Writing Corporate Articles using LaTeX

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Executive Summary

This document is a guide to writing corporate documents using the LaTeX document preparation system.

This document also serves as a template. It is intended for people with some familiarity with LaTeX.

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1 What is LaTeX?

LaTeX is a mark-up language that describes how a document should be prepared.

Three things are needed to make a LaTeX document:

1. A source document, usually with extension *.tex*
2. Some packages and classes that help turn what's in the source document into something helpful
3. A compiler, also referred to as a working LaTeX installation. This could be local or web-based, for example at overleaf.com.

At first glance the source document looks like a programming language, and that's because it is: LaTeX is not WYSIWYG, like many of the document preparation tools in common use today. A good analogy to LaTeX is html code, which can be read in any text editor but is rendered by web browsers into a finished product.

1.1 Printed Resources

Several excellent LaTeX references exist and may be found useful by some users. Examples include those by Knuth (1984) and Lamport (1986).

1.2 Online Resources

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2 Using LaTeX to Make Corporate Documents

A LaTeX style file called *corporate.sty* has been written to implement common formatting in LaTeX `article` and `book` documents.

2.1 Corporate style files

Style files control the formatting and presentation of LaTeXdocuments. These are available as *packages* for different journals, institutions, and other applications.

A style file has been written to format documents created with the latex `article`, `scrartcl`, and `book` classes. The usual options can still be used with the document classes, including *twocolumn, letterpaper*, and so-on.

Options can be passed to the corporate style in the preamble:

```
\usepackage[option 1 = true, ..., option n=
    string]{corporate}
```

Options include:

blackLinks = true make all links the same color as the rest of the body text.

compactLayout = true reduce white space around headings and lists.

draft = true add a 'draft' watermark to all pages.

logo = true show the corporate logo in headers (defaults to true).

logoPath = ... use a specific file for the logo (defaults to *logo.png*).

coverLogoPath = ... use a specific file for the logo on the front cover of reports (defaults to *logo_-big.png*).

The *corporate* package calls other packages listed in Table 1. These packages often call other packages, so this is not an exhaustive list.

It should be noted that the 'english' option to Babel really means American English.

2.2 Starting new documents

Its probably easiest to use this document as a template for a new document. You should also make sure that you have the most recent version of the style file.

You can find the most up-to-date version of this template and the style file at https://github.com/AndyClifton/CorporateLatex.

2.3 Creating content

2.3.1 Front, main, and back matter

The convention in this style is to have Roman numerals in the front matter, and then Arabic numerals in the main matter of the document (after the tables of contents, figures and tables). Tables and figures in the front matter are also numbered differently (Table A, B, C, ...) than in the main matter (Table 1, 2, 3, ...).

This change in page and float numbering is implemented using the *frontmatter, mainmatter*, and *backmatter* commands at the start of these sections of the document:

```
\begin{document}
\maketitle
\frontmatter
...
\tableofcontents
\clearpage
```

Table 1. Packages loaded by the corporate style.

Package	Functionality
amsfonts, amssymb	supplies AMS fonts, which are useful for mathematics
babel	activates language-appropriate hyphenation rules
booktabs	improves the formatting of tables
caption	required to generate captions for floats
courier	changes fonts
fontenc	enables direct typing of international characters
geometry	sets page size and margins
graphicx	graphics handling, including *.eps* figures
hyphenat	improves spacing and breaking of hyphenated words
listings	enables the inclusion of high-quality computer code listings
mathptmx	changes fonts
nag	checks that packages are up to date and looks for bad habits in LaTeX code
opensans	sets Google's *Open Sans* as the default font
parskip	required for better spacing
pdfcomment	required for tool-tips. Also calls the `hyperref` package.
setspace	required for better spacing
subcaption	provides the `subfigure` environment to produce sub figures
tocloft	improved table of contents and list of figures/tables in memoir documents
tocbibind	Adds bibliography, index, and contents entries to the Table of Contents in memoir documents
todonotes	inline and margin to-do notes
xcolor	Driver-independent color extensions for LaTeX and pdfLaTeX

```
\listoffigures
\listoftables
\mainmatter
...
\backmatter
\end{document}
```

Page numbering in the front matter (i.e. the Abstract, Summary, and Foreword chapters or sections) starts at page 3 to allow for cover pages.

If you don't use the *frontmatter* command, you

may need to increment the page counter manually. To increment the counter n pages, use `\setcounter{page}{n}` after `\begin{document}`.

2.3.2 Cross references

Use labels and references to refer back and forth to figures, equations, tables and sections.

For example, an equation can be added using the following text:

```
\begin{equation}
y = mx+c
\label{eqn:line}
\end{equation}
```

This gives the following:

$$y = mx + c \tag{1}$$

And using the text `Eqn. \ref{eqn:line}` provides a cross reference to Eqn. 1.

2.3.3 Floats

Floats are images, tables or other pieces of the document that are free to move to the best place in the document for them. The two most common floats are the tabular environment (for tables) and the figure environment for figures.

Use the `tabular` environment to produce basic tables. Table 2 is produced using this code:

```
\begin{table}[!h]
\centering
\caption{An example table.}\label{tab:widgets
    }
\begin{tabular}{lr}
Item & Quantity \\
\hline
Widgets & 42 \\
Gadgets & 13
\end{tabular}
\end{table}
```

Table 2. An example table.

Item	Quantity
Widgets	42
Gadgets	13

If all of the delimiters (&) are included in each row, the table will be complete and will produce a better PDF.

To include a figure in a document, use the `figure` environment and the `includegraphics` command.

```
\begin{figure}
\includegraphics[width=\textwidth]{figure's-
    file-name}
\caption{Caption goes here.}\label{fig:
    figuresLabel}
\end{figure}
```

Subfigures are implemented using the `subcaption` package. The example below generates Figure 1.

```
\begin{figure*}
        \centering
        \begin{subfigure}[t]{.45\linewidth}
                \centering
                \includegraphics[height=2in
    ]{../common_files/21206.jpg}
                \caption{Wind turbines at the
     Forward Wind Energy Center in Fond du
    Lac and Dodge Counties, Wisconsin. (Photo
     by Ruth Baranowski / NREL)}\label{fig
    :21206}
        \end{subfigure}%
        \hfill
        \begin{subfigure}[t]{.45\linewidth}
                \centering
                \includegraphics[height=2in
    ]{../common_files/20018.jpg}
                \caption{Aerial view of the
    National Wind Technology Center. (Photo
    by Dennis Schroeder / NREL)}\label{fig
    :20018}
        \end{subfigure}
        \caption{Images}\label{fig:NRELimages
    }
\end{figure*}
```

Note that the `subfig` and `subfigure` packages are deprecated. The `subcaption` package appears to be the most frequently maintained package at this time, and contains the same functionality as the `subfig` and `subfigure` packages.

2.3.4 Including computer code

The `listings` package has been loaded. Note: this does not work if the 'draft' document option is used.

To insert code with syntax highlighting, you can use the `lstlisting` environment, for example

`\begin{lstlisting} ...\end{lstlisting}`.

You can change the language that is used to control the syntax highlighting using `\lstset{language=[dialect]language}`. This document uses...

```
\lstset{language=[LaTeX]Tex,columns=
    fullflexible,keepspaces=true,breaklines=
    true}
```

(a) Wind turbines at the Forward Wind Energy Center in Fond du Lac and Dodge Counties, Wisconsin. (Photo by Ruth Baranowski / NREL)

(b) Aerial view of the National Wind Technology Center. (Photo by Dennis Schroeder / NREL)

Figure 1. Images

... because most of the code is LaTeX. This can be changed for each block of code but should be changed back afterwards. For example, the next block of code is written in C.

```
/* Hello world in C* */

#include <stdio.h>

main()
{
    printf("Hello␣World!\n");
}
```

For more details see the `lstlisting` documentation or the wikibook.

2.3.5 Citations

Use `bibtex` to organize references and store them in a single file (e.g. `/Documents/bibliography/bibliography.bib`). The bibliography will then contain entries with 'keys' for each source, like `Lamport_1986_a`.

Authors can then insert citations to this key throughout their document, using different styles of citation. Citations are generated using the `biblatex` package, which also formats references in the correct style. Ways to generate citations are described in the `biblatex` documentation, and include:

- `\cite{Lamport_1986_a}` prints Lamport 1986.
- `\citep{Lamport_1986_a}` prints (Lamport 1986).
- `\citet{Lamport_1986_a}` prints Lamport (1986).

To cite URLs, use the 'misc' style. For example, the bibtex entry for http://tex.stackexchange.com (Anon. 2014) looks like this:

```
@misc{texstackexchange,
        Author = {Anon.},
        Howpublished = {Accessed July 21,
    2014: \url{http://tex.stackexchange.com
    }},
        Title = {\TeX -- LaTeX Stack Exchange
    },
        Year = {2014}}
```

This format will allow you to include the date on which a URL was accessed.

The citations should work with journal articles (Clifton et al. 2013), books (Knuth 1984; Lamport 1986; Turibain 1982), technical reports (Other and Nother 2014), and URLs (Anon. 2014). Any unknown publication types will be formatted using the 'misc' type.

2.3.6 Bibliographies

This style uses "Chicago A" style-references produced using Biblatex. The style can be changed by modifying the style file.

To include a bibliography in the document give the bibliography file location in the preamble and insert the bibliography at the appropriate location:

```
% give the bibliography file location
\bibliography{files/bibliography.bib}
...
\begin{document}
...
% insert the bibliography into the document
\cleardoublepage
\label{sec:Bib}
\printbibliography
...
```

```
\end{document}
```

An example bibliography is included in this document on page 6.

2.3.7 Footnotes

Footnotes can be inserted using the `\footnote{}` command[1]. Footnotes are numbered in the main matter[2], and use daggers, etc instead of numers in the appendices.

2.4 Creating a file structure

Your main file should be called *main.tex*. This helps editors and coauthors identify where to start. Then, use `input` to import other files into your main file at compilation.

For example, each of the chapters in this report is in separate files, called *WhatIsLatex* (Chapter 1), *LatexForDocs* (Chapter 2), and so-on. In the example available on Github, they are stored in the *files* directory. *main.tex* then looks like this:

```
...
\begin{document}
% content
\input{files/WhatIsLatex}
\input{files/LatexForDocs}
...
```

2.5 Best practice in writing a document in LaTeX

Create a structure before you get too far. Authors will find it easier to write documents and make changes if they separate the content of the document from the structure.

1. Each new LaTeX document should be placed in it's own directory.
2. Create a main LaTeX file that just contains the preamble, custom commands and uses `input` to call the content. See Section 2.4 for an example where each `chapter` is contained in its own file. In an article, each `section` could be contained in its own file.
3. Keep the number of packages used to a minimum. Not all packages can be used as they lack compatibility.

Focus on content, not appearance. Don't spend hours trying to adjust fonts, headers or spacing between lines.

1. Don't throw in lots of `clearpages` or other commands to push material around. LaTeX is designed to handle that.
2. Resist the temptation to add or subtract space, change lengths or do other things to modify the layout.
3. Write!

3 Preparing high-quality PDFs from LaTeX

Producing a high-quality PDF from LaTeX may require special steps such as tagging, alt-text, and embedding fonts for documents that will be used with electronic document readers.

3.1 PDF tagging

PDF tagging is a process whereby the components of the PDF document (headings, figures, tables, text) are marked so that a document reader can understand the document. This is useful when text to speech converters are being used. The process of tagging is also known as structuring, so that a tagged document might also be referred to as a structured document[3].

At this time tags cannot be added reliably within LaTeX. Instead, they should be added after the PDF is compiled using a PDF editor such as Adobe's Acrobat Pro.

3.2 PDF/A files

PDF/A documents may be required for some applications. These files can be created using the LaTeX PDFx package.

To do this, add `\usepackage[a-1b]{pdfx}` *before* `\usepackage[...]{corporate}`, and a file called `main.xmpdata` with the metadata to the directory where this file is.

For more details of how to do this, see the tutorial at https://www.mathstat.dal.ca/ selinger/pdfa/.

An example of the `main.xmpdata` file is included with the example article.

3.3 Alternative text

Alternative text, or 'Alt text', is a textual description of an equation, link or figure that can be used to replace the visual information in that element. This is often seen as a text 'pop-up' in PDF readers. For example, passing the pointer over the following equation should reveal a pop-up:

[1] like this
[2] and like this as well
[3] This is a test

$$a^2 + b^2 = c^2 \tag{2}$$

Alt text can be added after the PDF is compiled using a PDF editor such as Adobe's Acrobat Pro. Alternatively – and probably best for ensuring that the final document is what the author intended – it can be generated from within the source document using the `pdftooltip` environment from the `pdfcomment` package. The previous equation was generated using `\pdftooltip{a^2+b^2=c^2}{An equation}`.

The same approach can be used to create alt text for images. For example, Figure 2 has been labeled with a tool tip.

3.4 Embedded fonts

All fonts should be embedded in the the final PDF. Check the PDF for embedded fonts using a PDF viewer. For example, in Adobe Acrobat Reader, look at the 'fonts' tag of the document properties. If any fonts are not shown as being an *embedded subset*, try the conversion again.

Encapsulated postscript figures are particularly prone to having undefined fonts. Check by compiling the document in draft mode, and seeing if the fonts are still present in the output PDF. To fix this problem, change *.eps* files to *.png* files. To do this 'on the fly', use this in the document's preamble:

```
\usepackage{epstopdf}
\epstopdfDeclareGraphicsRule
 {.eps}{png}{.png}{convert eps:\SourceFile.\
    SourceExt png:\OutputFile}
\AppendGraphicsExtensions{.png}
```

4 Exporting LaTeX into other formats

LateX source files are usually converted into PDF files. But, they can be converted into other formats for easier editing or for publishing to the internet.

The best approach to exporting LaTeX documents is to use *Pandoc* to parse the .tex source and reformat it for other uses.

Pandoc is an open-source program that you have to install. Details can be found at https://pandoc.org/.

Pandoc is called from the command line / terminal of your computer:

```
pandoc -s ArticleMain.tex -o pandocDemo.docx
```

An example.docx file generated using pandoc 2.03 is included in this repository.

Acknowledgments

This document is based on the NREL LaTeX class files developed by the author and then forked for this project.

I wish to thank members of the TeX – LaTeX StackExchange site for useful suggestions concerning LaTeX and typography (Anon. 2014).

This report was typeset using the LaTeX typesetting system originally developed by Leslie Lamport, based on TeX created by Donald Knuth.

References

Anon. 2014. *TEX– LATEXStack Exchange*. Accessed July 21, 2014: http://tex.stackexchange.com.

Clifton, A., L. Kilcher, J.K. Lundquist, and P. Fleming. 2013. "Using machine learning to predict wind turbine power output." *Environmental Research Letters* 8 (2): 024009. doi:10.1088/1748-9326/8/2/024009.

Knuth, Donald E. 1984. *The TEXbook*. Addison-Wesley.

Lamport, Leslie. 1986. *LATEX: A Document Preparation System*. Addison-Wesley.

Other, A. N., and Y. A. Nother. 2014. *A technical report*. Tech. rep. A Very Important Laboratory.

Turibain. 1982. *The Chicago Manual of Style*. Thirteenth. 400–401. University of Chicago Press.

A How to Use Appendices

The style file also controls the appearance of the appendices.

A.1 How to switch to appendixes

To switch to appendices, use the *appendix* command:

```
\appendix
\input{files/AppendixA}
\input{files/AppendixB}
```

A.2 Changes to Figure, Table, and Footnote Numbering

The following table (Table A.1) should have a different caption numbering style than Table 2. The table number should start with the appendix label (in this case A,) be followed by a period, and then be numbered. Numbering should restart in each new appendix.

The following table should use the same letter as Table A.1, but the number should be incremented by one.

(a) Wind turbines at the Forward Wind Energy Center in Fond du Lac and Dodge Counties, Wisconsin. (Photo by Ruth Baranowski / NREL)

(b) Aerial view of the National Wind Technology Center. (Photo by Dennis Schroeder / NREL)

Figure 2. Images with Alt Text

Table A.1. An example table.

Item	Quantity
Widgets	42
Gadgets	13

Table A.2. An example table.

Item	Quantity
Widgets	42
Gadgets	13

Footnotes use symbols in place of numbers in the appendices*.

B Including Multiple Appendices

This chapter is included to demonstrate that the style file correctly formats a second appendix†.

B.1 Changes to numbering

The following table (Table B.1) caption should have a different numbering style than Table 2. Instead, the caption numbering style should be the same as Table A.1. Numbering in this chapter should start with B.

Table B.1. An example table.

Item	Quantity
Widgets	42
Gadgets	13

*this is a test
†this is also a test