An overview of TEX, its children and their friends ...

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Link for the impatient.

In the world of TEX, there are many developments and ambiguous names. This paper tries to give an overview of the development of TEX and related programs. Contributions are welcome![1]

1. Introduction

The base frame and main idea of this document was taken from the article A brief history of TEX, volume II by Arthur Reutenauer in the proceedings of EuroBachoTEX2007 and his talk there (see references). Additional information is taken from original documentations (see references on page 32) and some review articles. For old, historic information, the historic archive maintained by Ulrik Vieth and hosted on `ftp.tug.org` (see refs) was very useful. Many thanks for that great archive!

All information is up to the date of this generated pdf. Everything here is without guarantee – this is just to get an overview. Consult the references for further (and/or correct) information!

In the tree views (page 6), every node has a tooltip that shows up when you hover the mouse over it. If your pdf viewer does not support this, go to the end of the document, where every tooltip is written in normal text (page 17).

I tried to make the graphs more readable by using colors. All decisions reflect my personal opinion, not that of the community, of the authors or someone else.

normal That is, not very important in my opinion, no huge user group, but still maybe important for special needs. Was in use at least some time back, but is not of great impact nowadays.

important Engines or formats that had or have a great impact on (everyday) typesetting for a large community.

[1] The current source code of this document is availble at `http://github.com/alt/tex-overview`. Please feel free to patch there or mail me any suggestions and comments. I'll be happy to extend and correct this document!

experimental Developments that might still be under construction or were never used by a large community. Nevertheless, these might be very important to the development of other engines or for use of special typesetting.

package LaTeX-packages or single TeX-files (useable as packages or modules) that seemed worth mentioning. There won't be many of this; most very important packages won't be mentioned.

distribution Software bundles that bring TeX and friends to the normal user.

program Programs that are not directly connected to TeX (but interesting in the context of using TeX) or are separate helper programs.

Furthermore, there are two versions of some graphs: A short version mentioning only the most important things and a full one with everything I could find.

In most cases I did not mention the authors of the programs/packages. This is not to diminish their effort but only for clarity (long names make things harder to read). I did not write any of the below-mentioned programs or packages. The authors are given in the documents linked in the references.

2. How to contribute

I hope one day this document would become the standard reference for questions like "What program do I need for …?", "What's the difference between ...TeX and ...TeX?", "Why is it called …?" etc.

To get to this point, I need some help of people having read more documentation or even developed some of the programs mentioned here themselves. Special help is needed for:

- font technologies
- METAFONT and succesors
- BibTeX and successors/alternatives

It is up to you to contribute texts, references, links, descriptions, hints etc. I'll be happy about anything I can add here. Also, if you have suggestions about the layout, let me know.

3. Problems with pdf viewers

As this document makes heavy use of pdf-features, some pdf viewers are not able to show everything correct and as intended. My experiences with viewers are as follows:

evince Shows the document correct and complete. Tested using Linux.

Acrobat Reader will show all the information but might hide some text of very long tooltips (at least that's the case on my machine). Also, it draws annoying green boxes around the tooltips which do not belong there.

TeXworks The built-in pdf viewer of the TeXworks editor does not break lines of tooltips, therefore long annotations are not shown completely.

okular also does not break the lines.

xpdf shows only very short tooltips. Most of the information is not visible in the graphs.

About this document

This document was typeset in the TEX Gyre Pagella using the luaLATEX 2_ε format, luaTEX 0.63.0.

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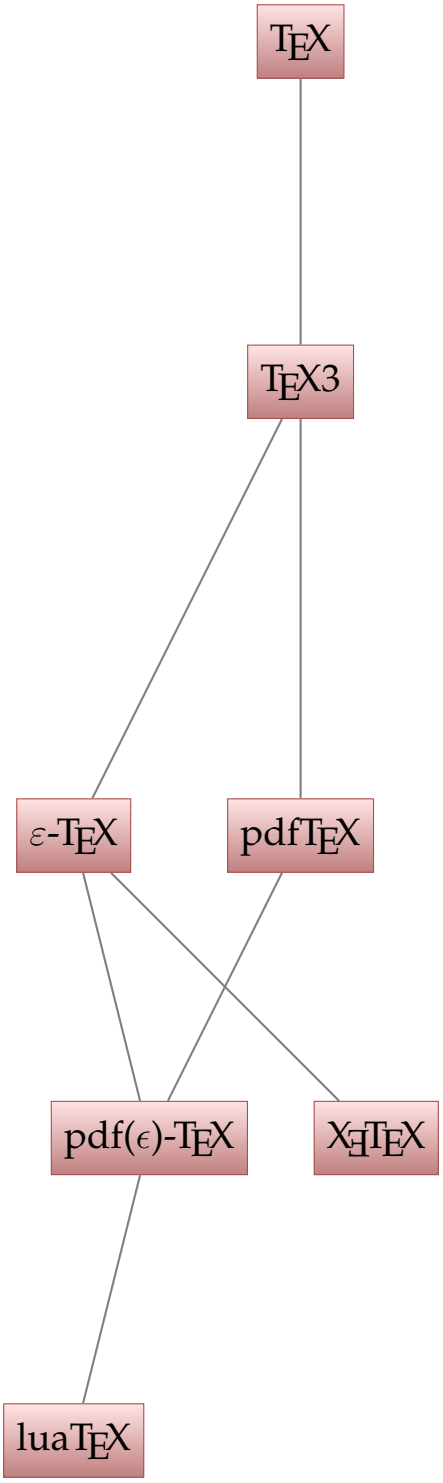
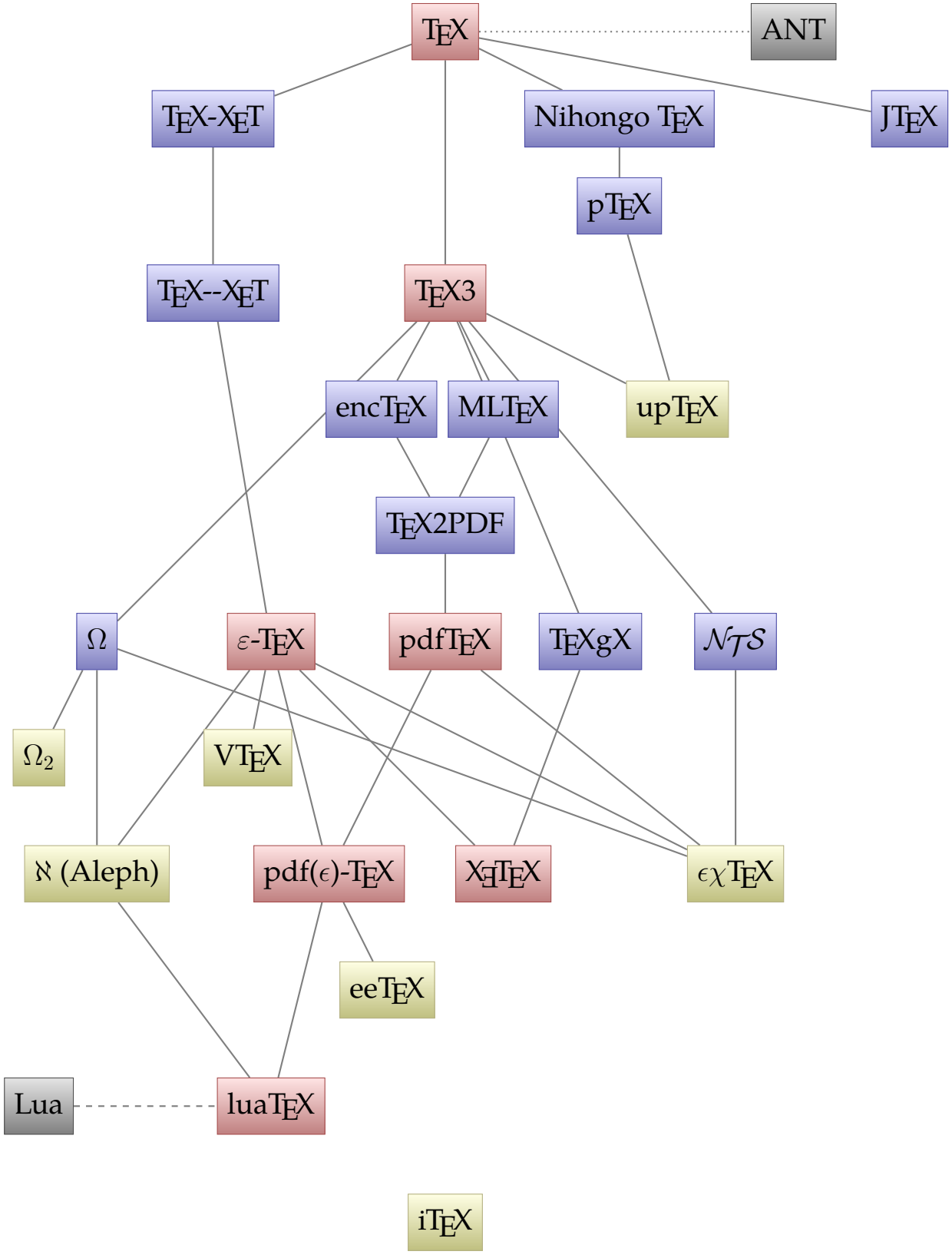
Part I.
Tree Views

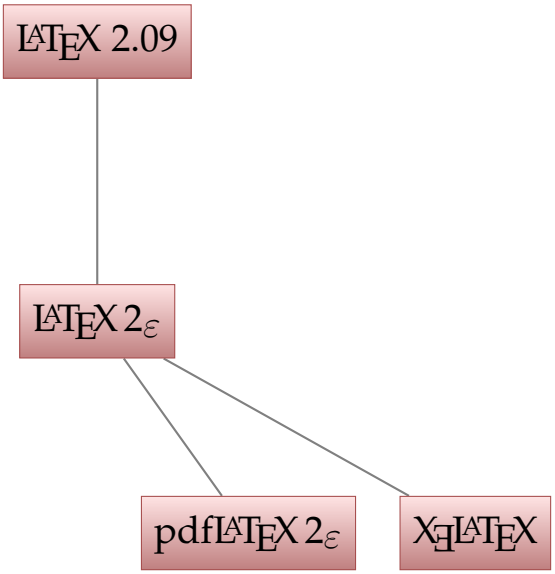
4. TEX – the program short view



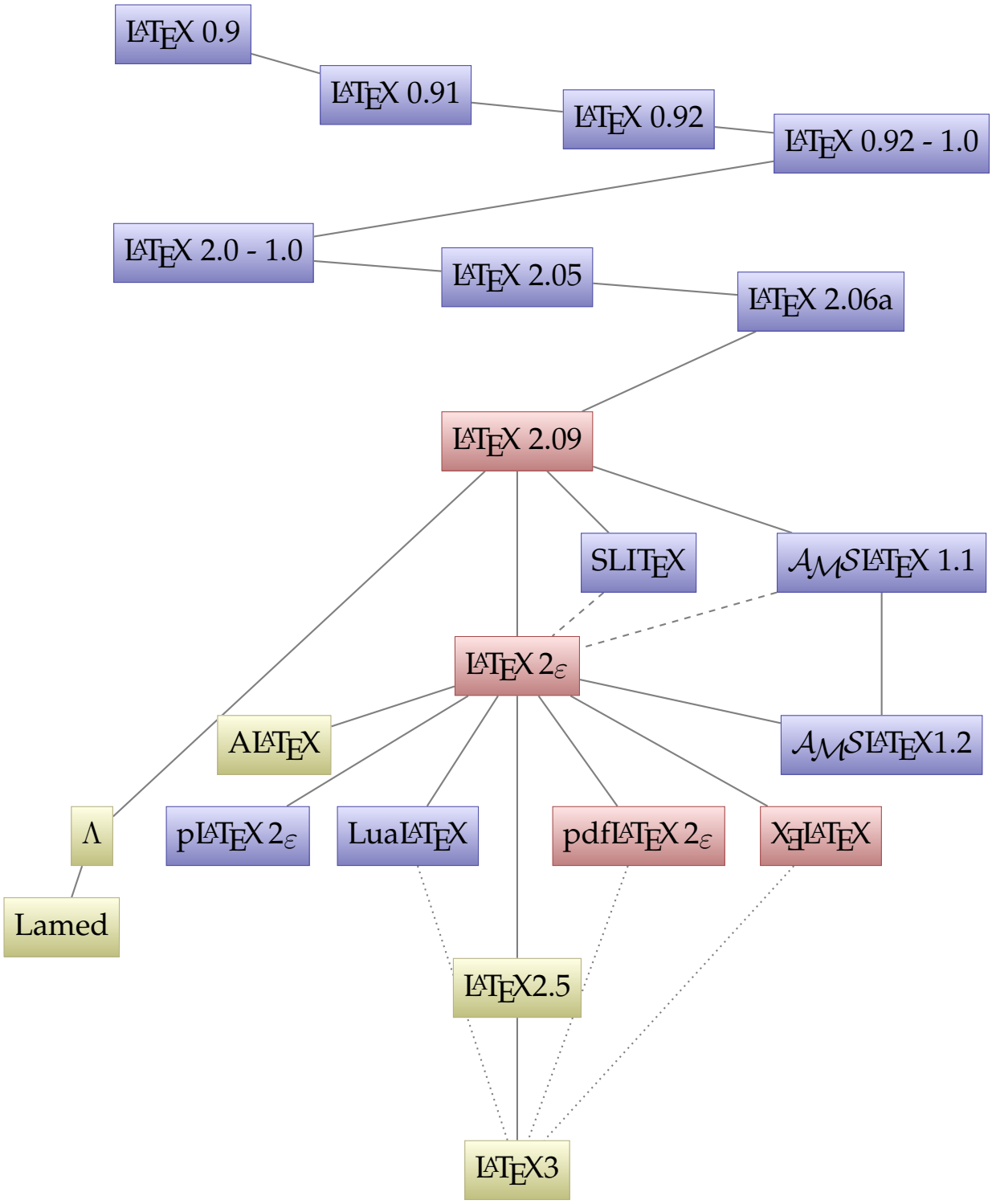
4. TEX – the program



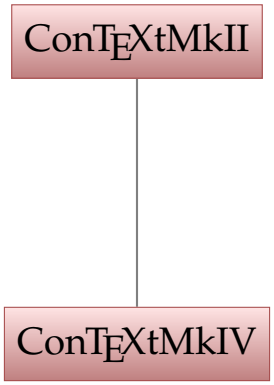
5. LaTeX – Lamport's TeX format short view



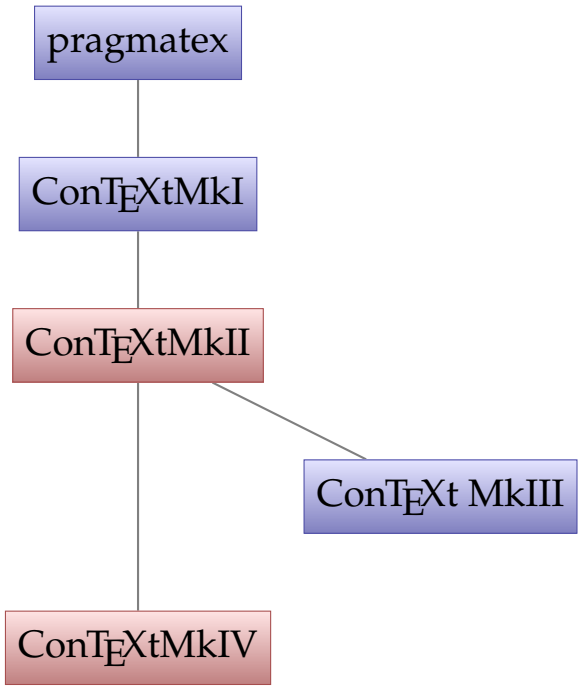
5. LaTeX – Lamport's TeX format



6. ConTEXt: con tex t – text with tex short view



6. ConTEXt: con tex t – text with tex



7. Other Formats

7.1. YTEX – a macro package developed at MIT

7.2. StarTEX, Starter's TEX – a format designed to help students with short documents

7.3. JadeTEX – a macro package for processing Jade/OpenJade output

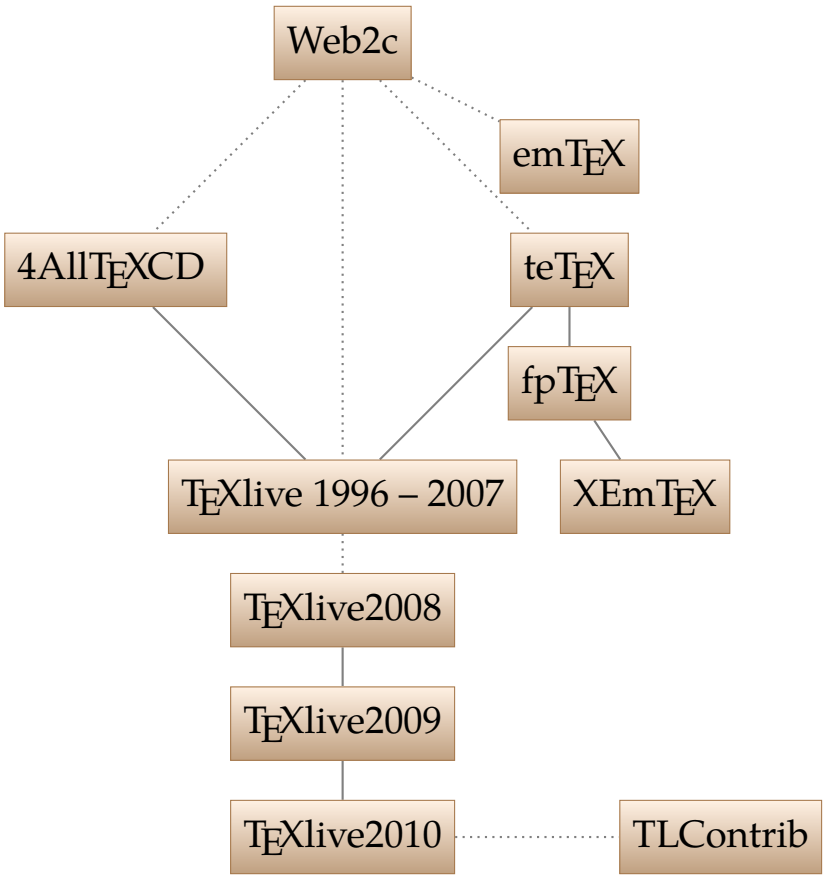
8. Pandora's Box

The following pages will be a hodge-podge of many things that are related to TEX and used in the process of generating documents in different file formats, i. e. conversion tools, bibliography tools etc. Feel free to contribute, I'll choose case-by-case if I'll add something or won't include it. Text editors or viewers will *not* be included!

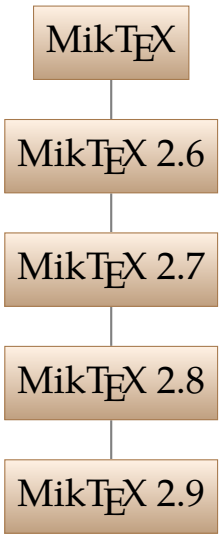
8.1. Distributions

This section will feature the main distributions of TEX and related programs. Of course, not every Linux Distribution's TEX package can be listed here, but only official upstream distributions.

8.1.1. TEXlive

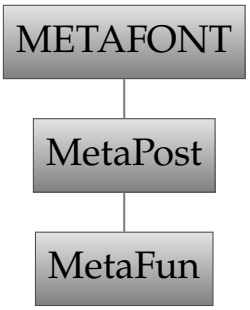


8.1.2. MikTEX

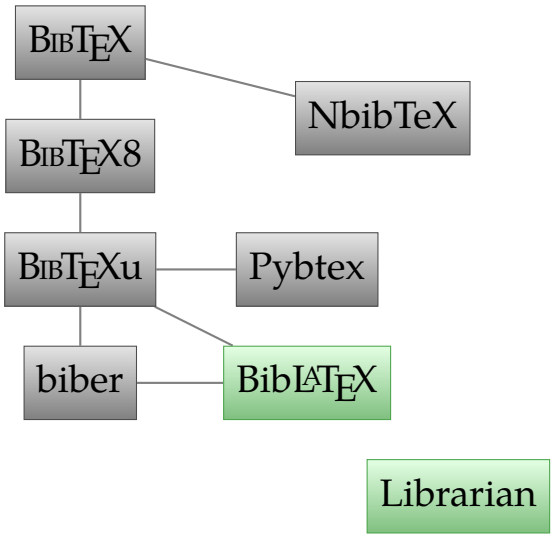


8.1.3. W32TEX

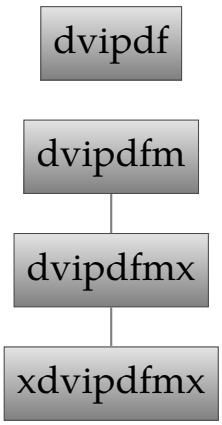
8.2. META*



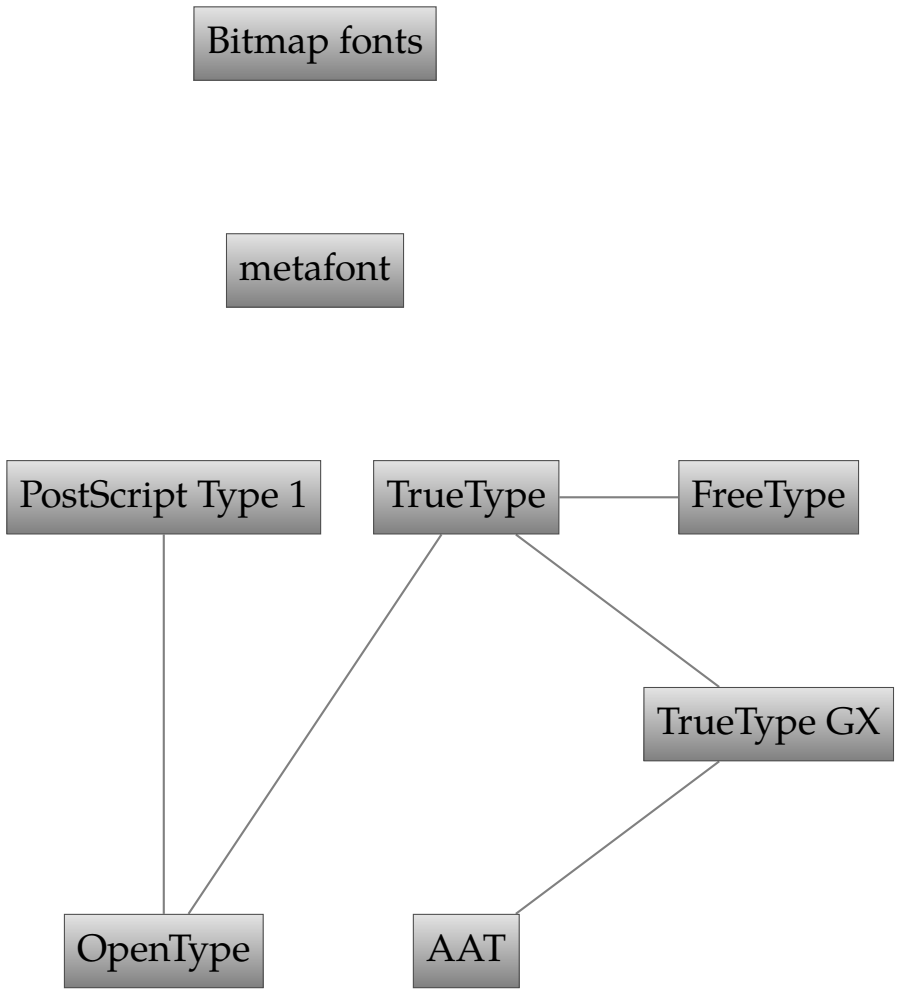
8.3. BibTEX



8.4. (x)dvipdf(m)(x)



8.5. Font Techonolgies



Part II.
Text Views

9. TEX – the program

TEX

Born in 1978 by Donald Erwin Knuth.

ANT

Ant is Not TeX. A typesetting system inspired by TeX. Only *inspired*, so it has nothing to do with TeX in terms of common code.

TEX-XET

The first extension to TeX, 1987. It was able to typeset in two directions, but only with a mark in the dvi to change the direction.

Nihongo TEX

A true multibyte extension of TeX. Could handle all Japanese characters in one font.

JTEX

An extension of TeX for typesetting Japanese. (1987, Yasuki Saito)

pTEX

Extension of Nihongo TeX to enable vertical typesetting. ("p" for "publishing") Distributed as WEB change files.

TEX--XET

TeX--XeT was able to really put the glyphs on the right place in the dvi.

TEX3

Ability to handle 8-bit input. 1989. TeX development was frozen in 1991 and only bugfixes were made. Now in version 3.1415926, it gets closer to pi with every bugfix. Don Knuth wishes the version number to be pi when he dies.

encTEX

A small extension to TeX, started 1997. Adds 10 new primitives relating input re-encoding

MLTEX

Extension to TeX (started 1990) that allows hyphenation of words with accented letters. (Therefore the name: MultiLingual TeX.) Distributed as a change file to the original WEB sources of TeX.

upTEX

Unicode-aware version of pTeX. ("unicode-publishing"-TeX) Also modernized from TeX3.

TEX2PDF

Early name for pdfTeX. Don't confuse with converters like dvi2pdf.

Ω

Support for 16bit-unicode-input. Still constrained on the output encoding. Started 1994.

ε-TEX

An extension to TeX, provided by the NTS team as an intermediate project until NTS would be ready. eTex is a full TeX and backward compatible. The number of TeX's registers is increased and various new primitives useful to programmers are added.

pdfTEX

A new engine to directly produce pdf-files from TeX, without the need of dvi-ps-pdf. This allows to use microtypographic extensions and many other features of the pdf format like page transitions etc.

TEXgX

GX stands for Graphic eXtension, a font technology available only on Mac OS. TeXGX was able to handle these fonts.

NTS

A project to completely reimplement TeX in Java. Now NTS is officially declared dead.

Ω_2

A short-time try to pick up the development of Omega again in 2006. Seemed more like a good plan and is now regarded as obsolete. LuaTeX is kind of a successor.

VTEX

VTeX (VisualTeX) can produce pdf, html, svg, dvi or ps output directly from input. In contrast to pdfTeX, it includes a full PostScript interpreter, thus capable to include EPS figures, PStricks etc. First official version I found: February 15, 1999: VTeX 6.3; last official version seems to be from Oct 1, 2005: VTeX 8.61. Commercial product.

ℵ (Aleph)

Originally named epsilon-Omega, an attempt to stabilize Omega while merging epsilon extensions. Authors: John Plaice and Yannis Haralambous, now maintained for severe bugfixes by Taco Hoekwater.

XETEX

This extension enables full multilingual support for left-to-right typesetting, right-to-left and almost any other possible direction. Unicode encoding is fully supported (utf8 as native encoding). XeTeX also features support for OpenType and AAT-fonts (via the operation system). In newest versions, character protrusion is possible.

$\epsilon\chi$TEX

Planned implementation of a high-quality typesetting system, written in Java. Based on experiences in NTS, eTeX, pdfTeX and Omega. Started in 2003, current version in repository is 0.0. (i. e. not very far ...)

pdf(ϵ)-TEX

Merging the pdfTeX engine with the eTeX-extensions. This engine can produce dvi (with or without the eTeX-extensions) as well as pdf (again, with or without extensions).

eeTeX

Experimental extension to pdfeTeX by Taco Hoekwater, created 2000. Distributed as change file. Now dead due to his development of luaTeX.

Lua

A script language; has nothing to do with TeX.

luaTeX

LuaTeX supports utf8, OpenType and many more things. TeXlive 2010 ships version 0.60.2. luaTeX features an embedded scripting language, lua, making it easy to extend, so most of the programming can be done in lua instead of TeX-hackery.

iTeX

iTeX is the official successor of TeX3, announced by Don Knuth at the TUG conference 2010.

10. LaTeX – Lamport's TeX format

LaTeX 0.9

First version still on web (historic archive, see refs) is 0.9, for use with TeX 0.95. No installation help found. Apparently one needs the files lplain.tex and latex.tex to create the format.

LaTeX 0.91

Version 0.91 for use with TeX 0.97 (C) 1983 by Leslie Lamport. Most changes to previous version are in the file lplain.tex.

LaTeX 0.92

First version with the @ as letter for internal names. Seeminlgy first version with a manual. For use with TeX Version 0.999999. (no joke, that's the version number given in the latex.tex file!) (C) 1983 by Leslie Lamport, conversion to 0.92 from 0.91 by Arthur Keller.

LaTeX 0.92 - 1.0

Adaption of 0.92 for TeX version 1.0. (C) 1983 by Leslie Lamport, conversion to 0.92 from 0.91 by Arthur Keller.

LaTeX 2.0 - 1.0

Seemingly heavy changes compared to 0.92. Version for TeX 1.0. Release of 11 Dec 1983. There were never public versiaons 1.x

LaTeX 2.05

No sure information found so far.

LaTeX 2.06a

Release of version 2.06a of the LaTeX macros. September 1984.

LaTeX 2.09

The first official version by Leslie Lamport, 1985.

SLiTeX

A variation of LaTeX2.09 to provide an easy way for producing presentations. In LaTeX2e absorbed as a documentclass (slides).

$\mathcal{A}\mathcal{M}\mathcal{S}$LaTeX 1.1

A port of Spivak's AMS-TeX to LaTeX 2.09, released 1990

LaTeX 2$_\varepsilon$

June 1994: New release of LaTeX to avoid incompatible dialects of LaTeX 2.09. Introduced by the LaTeX3-Team.

$\mathcal{A}\mathcal{M}\mathcal{S}$LaTeX1.2

A port of version 1.1 to LaTeX 2e by Downes and Jones.

ALaTeX

A slightly changed LaTeX format by Matt Swift to offer modularity at format level. Acts as normal LaTeX if not explicitly told to do different. "A" for "alternate", "abstract" or the indefinite article.

pdfLaTeX 2$_\varepsilon$

The standard LaTeX. If anyone talks about "LaTeX" it is nearly shure to be this package. pdfLaTeX2e produces pdf or dvi output.

XeLaTeX

Using the XeTeX engine. There are some special packages that provide easy access to the modern features of XeTeX.

LuaLaTeX

LaTeX based on LuaTeX with pdf (standard) or dvi (dviLuaLaTeX) output. LaTeX support for luaTeX is under heavy development to make this machine usable with the format. Work in progress, but already well useable!

pLaTeX 2ε

A LaTeX-bundle for the pTeX engine.

Λ

A LaTeX-package for the omega-engine.

Lamed

A LaTeX-package for the aleph-engine.

LaTeX2.5

Will Robertson suggested in an interview (see refs) an interim unstable version on the way to LaTeX3 with version number 2.5 that should bring package authors towards using LaTeX3 syntax. This version should be backwards incompatible to LaTeX2e. (This version does not exist in any official plannings, but I liked the idea, so it is mentioned here ;))

LaTeX3

The long-time successor of LaTeX2e. It is planned to implement a very elaborate low-level programming language. (Almost done by now.) The expl3-package provides an implemantation that can be used on top of LaTeX2e. Several LaTeX packages already make heavy use of expl3. (As does this document.)

11. ConTeXt: con tex t – text with tex

pragmatex

Former name of ConTeXt.

ConTEXtMkI

Original ConTeXt with Dutch low level interface.

ConTEXtMkII

ConTeXt with English low level interface. Works with any TeX-engine, like LaTeX: TeX, e-TeX, pdfTeX, Aleph, XeTeX, ...

ConTEXt MkIII

Reserved for future use for files supporting XeTeX. Was "skipped" for "practical reasons" (Hans Hagen)

ConTEXtMkIV

Specially designed for LuaTeX.

12. Other Formats

12.1. YTEX – a macro package developed at MIT

YTEX

No real documentation found.

12.2. StarTEX, Starter's TEX – a format designed to help students with short documents

StarTEX

A format using <command> instead of command

12.3. JadeTEX – a macro package for processing Jade/OpenJade output

JadeTEX

feed me!

13. Pandora's Box

13.1. Distributions

13.1.1. TEXlive

Web2c

An Implementation and Distribution of TeX which translates the original WEB sources to a C code.

emTEX

Eberhard Mattes TeX Distribution for MS-DOS and OS2.

teTEX

Maintained by Thomas Esser (hence the te in teTeX) from 1994 to May 2006.

4AllTEXCD

The (vague) past ... (?)

fpTEX

A free TeX distribution for Win32 based on teTeX, by Fabrice Popineau. Still active, provides up-to-date binaries for Windows. Special support for Japanese Typesetting.

XEmTEX

A TeX distribution for Windows, based on fpTeX with XEmacs,AucTeX as IDE for (La)TeX. XemTeX was sponsored by the French government.

TEXlive 1996 – 2007

First version 1996 (UNIX only, later also Windows binaries), and then a long story of ongoing work -- see the detailed documentation for a detailed history.

TEXlive2008

A new package manager and network installer are available. So installation via the net is possible as well as package updates. Missing packages are not installed on-the-fly. The last of the modern machines is added: luaTeX

TEXlive2009

Dropped Omega and Lambda. Aleph and Lamed are kept.

TEXlive2010

Up to now, latest release of TeXlive.

TLContrib

An extension of TeXlive that contains packages that TeXlive cannot hold because: not free, binary update, not on CTAN or intermediate release. Useable via the TeXlive manager.

13.1.2. MikTeX

MikTeX

MikTeX is a TeX distribution originally for Windows only. Copyright by Christian Schenk goes back to 2001

MikTeX 2.6

Windows only. featuring pdftex 1.40.4, mpost 1.000

MikTeX 2.7

Windows only. featuring xetex 0.999.6, pdftex 1.40.9, mpost 1.005

MikTeX 2.8

Windows only. featuring xetex 0.9995.1, pdftex 1.40.10, mpost 1.005

MikTeX 2.9

Windows only (stable version). Beta version for GNU/Linux available. featuring xetex 0.9997.4, pdftex 1.40.11, LuaTeX 0.60.2, mpost 1.211. Offers both LaTeX and ConTeXt (Mk IV) formats.

13.1.3. W32TeX

W32TeX

A distributon to provide binaries for windows, with special support for Japanese. First version (up to the changelog): 2009/08/02. Still highly up-to-date.

13.2. META*

METAFONT

The program for creating the fonts originally used by TeX.

MetaPost

A graphic generating program inspired by METAFONT. MetaPost can produce PostScript graphics as well as SVG.

MetaFun

"MetaFun is Hans Hagen's extension to (or module for) the MetaPost language."

13.3. BibTeX

BibTeX

A helper program to generate a bibliography list.

NbibTeX

"NbibTeX helps authors take better advantage of BibTeX data" says the homepage.

BibTeX8

The documentation says: "An 8-bit Implementation of BibTeX 0.99 with a Very Large Capacity"

BibTeXu

A unicode-aware version of BibTeX

Pybtex

A python implementation of BibTeX.

biber

A cooler version of unicode-aware BibTeX, designed for (?) use with BibLaTeX

BibLaTeX

A LaTeX package as frontend for biber.

Librarian

A TeX file (useable with all formats) that typesets BibTeX-style bibliographies without the need of BibTeX. Therefore, it provides a format-independent typesetting of bibliographies.

13.4. (x)dvipdf(m)(x)

dvipdf

Converts dvi files to pdf files.

dvipdfm

Converts dvi files to pdf files. Does not build on dvipdf, but is an independent implementation.

dvipdfmx

Extended version of dvipdfm. Support for multi-byte encodings and more pdfTeX features. Still active. Combined work of dvipdfm-jpn and dvipdfm-kor.

xdvipdfmx

Converts xdvi files produced by XeTeX to pdf files. Normally always executed after a XeTeX run, so the user won't notice that an xdvi document was created in between.

13.5. Font Techonolgies

Bitmap fonts

Bitmap fonts contain the shape of the letters as a number of dots. If you zoom in, a bitmap letter will show pixels.

metafont

Fonts based on the METAFONT program.

PostScript Type 1

Outline font. The shape of a letter is described as mathematical curves so the letter can be made arbitrarely large without getting pixeled.

TrueType

FreeType

TrueType implementation for Unix.

TrueType GX

Only available for Mac OS.

OpenType

Extension of TrueType font format, adding support for PostScript font data. Developed by Microsoft and Adobe.

AAT

Only available for Mac OS.

Part III.
Appendix

A. References

The references are in order of occurance in the above document. I. e. if you want information about LuaTEX, it will be below e. g. ϵTEX.

Books

D.E. Knuth, D. Bibby, and I. Makai. The TEXbook
Addison-Wesley Reading, MA, 1986.

F. Mittelbach, M. Goossens, J. Braams, D. Carlisle, C. Rowley, C. Detig, and J. Schrod. The LATEX companion.
Addison-Wesley, 2004.

Overview Articles

Arthur Reutenauer. A Brief History of TEX. Talk at EuroBachoTEX 2007.
http://www.gust.org.pl/bachotex/EuroBachoTeX2007/presentations/bhot.pdf/view

A Brief History of LATEX
http://www.xent.com/FoRK-archive/feb98/0307.html

Short Article About Omega And Aleph
http://www.tex.ac.uk/cgi-bin/texfaq2html?label=omegaleph

Interviews with Will Robertson, Hans Hagen et. al.
http://www.tug.org/interviews

Web Archives

CTAN – Comprehensive TeX Archive Network:
http://www.ctan.org

Historic Archive of TeX Distributions:
ftp://ftp.tug.org/historic

Engines (Web sources)

ANT project page
http://ant.berlios.de

Yasuki S AITO. Report on JTEX: A Japanese TEX. TUGboat 8 (1987), no. 2, 103 – 116.
http://www.tug.org/TUGboat/Articles/tb08-2/tb18saito.pdf

pTEXsources and documentation
http://dante.ctan.org/tex-archive/help/Catalogue/entries/ptex.html

MLTEX source (CH file)
http://www.tex.ac.uk/tex-archive/systems/generic/mltex/mltex.ch

encTEX page
http://www.olsak.net/enctex.html

$\mathcal{NTS}$ project page
http://nts.tug.org

VTEX – official homepage of micropress-inc
http://www.micropress-inc.com/

$\epsilon\chi$TEX project page
http://www.extex.org

eeTEX project page
http://tex.aanhet.net/eetex

LuaTEX project page
http://www.luatex.org

iTEX announcement by Don Knuth at the TUG 2010
http://river-valley.tv/tug-2010/an-earthshaking-announcement

Formats (Web sources)

ConTEXt wiki
http://wiki.contextgarden.net

LATEX project page
http://www.latex-project.org

LATEX3 project
http://www.latex-project.org/latex3.html

ALATEX: Discussion in TUGboat Vol. 16 (1995), No. 3, p. 269ff.
http://www.tug.org/TUGboat/Articles/tb16-3/tb48swif.pdf

YTEX on CTAN
http://tug.ctan.org/cgi-bin/ctanPackageInformation.py?id=ytex

JadeTEX project page
http://jadetex.sourceforge.net/

StarTEX on CTAN
http://www.ctan.org/tex-archive/macros/startex/

Distributions (Web sources)

fpTEX: Announcment at TUG 1999
http://www.tug.org/tug99/program/node39.html

TEXlive development history
http://tug.org/texlive/doc/texlive-en/texlive-en.html

TLContrib project page
http://tlcontrib.metatex.org/

MikTeX project page
http://miktex.org/

Win32 project page
http://w32tex.org/

Fonts (Web sources)

Type1 Fonts specifications
http://partners.adobe.com/public/developer/en/font/T1_SPEC.PDF

The FreeType project
http://freetype.org/index2.html

OpenType specifications
http://www.microsoft.com/typography/otspec/default.htm

Original Documentation – Everything Else

dvipdfmx project page
http://project.ktug.or.kr/dvipdfmx/

B. List of Contributors

I have to thank some people for helping me to improve this document. Of course I thank all the people provinding the above-mentioned references.

- Paul Isambert, for usefull discussions and testing
- Heiko Oberdiek, for solving a bug that broke the document with Acrobat Reader