The **labelschanged** package

Identifies labels which cause endless "may have changed" warnings, and also labels which are "multiply-defined".

v1.0 — 2017/12/11

Packaged, documented, and maintained by Brian Dunn.

"Label(s) may have changed."

Several conditions can cause LaTeX labels to keep changing, no matter how many times a document is recompiled.

Dynamic references: Some packages, such as varioref, generate text references which dynamically change depending on the location of each float, and these changing messages may then cause the floats themselves to move.

Margin/foot notes: References in margin or foot notes may have a similar effect.

Active characters: Due to the way changing labels are detected, problems may also be caused by active characters in captions or section names.

In these circumstances, the warning

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

reoccurs despite multiple document re-compiles. Locating the problem labels may be difficult, as there may not be any message identifying which labels have changed.

Locating the changing labels

In the preamble of the document, place:

```
\usepackage{labelschanged}
```

The labelschanged package will print the names of the labels which changed, and their associated definitions before and after the recompile.

```
Label 'xyz' has changed:
```
<before/after comparisons>

Solutions

Dynamic references: varioref issues a warning if the reference text spans a page break. `\fullref` or a plain `\ref` may be used instead.

Margin notes: See the packages marginfit, mparhack, marginfix, and marginnote for possible improvements in margin note placement, which then may resolve the changing labels problem.

Footnotes: See the packages footnotehyper, footnote, and ftnright for possible improvements in footnote placement, which again may resolve the changing labels problem. For footmisc, try avoiding the `perpage` option.

Active characters: The sectioning commands (`\chapter`, `\section`, etc.) and the `\caption` command all have an optional "short" argument which, if provided, is used in the table of contents and list of figures/tables instead of the regular argument.

```
\section[Simple heading name]{Complicated heading name}
\caption[Simple caption]{Complicated caption}
```

Providing a simplified caption or section heading may resolve the problem of incorrectly detecting changing labels.

memoir and breqn: See https://tex.stackexchange.com/questions/331209/warning-labels-may-have-changed-with-breqn

Multiply-defined labels

A bonus side-effect of the labelschanged packages is that multiply-defined labels are also listed at the end of the compilation. While warnings of multiply-defined labels also appear earlier in the log, listing them again at the end makes it easier to quickly identify those which are a problem.

Avoid using `\label{}` or `\bibitem{}`.

Missing references

Unfortunately, locating missing references still requires searching the log to find which are a problem.

References

This code is taken almost verbatim from David Carlisle's reply to a post on TeX-LaTeX Stack Exchange:

https://tex.stackexchange.com/questions/154594/how-to-diagnose-a-permanent-labels-may-have-changed-warning

David has given permission to have this reply converted to a LaTeX package, and has placed his Stack Exchange posts the in public domain, per:

https://tex.meta.stackexchange.com/a/3332/1090

For other discussion on this topic, see:

https://tex.stackexchange.com/questions/109178/why-does-the-compiler-keeps-telling-me-forever-to-rerun-because-labels-have-ch

Code

At the end of the document, the `.aux` file is read back while `\newlabel` and `\bibcite` are effectively redefined as:

```
\def\newlabel{\@testdef r}   —and—
\def\bibcite{\@testdef b}
```

While the `.aux` file is read, each label's new definition as given in the `.aux` file is compared to its existing definition as defined by `r@<label>` or `b@<label>`.

`\@testdef` `{`⟨*r -or- b*⟩`}` `{`⟨*label*⟩`}` `{`⟨*new definition*⟩`}`

```
\def\@testdef #1#2#3{%
```

Remember the new definition for comparison purposes:

```
    \def\reserved@a{#3}%
```

Compare with the old definition. No action if the same.

```
    \expandafter \ifx \csname #1@#2\endcsname \reserved@a  \else%
```

If different, print a warning:

```
        \typeout{^^JLabel `#2' has changed:^^J%
```

Display the new meaning:

```
        \meaning\reserved@a^^J%
```

Display the old meaning:

```
        \expandafter\meaning\csname #1@#2\endcsname^^J}%
```

Remember that labels have changed:

```
        \@tempswatrue%
    \fi%
}
```

Change History

v1.0

General: 2017/12/11: New pkg. . . 1