8 Cross-references

8.1 Cross-referencing within text

Consider the following piece of text:

> The section on cross-references is section 8 and appears on page 36 of the notes.

This text was not generated by typing in the numbers 8 and 36. Instead, *references* to the section were used, and LaTeX evaluated them itself. The section was started with the text

```
\section{Cross-references}\label{xref}
```

and the text above that made the references was created by

```
The section on cross-references is
section~\ref{xref} and appears on
page~\pageref{xref} of the notes.
```

The key to this cross-referencing is in the three commands:

- `\label{`*name*`}` records
  - records the number of the section, subsection, theorem etc. of whatever it follows,
  - records the page number where it occurs, and
  - stores the information so gathered in a file called `wombat.aux` (if the LaTeX source is in `wombat.tex`).
- `\ref{`*name*`}` extracts the corresponding section, subsection, theorem etc. number from the `.aux` file.
- `\pageref{`*name*`}` extracts the corresponding page number from the `.aux` file.

There is, however, a problem.

References can precede the labelling.

To see how LaTeX gets round this problem, we need to see just what it does with a reference. We will start with just `wombat.tex`:

```
\documentclass{article}
\begin{document}
On page~\pageref{koala} reference is
made to the koala\label{koala} bear.
\end{document}
```

1. Run `latex wombat`
2. LaTeX looks (unsuccessfully) for `wombat.aux`.

   ```
   No file wombat.aux.
   ```

3. LaTeX gives a warning for the `\pageref` command:

   ```
   Reference `koala' on page 1 undefined.
   ```

4. LaTeX writes "`??`" for `\pageref{koala}` in the DVI output.
5. LaTeX writes the pagenumber to `wombat.aux` for the `\label` command:

   ```
   \newlabel{koala}{{}{1}}
   ```

6. LaTeX ends with a warning that it couldn't do all the cross-referencing:

   ```
   There were undefined references.
   ```

7. LaTeX suggests that it be rerun:

   ```
   Rerun to get cross-references right.
   ```

8. So we rerun `latex wombat`.
9. LaTeX finds `wombat.aux`.
10. LaTeX writes a page number for the `\pageref{koala}` command.
11. LaTeX overwrites `wombat.aux` for the `\label{koala}` command.

12. LaTeX ends without any warning messages.

Note that the file `wombat.aux` always refers to the page and reference numbers generated by the *previous* run of LaTeX. If labels change while running LaTeX then a warning message is printed at the end:

```
Label(s) may have changed. Rerun to get cross-references right.
```

8.2 Simple Bibliographies

Bibliographies are very similar to cross-references, except that the information being referenced is all together in the references list at the back of the document. Two commands and an environment are provided for this purpose: `\cite`, `\bibitem` and the `thebibliography` environment:

- `\bibitem` is a combination of `\item` and `\label`.
- `\cite` is equivalent to `\ref`.
- `thebibliography` is analogous to `enumerate`.

Consider the following example:

```
In ``Treasure Island''~\cite{rls-ti} Stevenson
created the ultimate boy's adventure.
\begin{thebibliography}{MM}
\bibitem{rls-ti} R.L.~Stevenson, ``Treasure Island''.
\bibitem{rls-k} R.L.~Stevenson, ``Kidnapped''.
\end{thebibliography}
```

which gives the output:

> In "Treasure Island" [1] Stevenson created the ultimate boy's adventure.
>
> # References
>
> [1] R.L. Stevenson, "Treasure Island".
>
> [2] R.L. Stevenson, "Kidnapped".

The argument to the `\begin{bibliography}` command is a string that must be at least as wide as any of the labels used in the bibliography.

The key that is generated by `\bibitem` and printed by `\cite` can be set by the user by an optional argument to `\bibitem`: Consider the following example:

```
In ``Treasure Island''~\cite{ti} Stevenson created
the ultimate boy's adventure.
\begin{thebibliography}{MMMM}
\bibitem[TrIs]{ti} R.L.~Stevenson, ``Treasure Island''.
\bibitem[Kidn]{k} R.L.~Stevenson, ``Kidnapped''.
\end{thebibliography}
```

which gives the output:

In "Treasure Island" [TrIs] Stevenson created the ultimate boy's adventure.

References

[TrIs] R.L. Stevenson, "Treasure Island".

[Kidn] R.L. Stevenson, "Kidnapped".

If you wish to pass a note with the citation, a reference to a particular chapter, for example, this can be done by passing an optional argument to the `\cite` command. Consider:

```
In his ``shore adventure''~\cite[Part~3]{rls-ti},
```

which gives:

In his "shore adventure" [1, Part 3],

Again, these citations are written to the `.aux` file which reflects the *previous* run of LaTeX. LaTeX must be rerun until the labels are consistent.

If you want to refer to a shared bibliography, or make more advanced use of bibliographies, you should consider using the BibTeX command described in appendix B of Lamport's book.