A Simple LaTeXTemplate

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Here is a quick guide to a bunch of LaTeXcommands which I use frequently.

1 Equations

To get an inline equation, enclose your equation in $ symbols in the next paragraph.

The runtime of merge sort is $T(n) = \Theta(n \lg n)$, i.e, we have both $T(n) = O(n \lg n)$ and $T(n) = \Omega(n \lg n)$.

The following command creates a simple unnumbered equation:

$$\sum_{i=0}^{\infty} \frac{1}{\alpha^i} = \left(\frac{1}{1 - \frac{1}{\alpha}} \right), \text{ for } -1 < \frac{1}{\alpha} < 1.$$

A numbered equation:

$$\left(\sum_{i=1}^{n} X_{ik} \right)^2 = \left(\sum_{i=1}^{n} X_{ik} \right) \cdot \left(\sum_{j=1}^{n} X_{jk} \right) \tag{1}$$

Multiline equations are somewhat of a pain to get right. One way is to use the `\eqnarray` command:

$$\begin{aligned} \int_1^t \frac{1}{x^2}\, dx &= -\left(\frac{1}{x}\right)\Big|_1^t \\ &= 1 - \frac{1}{t} \end{aligned}$$

If you want to use braces, in equations, then one can use `\lbrace` and `\rbrace`. The `\left` and `\right` commands in front a delimeter will (usually) cause the delimeter to scale to the correct size for the stuff in between.

$$E[X_i] = \Pr\{X_i = 1\} \text{ if } X_i \text{ is an indicator random variable.}$$

The `amsmath` package has macros for theorems, proofs, multiline equations, etc. if you want to type more complicated things.

2 Numbered section

By default, I believe the first paragraph in a section is not indented. Changing from default requires additional effort.

The second paragraph is indented however. In general, LaTeXis easiest to use when you do not want to change from the default behavior.

There are several fonts that one can use: **Bold**
Italic
`Typewriter`
Roman Normal

23434289734983794872382394732897428937489237489
29384792387489273
2394872398472389

Unnumbered section

The enumerate or itemize sections are often useful constructs for organizing your thoughts.

The enumerate construct looks like the following:

1. The first item in your list.
2. Now, the second item in the list.
3. I can nest enumerate/itemize as well:
   (a) The first nested quantity.
   (b) The second nested quantity.

If you are unhappy with the default enumeration, you can change it (although it can get complicated to get exactly what you want). I can use the `renewcommand` feature to change the numbering system as follows.

```
\renewcommand{\theenumi}{\alph{enumi}) }
\renewcommand{\theenumii}{\Roman{enumii}}
```

Then, I get the following output:

a). First item
b). Second item
   (I) First nested
   (II) Second nested

The itemize construct appears as follows:

- Pick a node in the cycle to start. Label it with $00\ldots0$.
- Traverse through the cycle and label each node in the cycle ...

3 Compilation and Bibliography

To compile with bibliography:

```
1.  latex template.tex
2.  bibtex template
3.  latex template.tex
4.  latex template.tex
```

Figure 1: Figure caption. [h] tells LaTeXto place the figure here. Otherwise, the figure usually float up. The [h] doesn't always work though.

If I want to cite the second edition of CLRS, then just write [2].

4 Figures

To include a ps figure, I included the `graphicx` package, and then use the following code:

```
\begin{figure}[h]
\begin{center}
\includegraphics[scale=.6]{p1_2Fig.ps}
\caption{$B(k)$ and $1/\log{B(k)}$ for small values of $k$.}
\label{alphaPlot}
\end{center}
\end{figure}
```

This gives me Figure 2,

I believe the `.ps` extension is not needed for `includegraphics` command.

Suppose I just want a figure with a bunch of white space (so I can draw in the figure by hand). Figure 3 illustrates this.

5 Misc

To convert the `template.tex` file into a pdf,

```
latex template.tex
dvips -o template.ps template.dvi
ps2pdf template.ps
```

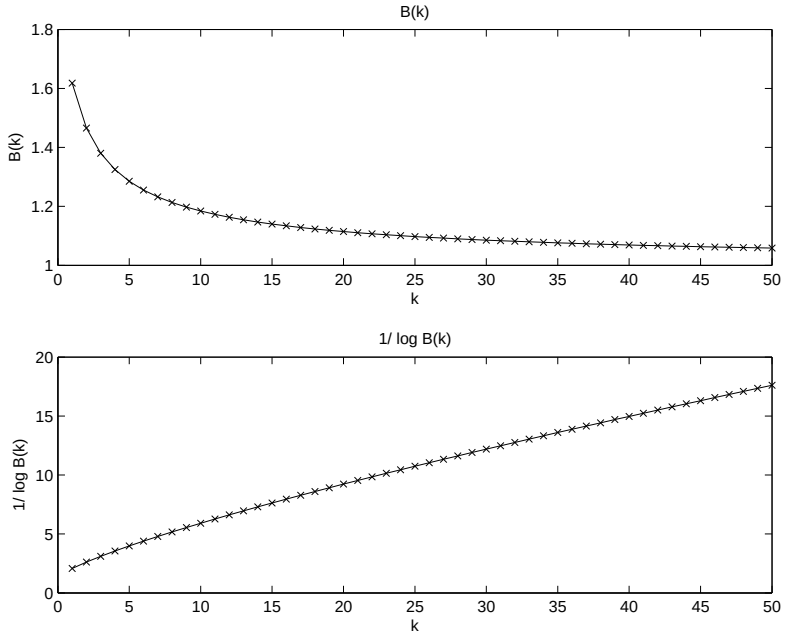

Figure 2: $B(k)$ and $1/\log B(k)$ for small values of k.

References

[1] Thomas H. Cormen, Charles E. Leiserson, and Ronald L. Rivest. *Introduction to Algorithms*. The MIT Press, Cambridge, MA, 1990.

[2] Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein. *Introduction to Algorithms*. The MIT Press and McGraw-Hill, second edition, 2001.

[3] M. Herlihy and J. E. B. Moss. Transactional memory: Architectural support for lock-free data structures. In *Proceedings of the Twentieth Annual International Symposium on Computer Architecture*, 1993.

TOP OF FIGURE

Figure 3: A figure with 3 inches of vertical white space.