Defining LaTeX commands and environments

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Introduction

This short document explains how to define your own LaTeX commands and environments.

1 User-defined commands in LaTeX

LaTeX includes the very useful facility to add new commands. For example, you could say

```
\newcommand{\wake}{baba\-badalgharagh\-takam\-min\-%
     arron\-nkonn\-bronn\-tonn\-er\-ronn\-tuonn\-thunn\-%
     tro\-varr\-houn\-awnskawn\-too\-hoo\-hoor\-denen\-thur\-nuk}
```

in a document that makes a lot of use of the hundred-letter word on the first page of Joyce's *Finnegans Wake*, and then you can save yourself a lot of typing (as well as remembering where all the suitable places to hyphenate it are) by just saying `\wake` every time you need this word as in

```
The fall (\wake!) of a once wallstrait oldparr is told\ldots
```

'The fall (bababadalgharaghtakamminarronnkonnbronntonnerronntuonnthunn-trovarrhounawnskawntoohoohoordenenthurnuk!) of a once wallstrait oldparr is told...'

Note the use of the comment character (%) to ensure that LaTeX doesn't see the end-of-line symbol and therefore doesn't break up this beautiful word into three. (Unfortunately, LaTeX does have to hyphenate it somewhere though, so the `\-` commands aer a good idea to tell it where a hyphen is acceptable.) Note also that new commands defined this way suffer from the familiar problem that any spaces following them will be ignored.

LaTeX commands may take arguments too. For example, in

```
\newcommand{\lis}[2]{#2_{1},\ldots,#2_{#1}}
```

we define a command `\lis` of two arguments (which will replace the `#1` and `#2` in the definition. Thus `consider \( \mathbf{x} = (\lis{n}{x}) \)` becomes 'consider $\mathbf{x} = (x_1, \ldots, x_n)$.'

LaTeX 2_ε improves the `\newcommand` command of LaTeX 2.09 by allowing you to define commands with an optional argument as well.

For example, in

```
\newcommand{\seq}[2][n]{#2_{1},\ldots,#2_{#1}}
```

we define `\seq` with two arguments, the first being optional (default value 'n'). This means

```
For some \(i \in \{ \seq{t} \} \) we have
\( f(i)=\seq[m]{\alpha} \)
```

gives 'For some $i \in \{t_1, \ldots, t_n\}$ we have $f(i) = \alpha_1, \ldots, \alpha_m$'.

2 Environments

LaTeX also allows you to define environments, which are usually variations of existing ones. The command `\newenvironment{envname}{starting}{ending}` creates a new environment called 'envname' so that the code 'starting' is done whenever the environment starts, and 'ending' is done whenever the environment finishes. So, the definition

```
\newenvironment{tinyitquote}%
{\begin{quote}\begin{tiny}\it}%
{\end{tiny}\end{quote}}
```

makes quotes in tiny italics, for example,

> *This is a tiny italic quote.*

Environments may also take arguments, by using an optional argument in a similar way to commands defined by newcommand. An example is

```
\newenvironment{qsi}[1]%
{\begin{quote}#1 wrote,\begin{sloppypar}\it}%
{\end{sloppypar}\end{quote}}
```

Makes the following LaTeX source

```
\begin{qsi}{Joyce}
The fall (\wake!) of a once wallstrait oldparr\ldots
\end{qsi}
```

yield:

> Joyce wrote,
>
> *The fall (bababadalgharaghtakamminarronnkonnbronntonnerronntuonnthunntrovarrhounawnskawntoohoohoordenenthurnuk!) of a once wallstrait oldparr...*