Abstract

This module will discuss how to create your first document. You will become more proficient with the software during the process. This module will provide an overview of document classes and packages to enable you to use them. In addition, it will introduce document structure and front matter. It will discuss some formatting basics too.

1 Some Basics

Before we construct our first document, let's talk about some basics. In addition to the content of \LaTeX{} articles, markup commands are entered to achieve the desired typesetting. These markup commands will be referred to as commands, environments, and declarations. All commands, environments, and declarations are case sensitive.

1.1 Markup Commands

Commands begin with a backslash character (\). The remainder of the command consists of characters, where the first space or non-character ends the command. An example of a markup command is \texttt{\texttt{maketitle}}. Not all phrases that begin with a backslash are commands. A backslash is also used when printing special characters, such as \%. If the backslash was not used, the remainder of the line would be treated as a comment by \LaTeX{} because a comment line begin with %. Sometimes there are special instances of a command, which is indicated by \texttt{\texttt{command*}}. An author can create their own commands as well.

An environment will be marked by the following, \texttt{\texttt{\begin{environment} ... \end{environment}}}, and will only affect the text contained therein. An example of an environment that will be discussed in this module is \texttt{\texttt{document}}. In addition, users can create their own environments. Sometimes there are special instances of an environment too (i.e. \texttt{\texttt{\begin{environment name*}}}).

We will discuss declarations more in the next module. We will discuss declarations pertaining to margins and line spacing in this module. These declarations use the \texttt{setlength} command (i.e. \texttt{\texttt{\setlength{\parindent}{0.1in}}}). They will be placed in the preamble, so they are true for the entire document.

1.2 Paragraphs and Spaces

Paragraphs are separated by a blank line. A sequence of several spaces is treated as one space. Additional horizontal and vertical space can be added by using \texttt{\texttt{hspace(distance)}} and \texttt{\texttt{vspace(distance)}}. Spacing for paragraph indents are controlled by \texttt{\parindent}. More information about spacing will be discussed in the next module.
2 Create a Document

Generally, the first markup command in a LaTeX document indicates the document class. This command, as well as other particular commands, are specified before the beginning of the document, `\begin{document}`. The space before the beginning of the document is called the “preamble” (Mittelbach, Goossens, Braams, Carlisle, & Rowley, 2004). Packages are declared in the preamble as well.¹

2.1 Document Classes

There are five base classes included with LaTeX: `article`, `book`, `report`, `slides`, and `letter`. Publisher provided classes will be discussed in a later module. They contain unique commands and environments that are supplied by the class. The markup command designating the document class is

\begin{verbatim}
documentclass[options]{class name}
\end{verbatim}

Class files contain global processing information for the document (Kopka & Daly, 2004). They set the format of the title, sections, and other elements in the document. There are usually packages that you can use or you can write code in order to override some of the formatting. Mittelbach et al. (2004) contains much information about advanced LaTeX formatting.

We will use `article.cls` throughout this workshop. There are several optional arguments that you can use with `article.cls`. If you do not specify any, it will use the defaults: `10pt`, `letterpaper`, `onecolumn`, `oneside`, `notitlepage`, and `final`.

Since `article.cls` comes standard with LaTeX, you can find out what options are available from nearly any LaTeX documentation and the meaning of most options are intuitive. I will only discuss a few of them here. Regarding font size, you have a choice between `10pt`, `11pt`, and `12pt`. The options `oneside` versus `twoside` is not as obvious as the others. It sounds like it would print double sided by just using it; however, it formats the document with the intention of printing two sided.

Using the `twoside` or `oneside` option is particularly important when you are using running headings. The page number will print alternating from right to left on the pages. You can use the `markboth` command to place text on the opposite side of the page number. The `markboth` command only works as intended when `twoside` is used. For `oneside`, you would need to use the `markright` command.

2.2 Packages

Packages extend the basic LaTeX commands. There are standard packages that are included with every LaTeX implementation and there are “contributed packages” submitted by LaTeX users (Kopka & Daly, 2004). To use packages, include the following markup command

\begin{verbatim}
usepackage[options]{package name}
\end{verbatim}

The options declared in the document class are global, so any option set in the document class file will apply to all packages. Options used with the packages apply to the packages only (Kopka & Daly, 2004). When generating a LaTeX document, the error “unknown control sequence” often indicates that a package is needed.

2.3 Article Class with LaTeX- article.cls

The basic structure of a LaTeX- article.cls is given below.

¹Document Classes and Packages must be installed to use them. For more information on locating and installing packages, please go to Workshop 1, Finding and Installing LaTeX.
\documentclass[twoside]{article}
\usepackage{graphicx}
\usepackage{hyperref}

\title{Using Document Classes and Packages}
\author{T.~Stitz \ and \ J.~Doe \ and \ A.~Smith}

... more preamble commands

\begin{document}
\maketitle

\section{First Level}
\subsection{Second Level}
\subsubsection{Third Level}

\section{Another First Level}
...

\end{document}

Title, author, and date can be placed in the preamble or the \textit{document} environment. It is a matter of style. The \texttt{maketitle} command must be in the \textit{document} environment. In the example above, \texttt{twoside} was declared explicitly, so the document will be typeset with the intention of printing the document two sided. In addition to the structure provided in the example, an article might contain an abstract, a reference section and an appendix within the \textit{document} environment.

### 2.3.1 Formatting Parameters and Markup Commands

Many of the markup commands used to format the document are set by a class file. If the user is satisfied with the default formatting, no parameters would need set. Some of the parameters that might need set when using \texttt{article.cls} are introduced in this section. This is by no means an exhaustive list, but it will give the reader an idea of some of the settings.

Several parameters control page layout. A page consists of a head, foot, and body. Any of the parameters can be set using \texttt{\setlength\{parameter\}\{value and units\}}. Often, they are set in the preamble so they apply to the entire document.

<table>
<thead>
<tr>
<th>Page Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>\topmargin</td>
</tr>
<tr>
<td>\headheight</td>
</tr>
<tr>
<td>\headsep</td>
</tr>
<tr>
<td>\parskip</td>
</tr>
<tr>
<td>\oddsidemargin</td>
</tr>
<tr>
<td>\evensidemargin</td>
</tr>
<tr>
<td>\footskip</td>
</tr>
<tr>
<td>\textheight</td>
</tr>
<tr>
<td>\textwidth</td>
</tr>
</tbody>
</table>

Use of the \texttt{geometry} package alleviates some of the burden of setting all of these variables.

\usepackage[options]{geometry}
\geometry{textwidth=6.5in, textheight=9in} or \texttt{geometry\{margin=1in\}}

There are also paragraph formatting commands, such as spaces between paragraphs; amount of indentation; and line spacing. The \texttt{\setlength} command can be used for the first two parameters, but the \texttt{renewcommand} must be used for line spacing.

\%Make the space between paragraphs one half line space
3 Entering Front Matter

I think of front matter as typeset text at the beginning of the document that is not part of the body of the document, such as title, author, and sometimes date. Usually the affiliation information is included in some form or another. For some publisher class files the abstract is part of the front matter too, but for article.cls it is not.

3.1 Entering Titles

Entering a title is very straightforward and does not change much from class file to class file.

```
\title{The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using AFM with adhesion mapping}
```

As stated previously, you can put this command in the preamble or the document. Your choice.

3.2 Entering Authors

There are several ways that you can enter authors.

3.2.1 Basic Structure

```
\author{Rebecca~L.~Agapov \thanks{The University of Akron, Department of Polymer Science, Akron, OH 44325 – 3909, United States} \ and \%
James~Robbins \thanks{OMNOVA Solutions, 2990 Gilchrist Road, Akron, OH 44305 – 4418, United States} \ and \%
Richard~Thomas \footnotemark[2] \ and \%
Dave~L.~Hardman \footnotemark[2] \ and \%
Mark~D.~Foster \footnotemark[1] \$^{*}$ \thanks{Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E-mail address: mdf1@uakron.edu (M.D. Foster).} \%}
```

The tilde does not allow a line break, so it forces the first name, last name, and middle initial to stay together. The thanks command is a footnote associated with the author. The thanks could be used in the title command if you needed a footnote there as well. Whatever you type in the curly bracket will appear in the footnotes exactly as you typed it. The title and author will appear as long as you use the \texttt{maketitle} command. The footnotemark command will be discussed in the next module, but it is used here because the footnote applies to more than one author.

3.2.2 Output from Basic Structure

The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using
AFM with adhesion mapping

Rebecca L. Agapov∗, James Robbins†, Richard Thomas†
Dave L. Hardman†, Mark D. Foster∗, †

I put the affiliations in the footnotes for this example:

The authors could appear on the same line by not using the and command and including a line break (\).

3.2.3 Code for Authors Displayed on Same Line

\author{Rebecca~L.~Agapov and Mark~D.~Foster\thanks{Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E-mail address: mdf1@uakron.edu (M.D. Foster).}}
The University of Akron\ Department of Polymer Science\ Akron, OH 44325–3909, United States\vspace{1.5em}\
James~Robbins, Richard~Thomas, and Dave~L.~Hardman\thanks{OMNOVA Solutions, 2990 Gilchrist Road, Akron, OH 44305–4418, United States}

3.2.4 Output for Authors Displayed on Same Line

The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using AFM with adhesion mapping

Rebecca L. Agapov∗, James Robbins†, Richard Thomas†
Dave L. Hardman†, and Mark D. Foster∗, †

Sometimes, you want the affiliations with the authors instead of in the footnotes as in this example.

3.2.5 Code for Affiliations in the Front Matter

\author{Rebecca~L.~Agapov and Mark~D.~Foster\thanks{Corresponding author. Tel.: +1 330 972 5323; fax: +1 330 972 5290. E-mail address: mdf1@uakron.edu (M.D. Foster).}}
The University of Akron\ Department of Polymer Science\ Akron, OH 44325–3909\ United States\vspace{1.5em}\
James~Robbins, Richard~Thomas, and Dave~L.~Hardman\thanks{OMNOVA Solutions\ 2990 Gilchrist Road\ Akron, OH 44305–4418\ United States}
3.2.6 Output for Affiliations in the Front Matter

The effect of fluorosurfactant, copolymer latex, and cross-linker on the surface properties of floor polishes: An investigation using AFM with adhesion mapping

Rebecca L. Agapov and Mark D. Foster‡
The University of Akron
Department of Polymer Science
Akron, OH 44325-3909
United States

James Robbins, Richard Thomas, and Dave L. Hardman
OMNOVA Solutions
2990 Gilchrist Road
Akron, OH 44305-4418
United States

There are many other looks that you can achieve. When we discuss publisher class files in a future module, we will utilize commands that come with the class file to achieve the look for their publication.

4 Entering the Abstract

The abstract is usually entered in the same manner regardless of class file.

\maketitle
\begin{abstract}
The performances of three fluorosurfactants of different perfluoroalkyl chain lengths in styrene–butadiene (SB) and styrene–acrylic (SA) latex formulations having different virtual cross–linkers were investigated with atomic force microscopy (AFM). Topographic mapping provided no conclusive relationship with macroscopic observations of floor polish performance (with “performance” being judged by absence of haze and uniformity of flow and leveling.) Adhesion mapping ...
\end{abstract}

Abstract from (Agapov, Robbins, Thomas, Hardman, & Foster, 2013).

5 Conclusion

To create a document, you must choose a document class file. It will provide formatting, so you can mostly concentrate on your content. Packages enable you to add information to your document easier, since you can use the commands that they provide instead of entering much more code to achieve the same effect. Sometimes a package can provide functionality that would not be otherwise available.
References

