TJN's Quick Example / Diatribe on LaTeX

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Abstract

If I had an abstract, it would be up here.

1 Introduction

This is where you'd begin typing stuff. I'm not going to put much here but will give a few examples as I have time. The key things that attracted me to LaTeX was the ability to do bibliography and citation stuff easily. I was looking for a standard format and some mechanism to "easily" create annotated-bibliographies. I used the web (add the URL to bib) and a book on LaTeX to get started [1]. I had to play with it and still do on a regular basis[1].

2 The good, the bad, the ugly...

I figure I should also mention some issues related to the "target audience" for LaTeX . I will expand this area but for now it's just here so I can also show **subsection** usage.

There are lots of folks who are 100% successful using MS-Word and the like to do all their documents. However, there are times when using something else, possibly LaTeX makes since too. I basically started using it for the reasons I mentioned above but also because I was trying to see if I could avoid the use of Microsoft(tm) products. I figured most of my stuff was simple text or sometime HTML. Typically I was creating README or source files and didn't need Word for any of that. Did I mention I almost entirely run Linux? Yep, so that meant I could try the ApplixWare, StarOffice type of stuff or even the VMware route but all either costed money or had some feature I didn't like. Oh, did I mention that I worked on a 100Mhz machine at home for most of my time at MTSU?

Anyway, ended up being ok except for when I had to interact with faculty, etc. Most of the world, like it or not, uses MS-Office and therefore your grade sheets needed to be maintained in Excel and docs typically get sent out in Word format. Anyway, that was when I found that if I had to deal with others I'd have to have some sort of access to those things but could possibly get by without it for my own stuff. Most recently I've come to like VMware for several reasons, which I won't bore you with now but suffice to say...it's cool.

Back to the topic at hand, LaTeX . I live in *vi* now-a-days[2]. So, similar to HTML, LaTeX is a markup style typesetting "language". I use the word language **very** loosely here because it's actually a set of very advanced macros but we won't argue of that for now. It allows you to type the text and insert keyword and symbols to make things look like you want. This is especially useful for those having to write scientific and specifically mathematical documents. I don't do a lot of math but when you do have to comment on the big-O notation or use Greek symbols they're ready for you and are as simple as `\phi` — ϕ. (Note, the `\phi` is what it took to generate the Greek symbol shown. If you look at the source the dollar signs are because it shift things to the math environment to show it ... or something like that?)

*Note, this is just where I work now. I do not speak on behalf of ORNL, these are strictly my opinions/views.

[1] I also ask lots of questions to various LaTeX savvy users like my old professor Dr. Untch at MTSU and other folks I've met on the OSCAR project.

[2] If you don't use *vi*, learn it! It's painful at first but if you do a lot of coding or hell if you use LaTeX you can use it for everything.

2.1 Pro

Here's a subsection where I'd talk about the good stuff I like or know about using LaTeX . This is where all the *ra-ra* goes and makes you want to run right out and start converting the masses to using this typesetting tool for all that is good and true! (*Ok maybe I exaggerate a bit.*)

Ok, so I'll try and be a bit more succinct now ... I've begun to ramble.[3] The good things are that LaTeX is widely used in technical journals and scientific/research domains. But MS-Word still finds it's way in because so many people have it and it's a WYSIWYG whereas most people don't use a GUI for LaTeX (as far as I know). There is a GUI package called LyX but I've never used it.

The other good thing that I really like about it is the citation/bibliography convention. This also applies to the referencing of Figures, sections, etc. All of these work on a label or identifying key. You use a specific notation to both cite or reference the target and don't have to worry about ordering. That is to say. If I cite a book and say it's [1]. Then I add another book to my bibliography and oops, now it's [1] and I've got to shift all the previous [1]'s down to [2]. You can image how this gets painful. It's similar for Figures and referring to sections of a paper. It doesn't matter if you add another Figure above your Fig1, it'll all work out! To me this was really nice. Also, there's a standard format for storing citations called BibTeX . I like it because I can put the references in a file or set of files and simple refer to them and not have to type in the information for each paper that needs them.

The formatting for a document following general style rules. I'm not going to go into detail on this other than to say if you want a specific file you simple include a different style (or class) sheet that tweaks the way things should look but your document really doesn't need to change all that much, if at all. The references can also be done in a somewhat similar fashion. You can change the flag for how to display citations from things like *plain* or *alpha* to get either [1] or [KD99] style respectively. Again nice if the teacher hates your way of doing things or if you don't know what the generally accepted means is ... you can quickly make the change and reproduce the document to suit.

Also, since the documents are text based, you can use versioning systems like CVS (Concurrent Versions System) to maintain the files. This is something I never even thought about with regard to documentation/papers and only considered CVS/RCS, etc for use with source code. Instead of having multiple files, mypaperv1.doc, mypaperv2.doc, laying around you simply have the mypaper.tex and the CVS repository hold all your "delta" (differences). So, you can actually roll back to a specific version if need be.

2.2 Con

Here's where I'd tell you all the stuff I didn't mention above in Section 2.1. (*NOTE: that was a reference and not hard-coded in the actual source document.*) Anyway, here' where all the evil will lurk.

Well, the down side to LaTeX , as I see it are that there's a significant learning curve. This being said, one can get up and running with rather basic documents without too much problem. The key areas where I tend to have issues are with figures and their placement and fancy typesetting. By typesetting I'm simply saying things like, I want this to be indented in odd ways and with strange spacing etc. An example of something that we basically had to punt on recently was trying to include a 'man page' output inside of our LaTeX based paper. They had originally written the paper in MS-Word and were able to tweak things in the WYSIWYG so that it looked ok. When I was in the process of converting this to a standard LaTeX document ... I had issues and eventually let someone else battle with it. This is just an example of where 90-95% of the paper was just fine but a small portion of it was a real pain and where much of the time was spent.

I have let this drag on but suffice to say, LaTeX isn't the ultimate answer but it's definately got it's place. I would suggest you take a look at it and in particular this example document to see how things were done. There are also a few web-based tutorials and several good books on the subject. (*I'll try to list a few I know about in the bibliography.*)

3 Conclusion

Well, that's probably more than you ever wanted to know about LaTeX but hey ... I'm long-winded! I'm also somewhat biased. So, to summarize:
Good:

1. Standard for scientific/research publications.

[3] I'm doing this while I wait for the new cluster I'm setting up to finish building. XTORC = 64 x (2Ghz P4, $\frac{3}{4}$Gb mem, fast & gigabit Ethernet).

2. Extensive tools for standard operations (e.g BibTex, etc.)
3. Content is text based, therefore you can use *vi, CVS*, etc.
4. Doesn't require Microsoft Windows!
5. Nice crossreferencing system (e.g. figures, sections, citations)
6. Excellent support of mathematical notations.
7. True typesetting abilities ... at somewhat steep learning curve.

Bad:

1. Rather steep learning curve.
2. Some trivial actions in standard WYSIWYG tools are rather painful.
3. You have to consider your peers. Will they be able to read PDF or Postscript files easily?

4 Extra Examples

A simple table & figure.

Fredkin gate

INPUT			**OUTPUT**		
A	B	C	A	B	C
0	0	0	0	0	0
0	1	0	0	1	0
1	0	0	1	0	0
1	1	0	1	1	0
0	0	1	0	0	1
0	1	1	1	0	1
1	0	1	0	1	1
1	1	1	1	1	1

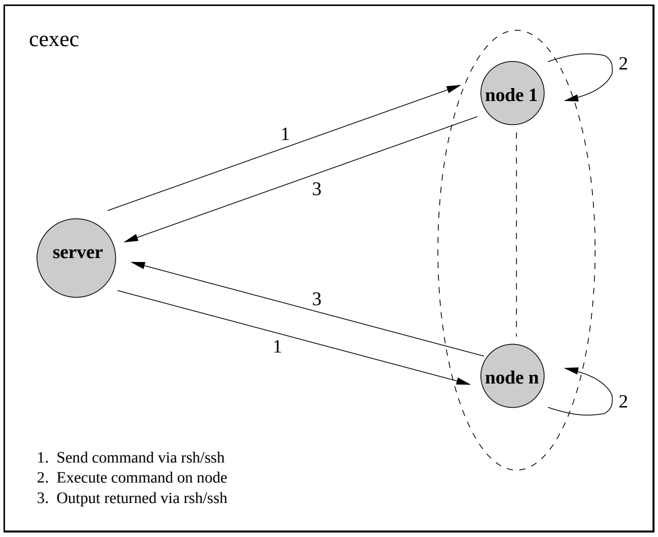

Figure 1: Example caption, this is a figure for the execution cycle of 'cexec'.

References

[1] Helmut Kopka and Patrick W. Daly. *A Guide to LaTeX: Document Preparation for Beginners and Advanced Uusers.* Addison-Wesley, third edition, 1999.

[2] Tobias Oetiker, Hubert Partl, Irene Hyna, and Elisabeth Schlegl. The not so short introduction to LaTeX2e, or LaTeX2e in 90 minutes. Version 3.13, February 23, 2000.

[3] Oren Patashnik. BibTeXing. Basic introduction to the BibTeX tool., February 8, 1988.

[4] Keith Reckdahl. Using imported graphics in LaTeX2e. Version 2.0, December 15, 1997.

[5] The TeTex Website. http://www.tug.org/tetex/. *Note, this is what typically ships with Linux, but in RPM form. Much documentation is available here, but also on Linux under file:/usr/share/texmf/doc/index.html (if tetex is installed).*