of the concept of "number". The MSOR subject benchmark [Web07] sets out what to expect from a mathematics degree at University.

4 Internal referencing

We now return to the subject of referencing internal elements such as sections, pages, theorems and equations. I will make use of the "marks" I set in the LaTeX document throughout Section 2 on Page 1.

The first result, Theorem 2.1, is usually referred to as "Pythagora's Theorem", although the Egyptians and Babylonians were familiar with the result before the Ancient Greeks — the Greeks may have been the first to have identified a formal proof but this is contested. Notice how I have stated the full result and not simply equation (1), which would not be true for general triples (a, b, c) of natural numbers.

The second result, Theorem 2.3, is one of the most fundamental results in number theory and is familiar (in one form or another) to primary school children. Yet, despite this, you may well have never asked yourself why it is true and how we can know. You will deal with such questions in ECM1706 this term. For completeness, I have given the definition of a prime number (Definition 2.2), but this is almost certainly different to the definition you would have expected. Nevertheless, if one studies number theory in later years, this definition is unquestionably the "right" one — fortunately, it can be shown that in the case of the natural numbers, this definition of "prime" coincides with the one with which you are already familiar!

5 The hyperref package

You will notice that the references in this document have become clickable hyperlinks. The package that is doing this is `hyperref`, which can be loaded by adding the line

```
\usepackage{hyperref}
```

in the preamble of the `tex` file.

6 Conclusions

This `pdf` has not told you *how* to reference, but if you take this file, the `tex` file and the `bib` file and analyse them together, you should identify how to use most of the basic LaTeX referencing commands.

References

[Con76] John Conway, *On numbers and games*, Academic Press: London, 1976.

[Con77] _____, *All games bright and beautiful*, The American Mathematical Monthly **84** (1977), no. 6, pp. 417–434.

[Web07] Quality Assurance Agency (QAA) Webpage, *MSOR Subject Benchmark*, `http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Mathematics-statistics-and-operational-resea pdf` (date accessed 04/11/14), 2007.