

LaTeX Customization and Tips

Viktor Dmitriyev

Adapter from Mini Course on LaTeX by [David Diez](#)

Outline

- Miscellaneous tips and customization in LaTeX

Overview

- Counters
- Commands
- Environments

Motivation

- LaTeX is very flexible
- What work on one PC may work differently on others
- Community is very important

Existing counters

LaTeX uses counters (variables) to keep proper numbering.

- The following are counters used by LaTeX: `part`, `chapter`, `section`, `subsection`, `subsubsection`, `page`, `footnote`, `equation`, `figure`, and `table`. These counters correspond to their corresponding commands.
- Other counters are used for each level of enumerate: `enumi`, `enumii`, `enumiii`, `enumiv`.
- A few other LaTeX counters: `paragraph`, `subparagraph`, `mpfootnote`.

Create new counters

We may want to create our own counters for our own purposes. Maybe we have examples that we want numbered.

```
\newcounter{counterName}[inCounter]
```

This creates a new counter called `counterName`. The `inCounter` argument + brackets are optional and an `inCounter` is used to reset `counterName` whenever `inCounter` increments (e.g. subsection has “`inCounter`” section).

Modifying

We can modify existing or new counters.

```
\setcounter{counter}{n}
```

```
\addtocounter{counter}{n}
```

```
\stepcounter{counter}
```

```
\refstepcounter{counter}
```

The `\refstepcounter` command lets us reference our counter value if we follow it with a `\label`.

Printing

So we can create, modify, and reference counters. However, we also need to print counters in the document. We do so by calling the counter with one of the following commands:

`\arabic{chapter}` (4, Arabic number)

`\Roman` (IV, uppercase Roman numeral)

`\roman` (iv, lowercase Roman numeral)

`\Alph` (D, capital letter)

`\alph` (d, lowercase letter)

`\fnsymbol` (§, footnote symbol)

We will put counters to use in our custom commands and environments.

Simple command

Common statements, like x_1, \dots, x_n can be abbreviated using a new command.

```
\newcommand{\xvec}{x_1,\dots,x_n}
```

Inserting this command and then typing (later in the document) $\$ \xvec \$$, we get x_1, \dots, x_n . If we forgot the dollar signs, we would be in trouble. We can resolve this by using an extra command:

```
\newcommand{\xvec}{\ensuremath{x_1,\dots,x_n} }
```

In the second definition, we left an extra space at the end, which helps prevent spacing problems. More elegant solution is to use the `xspace` package (see *Guide to LaTeX*, page 186).

Command with arguments

If we want to generalize our command, we add two arguments

```
\newcommand{\subvec}[2]{\ensuremath{\#1_1,\dots,\#1_{\#2}}}
```

We can create y_1, \dots, y_m from `\subvec{y}{m}`.

Additional arguments can be created and are referenced via `\#n` for the n^{th} argument. Optional default arguments can also be utilized (see *Guide to LaTeX*, page 188).

Generalization

The general framework of new commands is

```
\newcommand{\commandName}[n]{the commands}
```

where

- `commandName` is the name of the command,
- `n` is the number of arguments, and
- the arguments are referred to as `#1`, `#2`, ..., `#n` in **the commands**.

To redefine a command that already exists, use `\renewcommand` with the same format as above.

Sample environment

Environments use begin and end tags (e.g. `itemize`). We only need define what happens at the `\begin` and `\end` tags. For example,

```
\newenvironment{example}
  {\small\textbf{Example.} \hspace{2mm}} % begin stuff
  {\} % end stuff
```

Sample environment call:

```
\begin{example}
```

Modular addition works in mysterious ways: $2+2=1 \pmod{3}$.

```
\end{example}
```

Result:

Example. Modular addition works in mysterious ways: $2 + 2 = 1 \pmod{3}$.

General environment

Generally environments take the form

```
\newenvironment{environmentName}{begin stuff}{end stuff}
```

We can also declare that there will be n arguments.

```
\newenvironment{environmentName}[n]{begin stuff}{end  
stuff}
```

As before, we refer to the arguments as $\#1, \dots, \#n$ in the **begin stuff** and **end stuff**.

To redefine an environment that already exists, use `\renewenvironment` with the same format as above.

Environment + counter

```
\newcounter{example}  
\setcounter{example}{0}  
\newenvironment{example}  
  {\refstepcounter{example}\small  
   \textbf{Example \arabic{example}.}\hspace{2mm}}  
  {\}
```

Organizer and time saver

The `\include` command is useful for long documents:

```
\include{otherDocName}
```

For instance, this presentation actually calls three separate documents: one for each big section. Thus I would not take time Typesetting parts of the document I was not working on while keeping organized:

```
\include{tips/tips} % "tips" document in the "tips" folder
```

Summary

After this class, you should have a general idea of

- creating your own commands and environments and
- random tips.

Any questions?