Compiling with LaTeX

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June 15, 2018

Existing compilers

Four main compilers:

1. latex,
2. pdflatex,
3. lualatex,
4. xelatex.

A very short history

To understand the reason why several compilers exist and how to choose one, a very short overview of the TEX/LATEX history is presented:

1. TEX (Donald Knuth), the original work, generating DVI files;
2. LATEX (Leslie Lamport), a layer above TEX which facilitates and standardises the use of TEX (packages, classes, and so on), still generating DVI files;
3. PDFTeX and PDFLaTeX (Hàn Thế Thành), which generate directly PDF files, allowing to embed several properties such as hyperlinks and metadata;
4. XeTeX and XeLaTeX, which improve/allow font use and characters management, required for other languages than English;
5. LuaTeX and LuaLaTeX, which are an attempt to extend the existing TEX with the Lua programming language.

TeX vs LaTeX

Pro-TeX:

- some people really like plain-TeX,
- from my experience there are no “good/valid” arguments to do so.

Pro-LaTeX:

- embed properties in the PDF files, which is important in a more and more digital world;
- the last version of LaTeX(i.e., LaTeX 2_ε) is very stable and allows the use of classes and packages which are very useful to automate complex writing generation, such as mathematics.

There is a third option which will not be discussed: ConTeXt. The philosophy of ConTeXt is to provide a full-access to typography and document’s layout to the user, while LaTeX’s mindset consists in automating it through internal rules to let the user focus on the writing.

Which compiler to choose

Comparison of the compilers' features

	Compilers			
Features	LaTeX	PDFLaTeX	LuaLaTeX	XeLaTeX
Output	dvi	pdf	pdf	pdf
Embed prop?	no	yes	yes	yes
Fonts	MetaFont	MetaFont	OpenType	OpenType
Images	eps	png/jpg/pdf	png/jpg/pdf	png/jpg/pdf
Compiling	short	short	long	long
Microtype	low	high	high	low

Which compiler to choose

Discussion built on my own experience

Every comment here below is my opinion, even though I provide some arguments:

- the LaTeX compiler should not be used as many documents are published in a *e*-format;
- between PDFLaTeX, XeLaTeX and LuaLaTeX, a discussion is possible because
  - PDFLaTeX is more stable and the compilation is performed faster;
  - XeLaTeX is intended for modern font management but has a lower integration of `microtype` (cf. tutorial B003);
  - LuaLaTeX is still under development but has been claimed as the successor of PDFLaTeX.

I used to compile with PDFLaTeX. Now, I tend to compile with LuaLaTeX. Whatever your choice is, try to not change it while writing a document because it could affect the packages in use.