COMP516 Practical 6: Introduction to \mathbb{E}_{EX}^{1} 2012-11-08

Research papers is Computer Science are typically not written using a word processor like Microsoft Word or OpenOffice, but with a typesetting system called $\mathbb{ME}X$ (pronounced LAY-tech).

Word processors commonly have a graphical user interface, text appears as you type, what you see resembles more or less what a printout will look like (WYSIWYG), the quality of typesetting is mediocre, and text is saved in a proprietary binary format which is not future proof (see 'OpenDocument' for an attempt to change that).

In contrast, $\[MText]$ is more like a markup language (e.g. HTML). Text and formatting commands are entered and stored into plain text files using your favourite text editor. Output, in the form of DVI, PostScript or PDF files, is produced by processing those text files akin to compiling program files to produce executable code. The algorithms producing the output are quite sophisticated and the typesetting is of high quality. Like for program development, special editors exist (e.g. TeXnicCenter for Microsoft Windows or Kile for Linux) which ease the burden of this write-process-look cycle.

 \mathbb{M}_{EX} was originally developed by Leslie Lamport, and its first widely available version \mathbb{M}_{EX} 2.09 appeared in 1985. The current version of \mathbb{M}_{EX} , $\mathbb{M}_{EX} 2_{\varepsilon}$, was released in 1994. However, development of $\mathbb{M}_{EX} 2_{\varepsilon}$ macro packages is ongoing and there are new releases every few months. Both \mathbb{M}_{EX} and $\mathbb{M}_{EX} 2_{\varepsilon}$ are based on the typesetting system \mathbb{T}_{EX} , developed by Donald E. Knuth, from 1977 onwards. \mathbb{T}_{EX} is essentially stable since the release of version 3.0 in 1990. Since then only bug fixes have been added. The latest version is 3.141592 (version numbers converge to π) and was released in December 2002, i.e. since then no further bugs have been discovered.

This practical and several following practicals will introduce you to $\mathbb{E}T_{E}X$. Some of the tasks below might be performed quicker if you cut-and-paste from the PDF document.

1. Open the file

http://cgi.csc.liv.ac.uk/~dominik/teaching/comp516/misc/small.tex

using TexnicCenter Alpha (this should be the default option when downloading this file). The file will end up in H:\WinProfile\Downloads\ directory by default. By convention, files containing TEX or MTEX typesetting code end in '.tex'.

- 2. Alternatively save the file to the desktop and run TexnicCenter Alpha from the list of all available applications; make sure it has Alpha in the name, the other TeXnicCenter is an outdated software. Finally locate and open the small.tex file.
- 3. By default TeXnicCenter will generate DVI file out of the .tex source, which then can be transformed into a PS file and finally into a PDF file. To generate a PDF-file straightaway, select \mathbb{ME}X ⇒ PDF instead of \mathbb{ME}X ⇒ DVI from the list of options at the top.
- 4. Now, you can create a PDF file from the Large Source just by pressing Control-F7, and view the result by pressing F5.
- 5. To activate MS Word-like automatic spell checking, from Tools→Options→Spelling select Check spelling while typing.

¹ This document can be found at

http://cgi.csc.liv.ac.uk/~dominik/teaching/comp516/practicals/practical6.pdf

- 6. In fact to generate a PDF-flie without editing the source, it suffices to use a Terminal window. From the list of available applications select Terminal or just run the cmd command instead. Go to the directory containing the small.tex file and execute pdflatex small.tex to process the small.tex ETEX-file into a PDF. PDF-files can be viewed using Acrobat Reader, which should be the default application for opening these files.
- 8. MT_EX has its own rules for deciding the lengths of blank spaces. In particular, MT_EX will put an extra amount of space after a period '.' if it considers that the period marks the end of a sentence. It regards a period as the end of a sentence if it is preceded by a lowercase letter. If a period is preceded by an uppercase letter then MT_EX assumes that this a period that follows the initials of somebody's name.

This heuristic does not always make the right decision, e.g., in 'Mr. Smith' or in 'Proc. IJ-CAI', the period does not end a sentence but indicates an abbreviation. This can be corrected by putting a backslash '\' after the period, e.g., 'Mr.\ Smith' and 'Proc.\ IJCAI'.

To see the difference insert the following text before the line \end{document}.

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\begin{flushleft}
Mr. Smith (without backslash)\\
Mr.\ Smith (with backslash)\\
Proc. IJCAI (without backslash)\\
Proc.\ IJCAI (with backslash)
\end{flushleft}
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Save the change, build the PDF-file again and see how the (minute) difference in the amount of space after the period depending on the presence or absence of the '\'. You will probably have to increase the magnification in your previewer to be able to see it.

- 9. LaTeX also determines by itself how to break up a paragraph into lines, and will occasionally hyphenate long words where this is desirable. However it is sometimes necessary to tell LaTeX not to break at a particular blank space, e.g., there should never be linebreak between 'Example' and '7' in 'Example 7'. The special character used for this purpose is ~. It represents a blank space at which LaTeX is not allowed to break between lines, e.g., 'Example~7'. It is often desirable to use ~ in names where the forenames are represented by initials, e.g., 'U.~Hustadt'.
- 10. You can find a PDF-file of Greenberg's introduction to $\mathbb{M}_{E}X$ at

http://www.ctan.org/tex-archive/info/simplified-latex/simplified-intro.pdf

Download the file, read chapter 2, and experiment with fonts (described in sections 2.1 and 2.4), lists (described in section 2.2), and tables (described in section 2.3).

In the following practicals we will consider labels and references (chapter 4) and citing and bibliographies (chapter 3).

11. To use MTEX on your own computer you can download for free and install MikTeX from: http://miktex.org/download and TeXnicCenter from: http://www.texniccenter.org/resources/downloads/29