Writing a \LaTeX \, Article – The Basics

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Abstract

Module 3 continues where Module 2 ended. \LaTeX \, basics, such as spacing and markup structure are discussed. Common commands, environments, and declarations used when creating an article are introduced including lists, hyperlinks, and footnotes.

1 Some More Basics

1.1 Declarations

In the last module, we learned about a few declarations that use the setlength command. As promised, we will discuss additional declarations in this module. For some formatting commands, such as bold or italic, there is a command version and a declaration version. We will not need another command to set these declarations. The declaration will appear as a command. For example, the declaration for bold is \textbf{series}. A declaration will be true until another declaration of the same type is given or it is grouped within curly brackets (i.e. \{it \, This is italic\}). Often declarations are used in an environment, so it will be true in the environment only. There are cases that a declaration cannot be local only because some declarations are always global.

In the last module, we used declarations using the setlength command (i.e. \setlength{\parskip}{0.1in}) and made the length an absolute value. In various modules, we will use measurements or parameters, such as \baselineskip and 0.5\textwidth. In addition, you can use “rubber lengths” where the lengths will be $\pm$ particular values. For more information, use (Kopka & Daly, 2004; Mittelbach et al., 2004).

1.2 More about Spacing

In the last module, we discussed spacing basics. Another thing to keep in mind is that we have to be careful regarding horizontal space when using a command has no arguments. Remember, the first non-character ends the command. \LaTeX \, considers a space a non-character. To this end, the space is not translated as a space after the command; however, it is considered a space when it treats multiple spaces in your .tex document as one space. Therefore, adding an additional space will not work. Often \{} or \ is added at the end of the command in order to recognize the space after the command as a space. The command \textbackslash \, typesets the \, character. If there is punctuation after the backslash, you don’t need to do anything. If you need a space after it, you would use \textbackslash \{} or \textbackslash \. The end of a line can be forced by using a “hard return,” \, which is often used in environments.

Many more declarations and commands can be found in (Kopka & Daly, 2004; Mittelbach et al., 2004). Bold and italic are used in Table 1.

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Table 1: Example Syntax for Command and Declaration used for Formatting

<table>
<thead>
<tr>
<th>Format</th>
<th>Command</th>
<th>Declaration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bold</strong></td>
<td>\textbf{()}</td>
<td>\textbf{()series}</td>
</tr>
<tr>
<td><em>Italicics</em></td>
<td>\textit{()}</td>
<td>\textit{()}</td>
</tr>
<tr>
<td><em>Emphasis</em></td>
<td>\textemph{()}</td>
<td>\textemph{()}</td>
</tr>
</tbody>
</table>

Italics usually italic unless redefined in class file, package or document.

### 2 Lists

There are several list environments in \LaTeX. \textit{Itemize} and \textit{enumerate} will be discussed in this section.

#### 2.1 Itemize

\textit{Itemize} produces a bulleted type list and can be nested up to four times. Nesting occurs when another \textit{itemize} environment is placed in an existing \textit{itemize} environment.

The syntax for \textit{itemize} is

\begin{verbatim}
\begin{itemize}
  \item Item 1
  \item Item 2
  ...
\end{itemize}
\end{verbatim}

The default label values are shown in this example.

- Module 1
  - What is \LaTeX
  - Getting the Software
    - Error using Command Line Entry
    - Examples of \TeX Editors
      - \TeX studio
      - LeD

The labels or “bullets” can be changed by changing the value of \texttt{\labelitem\texttt{(level)}}. The \texttt{level} represents the level of nesting: i, ii, iii, or iv. Try the following:

\begin{verbatim}
\renewcommand\labelitemi{+}
\renewcommand\labelitemii{\diamond}
\renewcommand\labelitemiii{\rightarrow}
\renewcommand\labelitemiv{\triangleright}
\end{verbatim}

and you will change the list to

- Module 1
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\texttt{Renewcommand} changes the bullets for every itemized list for the remainder of the document.
Let's say this should be the bullets for some lists and not others. An environment could be created for this task. Basically, the syntax is \texttt{\newenvironment\{name\}\{occurs before the environment\}\{occurs after the environment\}}. Using the previous list as an example, the environment declaration would appear as follows.

\begin{verbatim}
\newenvironment{mylist}{\renewcommand{\labelitemi}{+}}{
\renewcommand{\labelitemii}{$\diamondsuit$}}
\begin{itemize}
\end{itemize}
\end{verbatim}

To use the environment, use \texttt{mylist} instead of \texttt{itemize}; otherwise, all else remains the same.

2.2 Enumerate

\textit{Enumerate} produces an ordered (numbered) list with a possibility of four levels of nesting. You can nest \textit{itemized} environments in \textit{enumerate} environments and vice versa. You can still only use four levels of nesting total. The syntax is the same as \textit{itemize} except \textit{enumerate} is used. The default values are in this example.

1. Take Pre-Quiz
   (a) Read Module Materials
      i. Do Homework
         A. Take Post-Quiz

The labels can be changed in a similar fashion as \textit{itemize}, but there is an extra consideration with \textit{enumerate} due to the counter. The label for \textit{enumerate} is \texttt{\labelenumi\{level\}} and the counter is \texttt{enum\{level\}}. Try the following:

\begin{verbatim}
\renewcommand{\labelenumi}{\Roman{enumi}.}
\renewcommand{\labelenumii}{\Alph{enumii}.}
\renewcommand{\labelenumiii}{\arabic{enumiii}.}
\renewcommand{\labelenumiv}{\alph{enumiv}.}
\end{verbatim}

Notice the commands \texttt{Roman}, \texttt{Alph}, \texttt{arabic}, and \texttt{alph}. These commands inform \LaTeX of the format of the label. When the command begins with a capital letter, the label will appear in caps. Remember, \LaTeX is case sensitive. The new labels appear in this example.

1. Take Pre-Quiz
   A. Read Module Materials
      1. Do Homework
         a. Take Post-Quiz

The counters can have a format that depends on previous exiting levels as well. Try the following:

\begin{verbatim}
\renewcommand{\labelenumii}{\labelenumi\arabic{enumii}.}
\end{verbatim}

\texttt{Labelenumi} was already in the appropriate format; thus, it was not changed. The new labels appear in this example.

1. Module 2 To Do List
   1.1. Take Pre-Quiz
   1.2. Read Module Materials
   1.3. Do Homework
   1.4. Take Post-Quiz
The numbering can be based on more than enumerate levels. For example, you could use section numbering (\thesecion).

There are packages available for list formatting. The paralist package offers new environments that adjusts spacing and position. The enumitem package enables easier label setting. The following commands could be used to change the values globally in the preamble or the same commands can be used as options to apply to formatting to a particular list.

Globally

\setenumerate[1]{label=\Roman*.}
\setenumerate[2]{label=\Alph*.}
\setitemize[1]{label=\bullet}
\setitemize[2]{label=\circ}

Locally

\begin{enumerate}[label=\Roman*.]
\end{enumerate}

I. Level 1 is capital roman numerals
  
  A. Level 2 is capital letters
     
     • Level 3 is a bullet
     
     ◦ Level 4 is a small circle

3 Hyperlinks

There are two packages that are often used to format and provide URLs: url and hyperref. The url package will allow correct word wrap of the URL when using PDFLaTeX, but does not provide a hyperlink. The package hyperref automatically provides hyperlinks for internal cross-references, external URLs, and citations. It is suggested that hyperref is the last package that is declared, but that will not always be feasible. It might require some trial and error to determine if it can appear last. There are many options available with hyperref that are set using a key-value type of scenario (key=value). For a complete list of options, see (Kopka & Daly, 2004). The options can be declared with the package statement or using the the \hypersetup command.

By default, cross-references have a box with different border colors to indicate a hyperlink. Often, it is desired to have hyperlinks appear as text of a particular color. For example, \hypersetup{colorlinks=true, linkcolor=blue, urlcolor=blue, citecolor=blue} will set all the links to blue. The option colorlinks disables the box or frame around the hyperlink and applies the color to the text. If the font appears different than the rest of the text, it might be necessary to set the URL font using \urlstyle{same}.

To display the URL, the url command is sufficient (url\{URL\}). The href command can be used to link text to a URL (href\{URL\}\{text\}). Internal links can be created by using \label\{label name\} and called within the document using \ref\{label name\} or \pageref\{label name\}. This document uses the label command for every section, go to section 1, 2, 3, or 4. Go to subsections 1.1, 1.2, 2.1, or 2.2.

4 Footnotes

Footnotes are produced by using the footnote command. By default, a superscript number will be generated and the footnote will appear in the footer of the page that the footnote is declared. Footnotes can only be generated in normal paragraph mode, but there are several commands that can be used to make footnotes more flexible.

Symbols can be used instead of numbers. The footnote command has a label and a counter associated with it like enumerate. The renewcommand command can be used to change the footnote marks to symbols, \renewcommand\{\textfootnote\} \{\textsymbol\{footnote\}\}. The sequence of symbols is as follows:

* † ‡ § ¶*I ** †† ‡‡ §‡ ¶‡

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When using symbols, the counter cannot generate more than 9. For footnote 10 and above, the optional argument must be used (i.e. `\footnote[1]{text}`). Footnotes can be placed in normally forbidden modes by using `\footnotemark[n]`, where $n$ is the footnote number. In this example, I place a symbol footnote in a box, then change the footnote format back to numbers. The syntax is:

```latex
\renewcommand{\thefootnote}{fnsymbol{footnote}}
\footnotemark[2]{This requires a footnote\footnotemark[2] and so does this\footnotemark[3]}\footnotetext[2]{Here is the first footnote in the box.}\footnotetext[3]{Here is the second footnote in the box.}\renewcommand{\thefootnote}{arabic{footnote}}
```

and the output is:

This requires a footnote† and so does this‡

After returning the footnote markers to numbers, here is another footnote.¹

Notice that the footnotes in the box did not affect the footnote counter. If `\footnotemark` was used without the option, then the counter would have incremented. In addition, using the options ensures that the correct footnote is associated with the footnote mark. The last module the `\footnotemark` and `\footnotetext` commands were used because the author command is not considered “normal text” either.

References


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¹Here is the first footnote in the box.
²Here is the second footnote in the box.
³First footnote after resuming the previous footnote notation.