LaTeX in Different Environments

Ghassan Arnouk Alec Bales D'Cruze Aaron English

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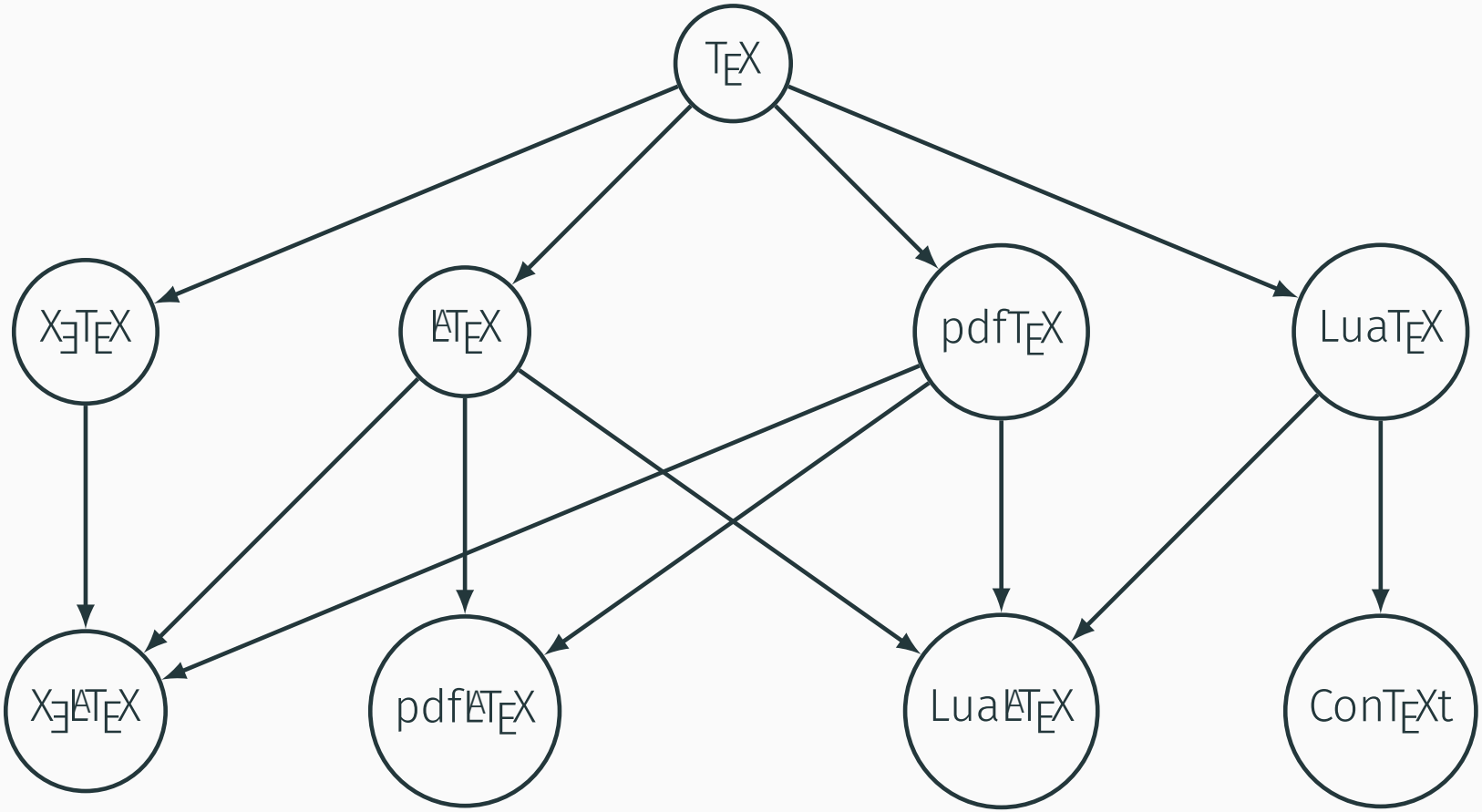
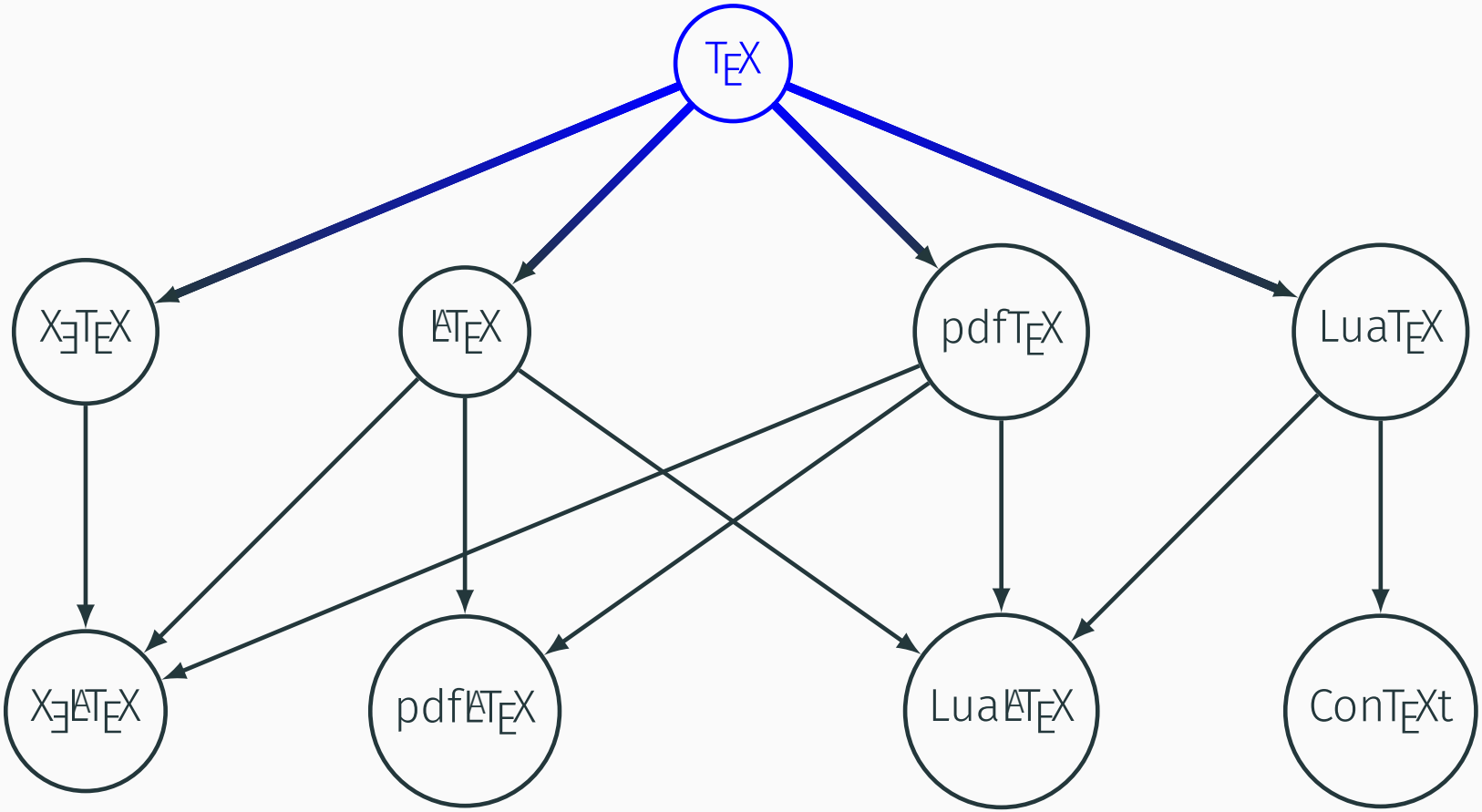
Contents

The TEX Family Tree

The Most Common Members



The Most Common Members



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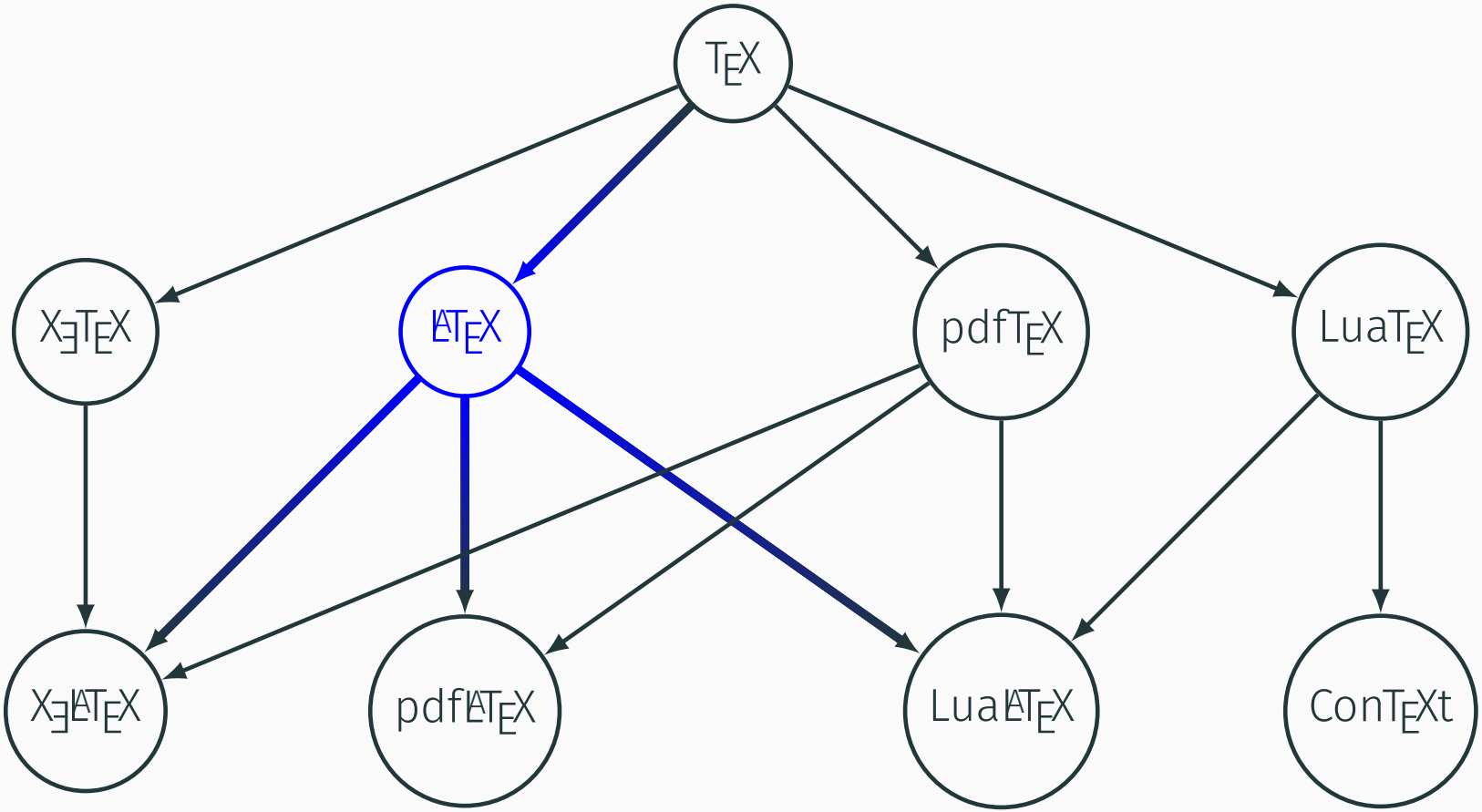

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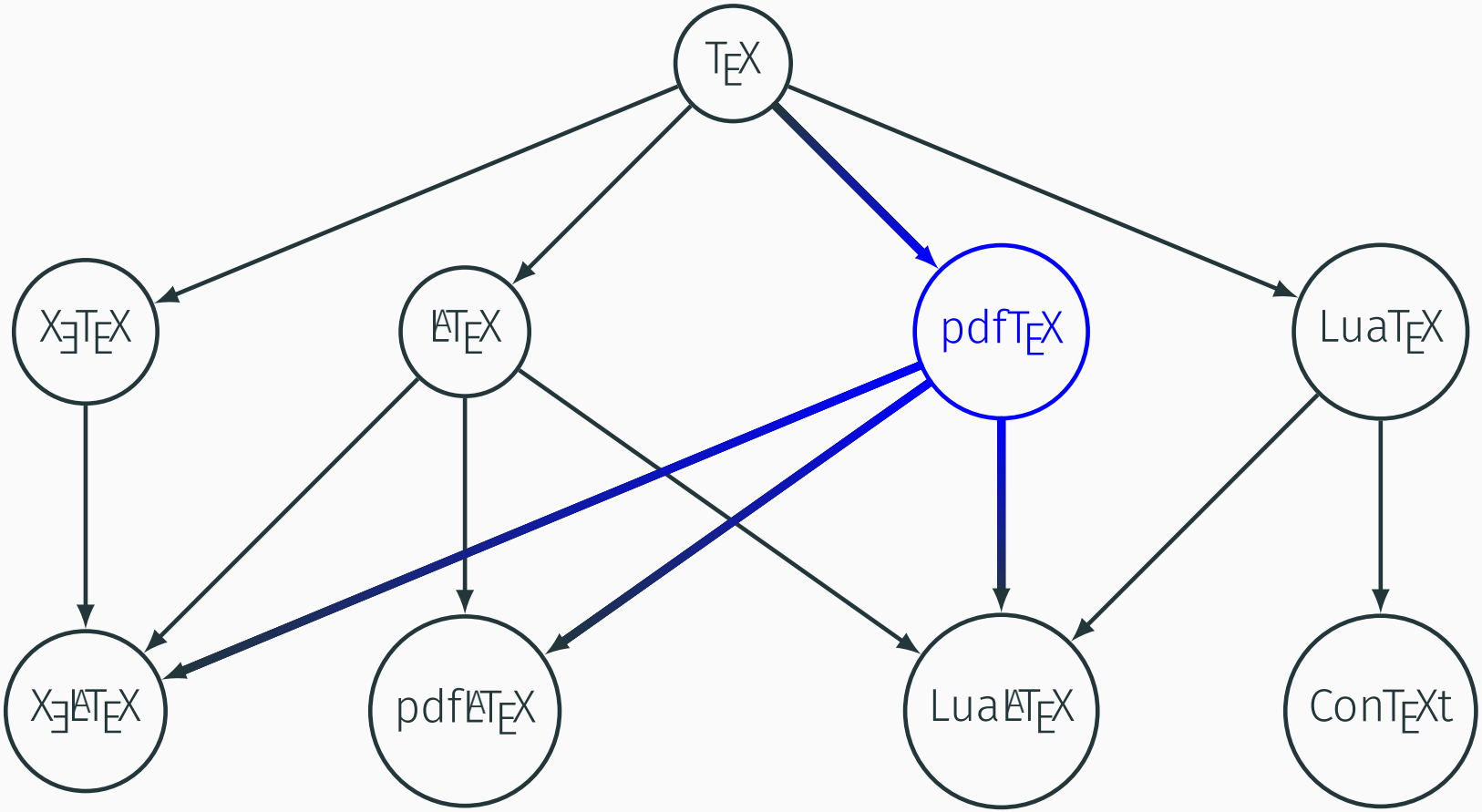

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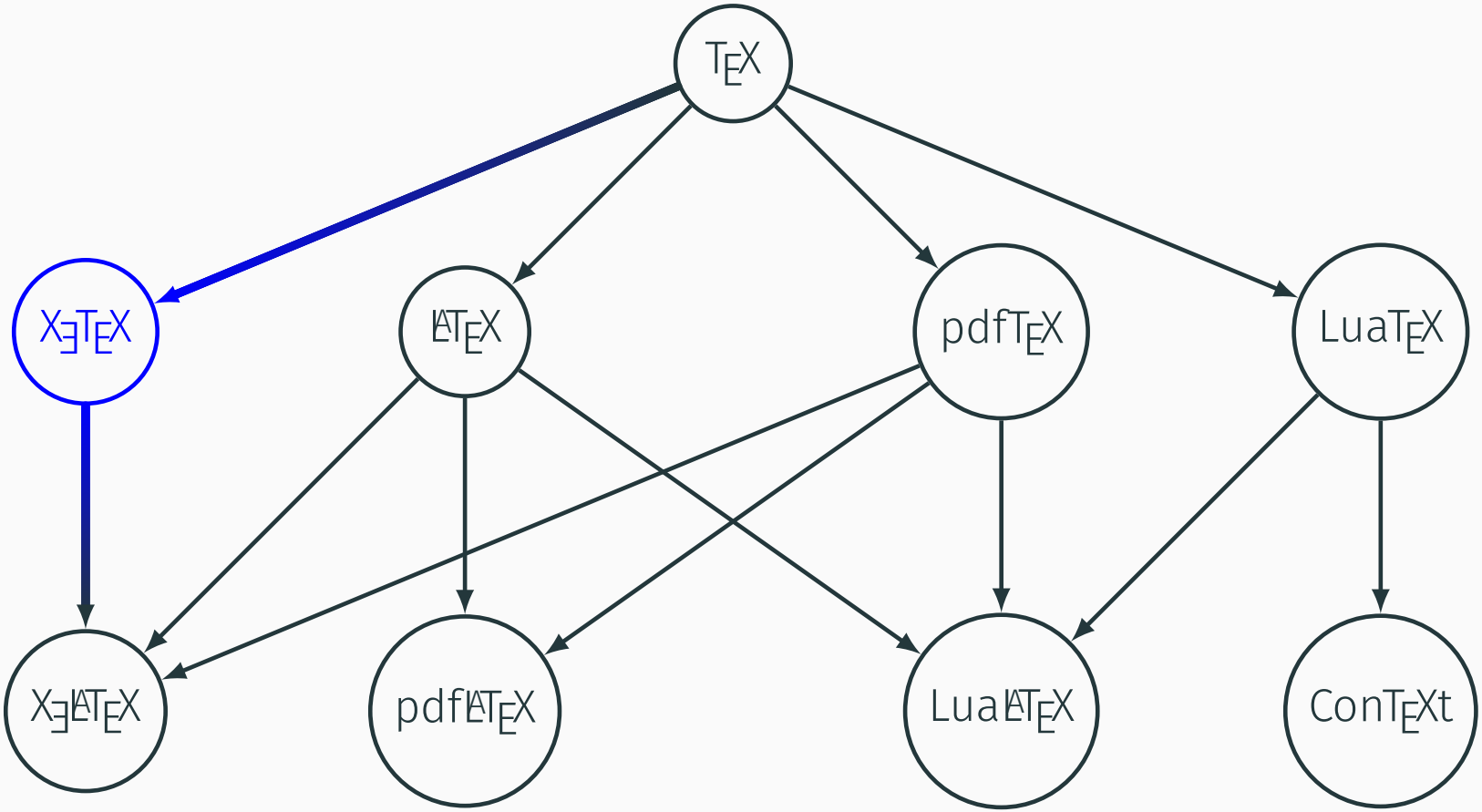

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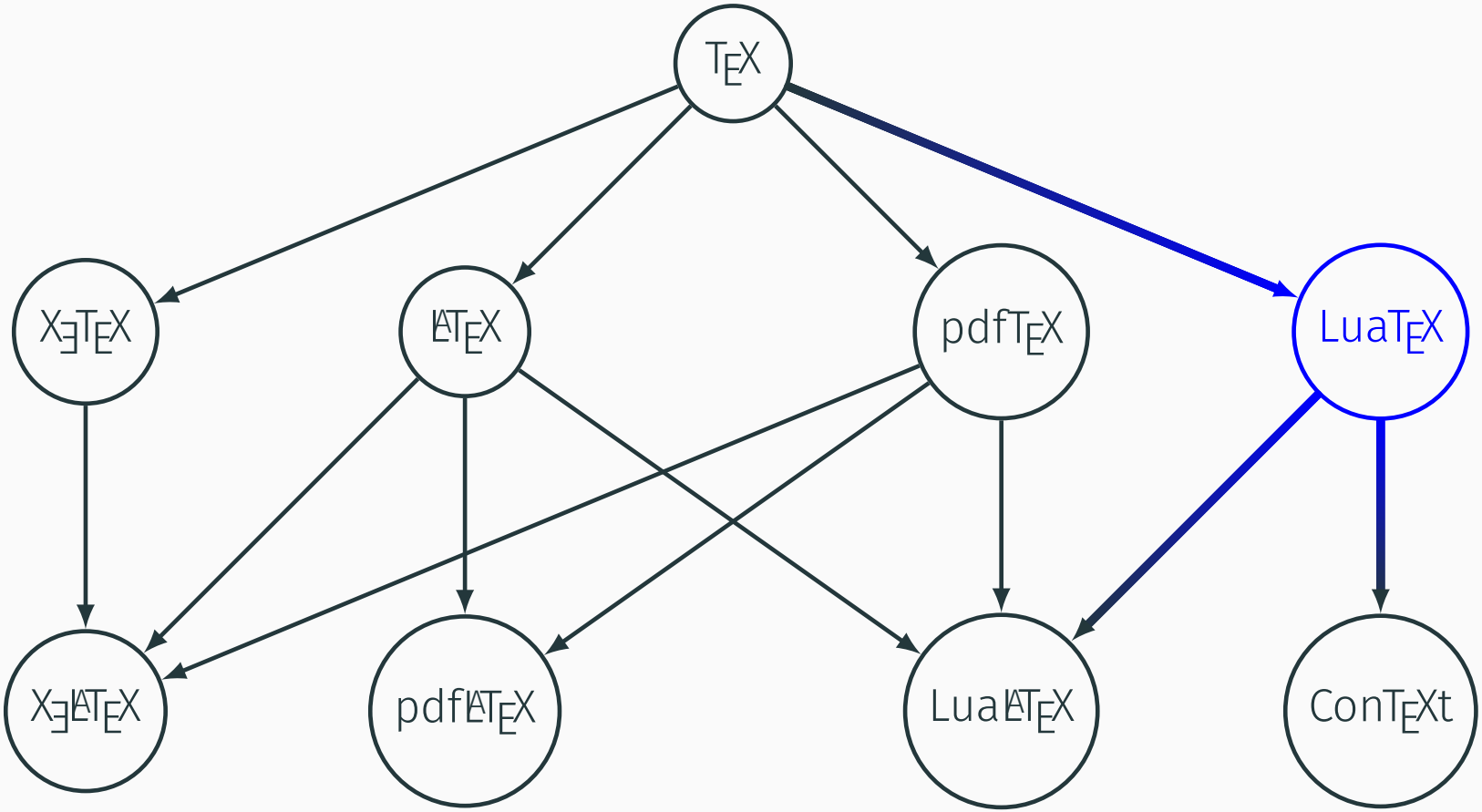

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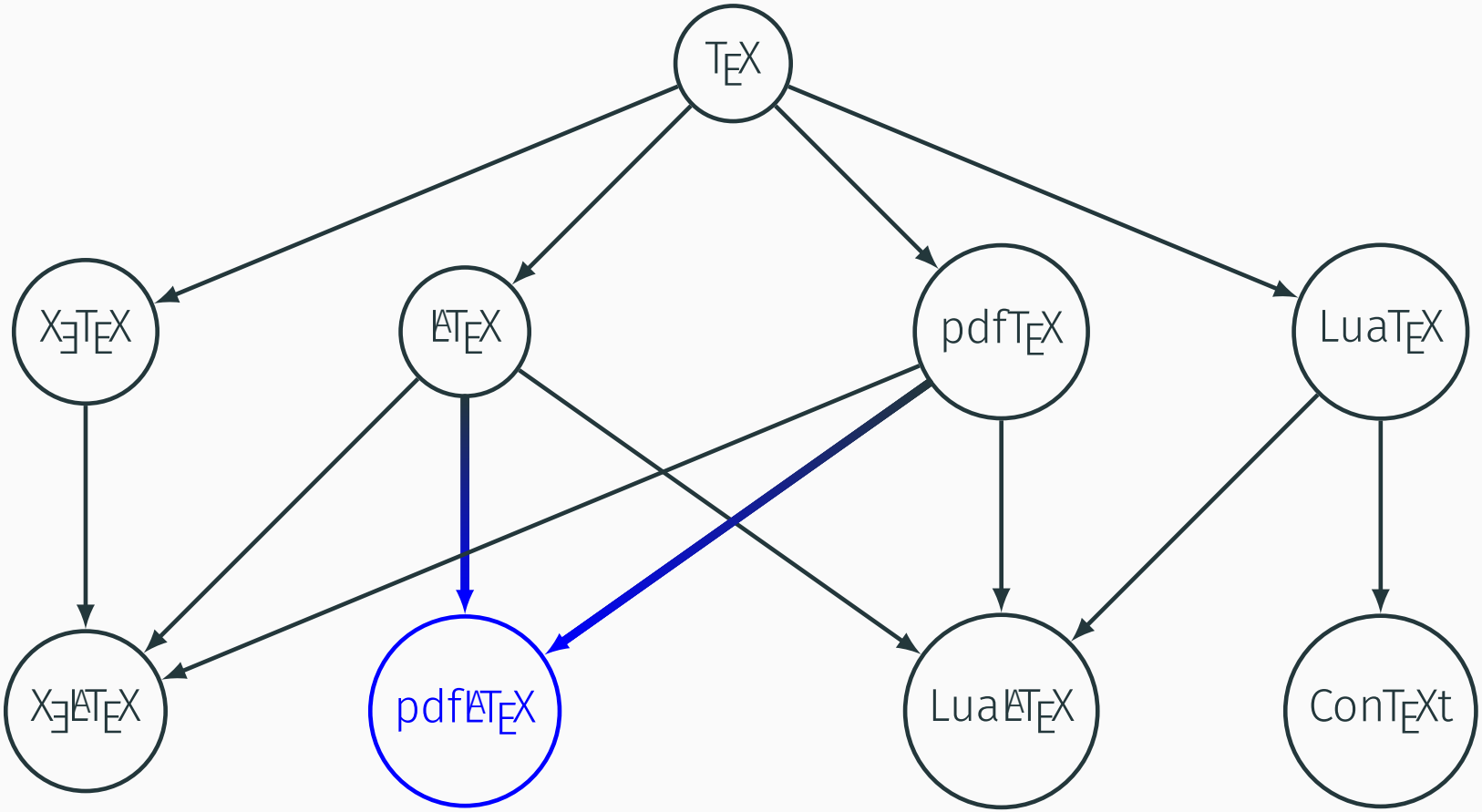

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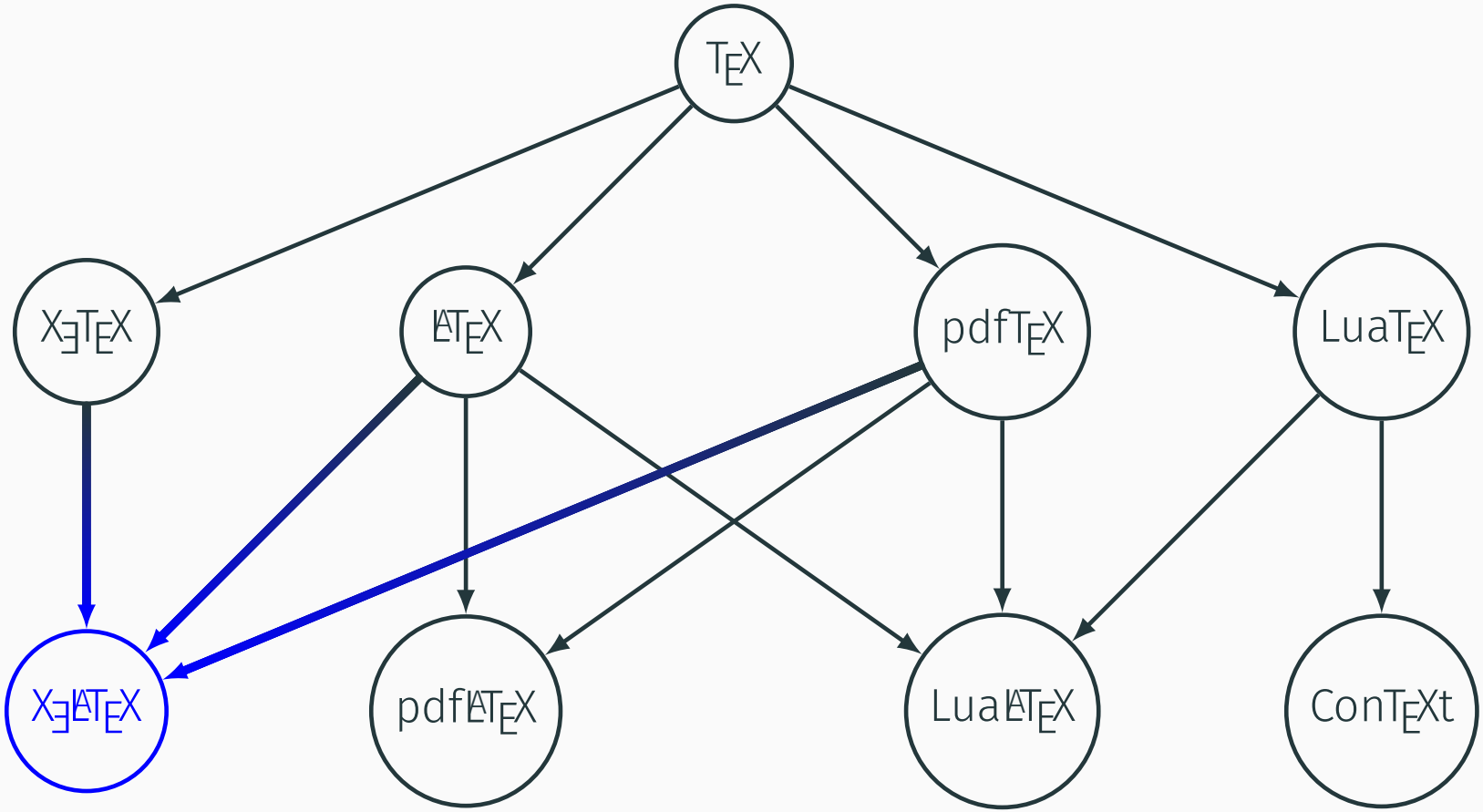
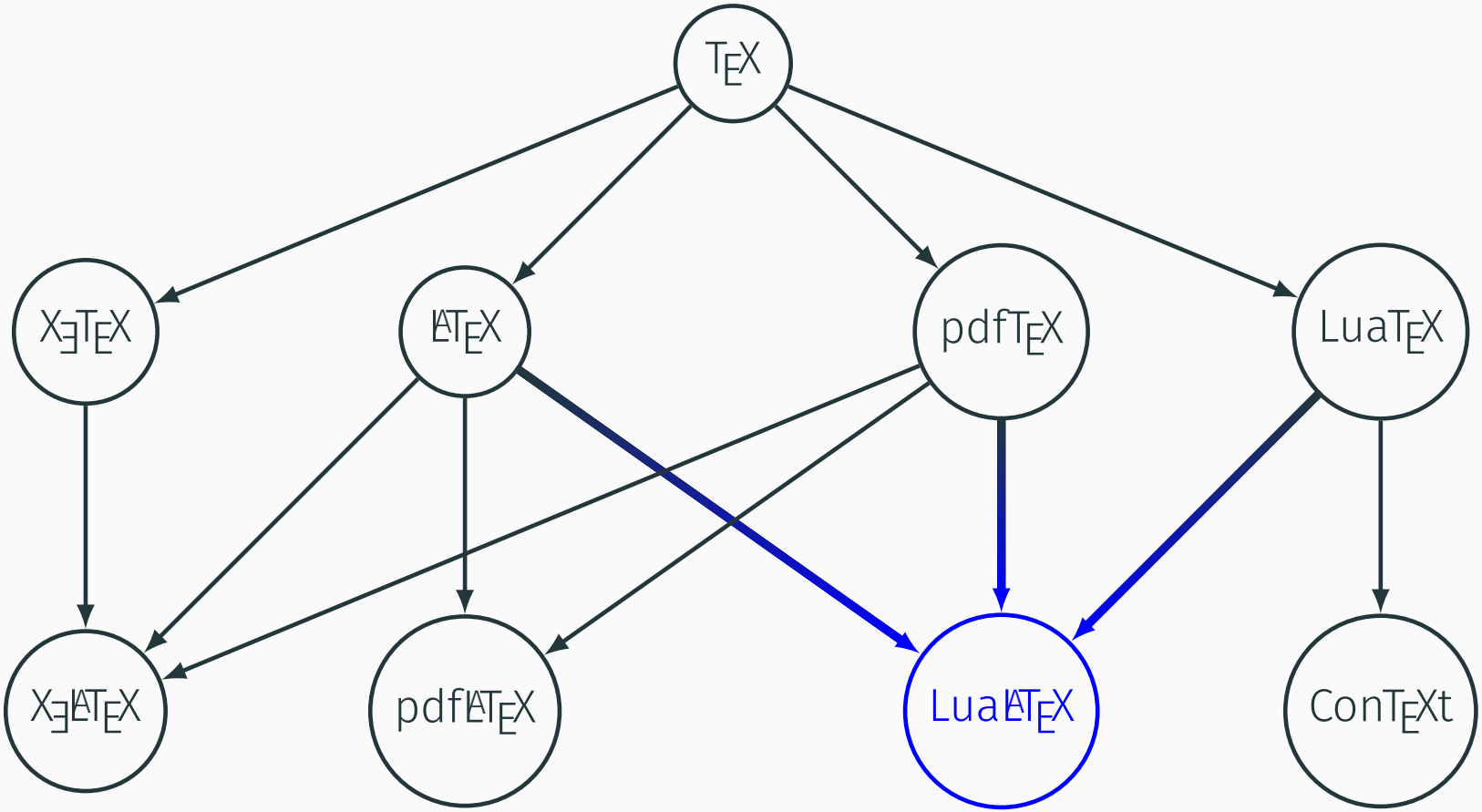
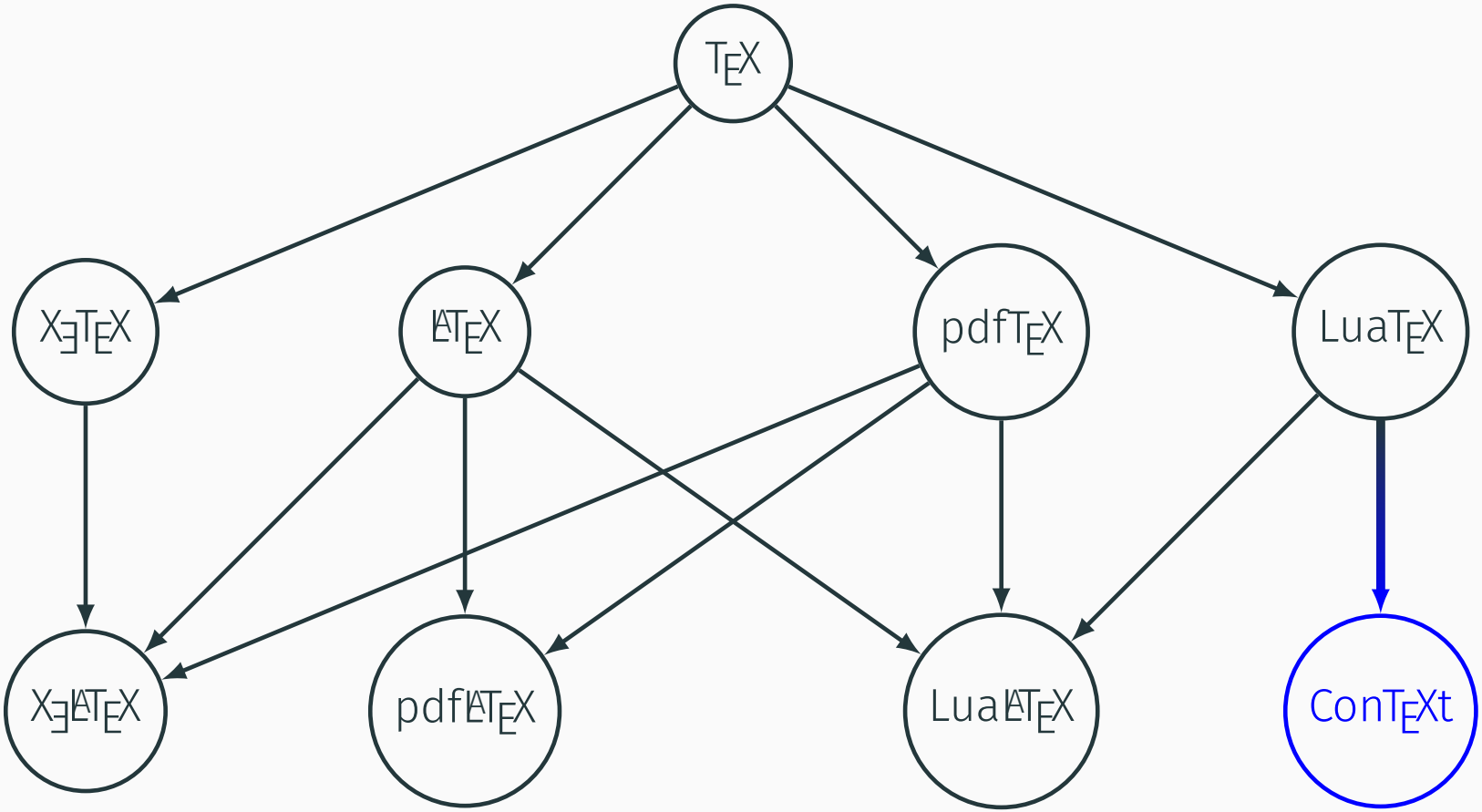


The Most Common Members

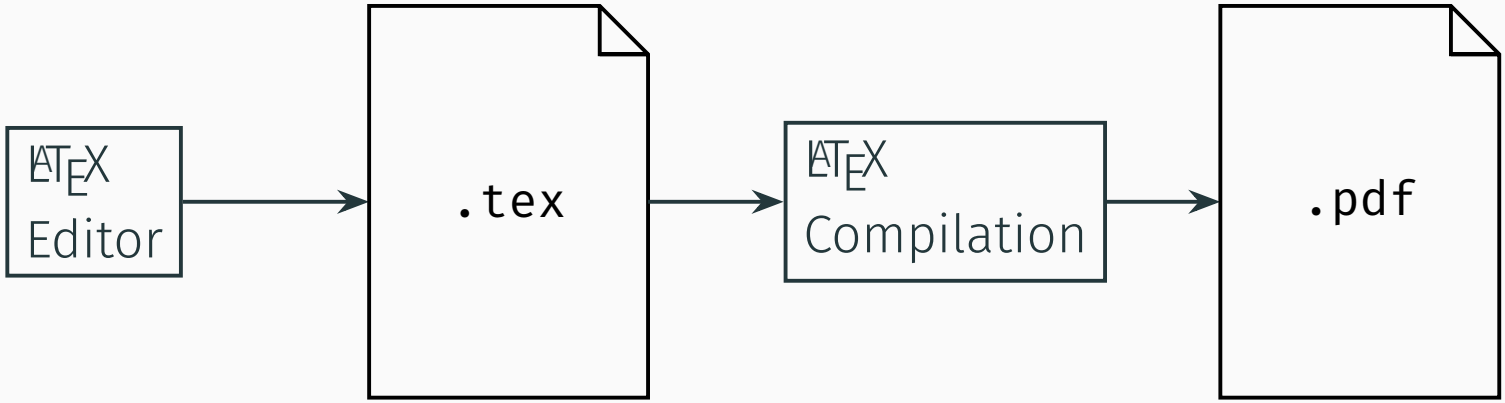


The Most Common Members



Processing TEX Files

The TEX Procedure



The TEX Procedure

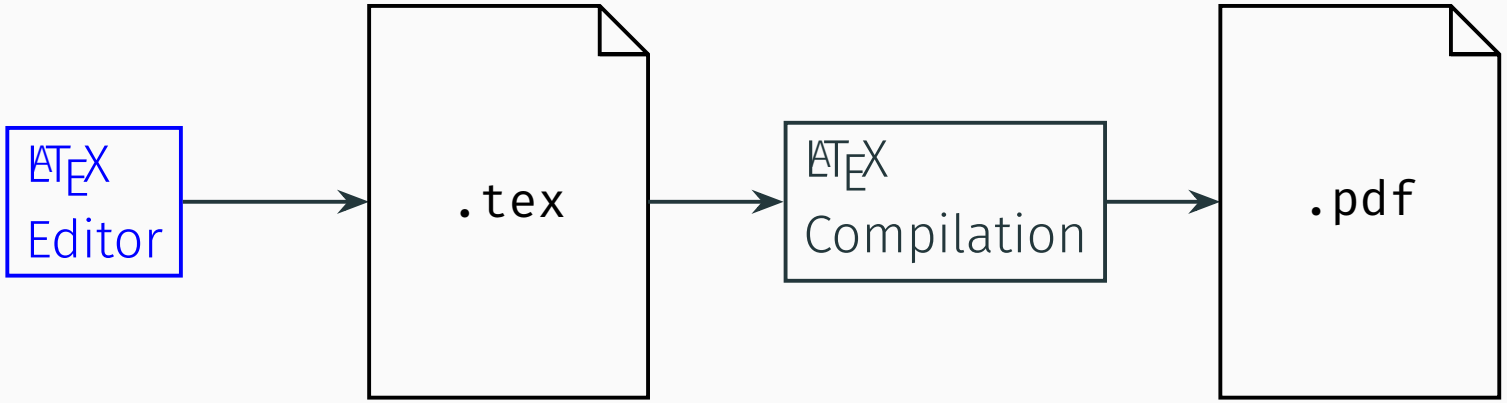


Table 1: LATEX Specific Editors

	Linux	MacOS	Windows
TeXStudio	✓	✓	✓
TeXMaker	✓	✓	✓
TeXnicCenter	✓	✓	✓

The TEX Procedure

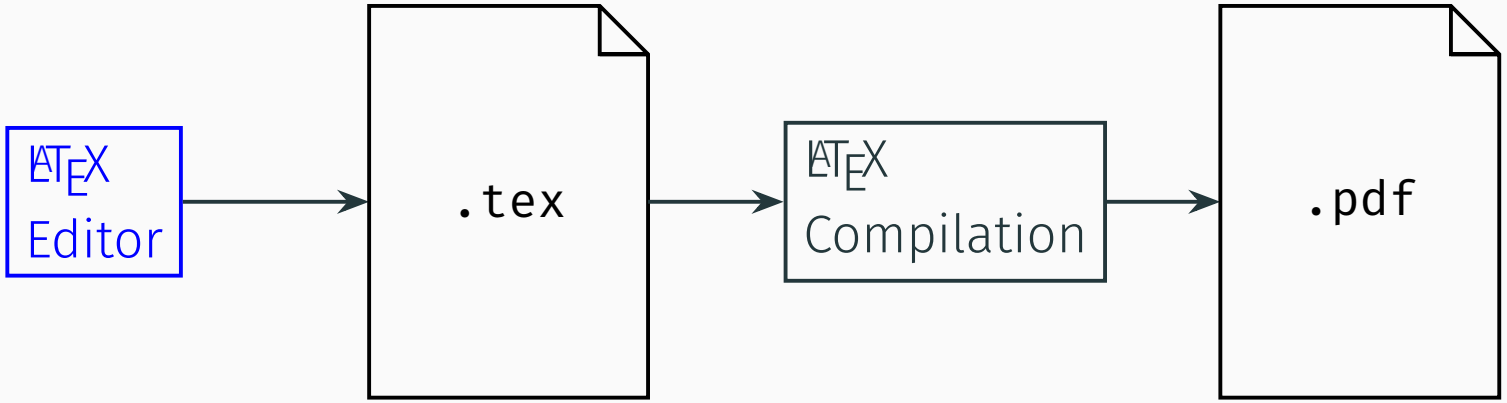


Table 2: Generic Text Editors with LATEX Specific Extra's

	Linux	MacOS	Windows
Emacs	✓	✓	✓
Vim	✓	✓	✓
VSCode	✓	✓	✓
Sublime Text	✓	✓	✓

The TEX Procedure

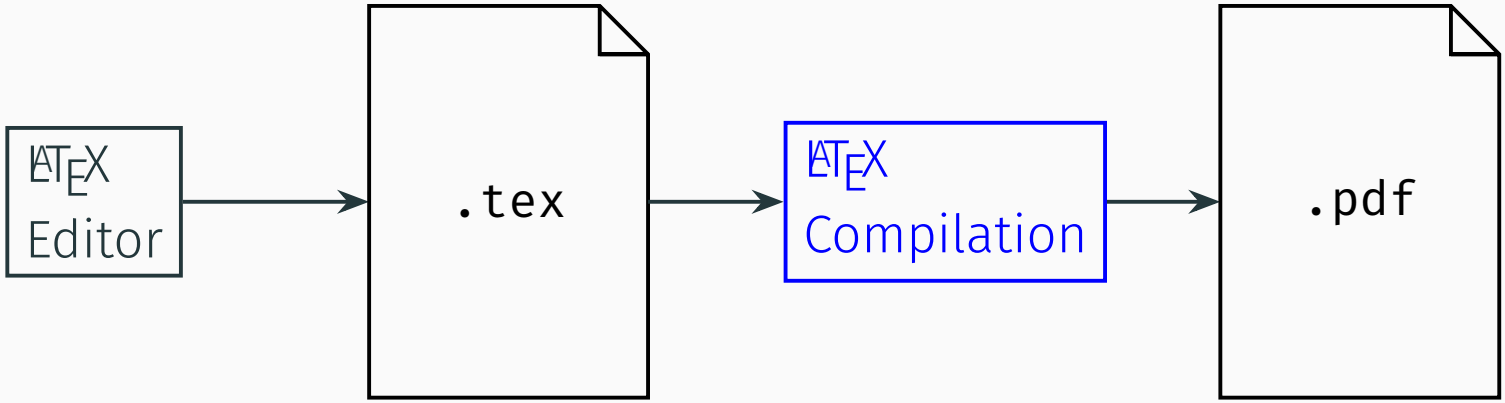
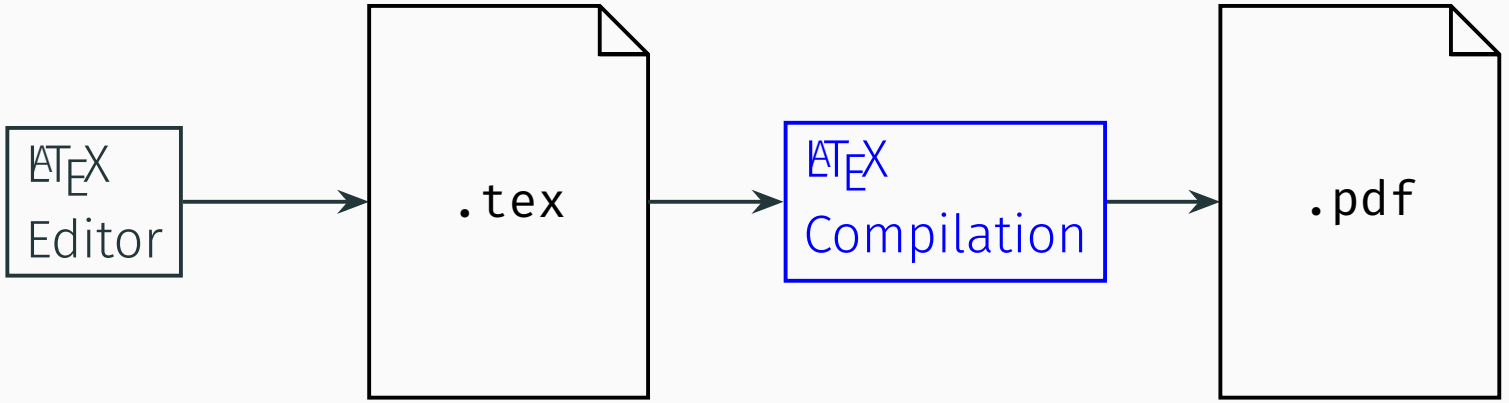


Table 3: TEX Distributions for Different Operating Systems

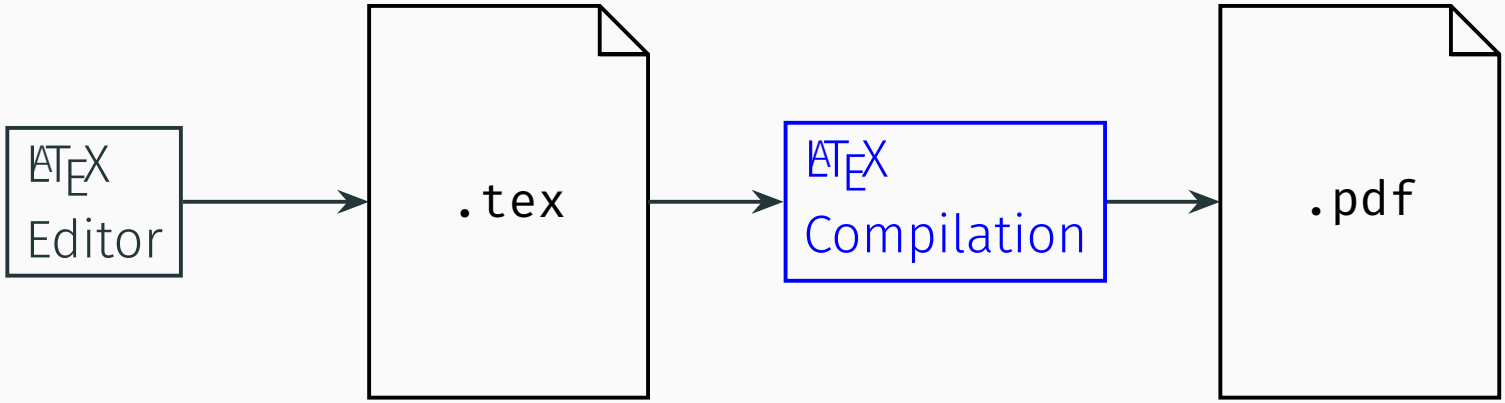
	Linux	MacOS	Windows
TeXLive	✓	✓	✓
MacTeX		✓	
MiKTeX			✓
ProTeXt			✓

Manually in Shell/Bash/Etc.



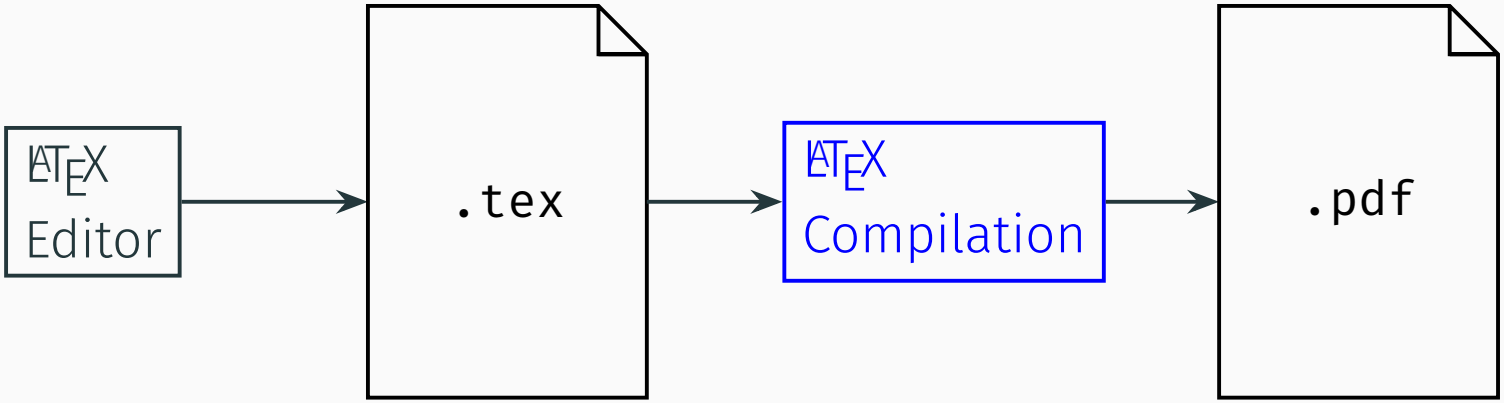

```
pdflatex --shell-escape --interaction=nonstopmode report
biber report
makeglossaries report
pdflatex --shell-escape --interaction=nonstopmode report
pdflatex --shell-escape --interaction=nonstopmode report
```

Passing Commands at Compile Time



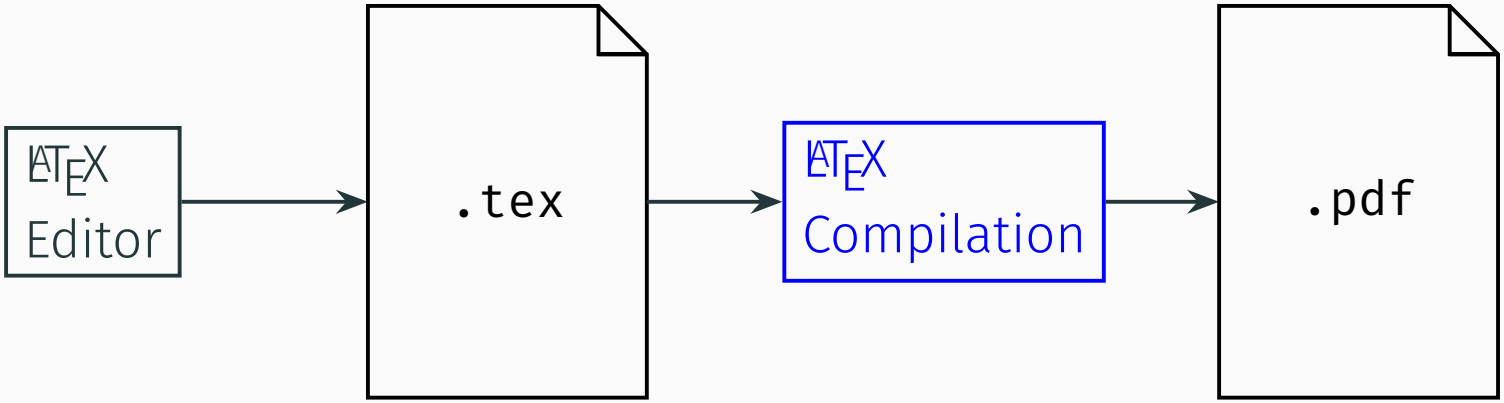

```
lualatex --shell-escape --interaction=nonstopmode
↪  "\\providecommand{\\iswhichmode}{draft} \\input{report}"
biber report
makeglossaries report
lualatex --shell-escape --interaction=nonstopmode
↪  "\\providecommand{\\iswhichmode}{draft} \\input{report}"
lualatex --shell-escape --interaction=nonstopmode
↪  "\\providecommand{\\iswhichmode}{final} \\input{report}"
```

latexmk




```
latexmk -pdf report.tex
```

ARARA



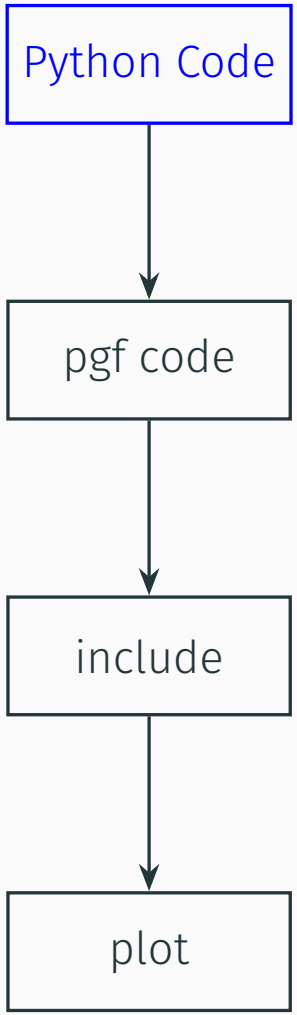

```
% arara: lualatex: { shell: true, interaction: nonstopmode }
% arara: makeglossaries
% arara: biber
% arara: lualatex: { shell: true, interaction: nonstopmode }
% arara: lualatex: { synctex: true, shell: true, interaction: nonstopmode }
```

```
arara -v report.tex
```

External Tools

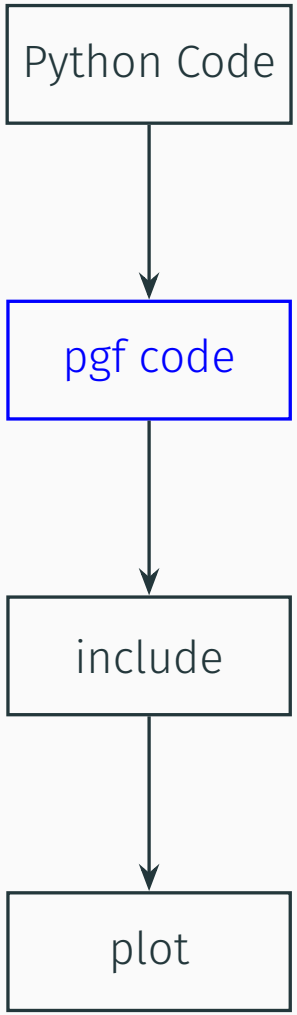
Matplotlib - Python Plotting

```python
import matplotlib as mpl
import numpy as np

mpl.use('pgf')
mpl.pyplot.rcParams.update({
    "pgf.texsystem": "lualatex", "text.usetex": True,
    "pgf.rcfonts": False, "font.family": "serif",
    "pgf.preamble": "\n".join([
        r"\usepackage[T1]{fontenc}", r"\usepackage{siunitx}",
        r"\usepackage{chemformula}", r"\usepackage{amsmath}"
    ]),
})

a = np.linspace(1, 20, 100)
b = a**2
fig, ax = mpl.pyplot.subplots()
ax.semilogx(a, b)
ax.set_xlabel('$R_{o}$ (\\si{\\ohm})')
ax.set_ylabel('$V_{o}$')
ax.grid(visible=True, which='both', axis='both', alpha=0.5)
fig.savefig('examplePlot.tex'.format(filename),
↪  bbox_inches='tight', format='pgf')
```



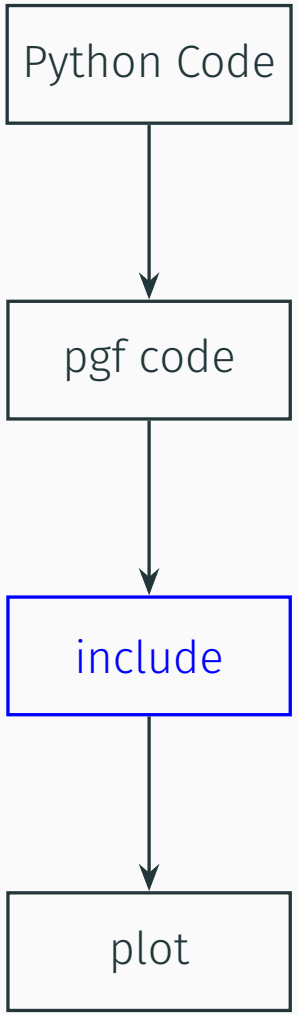
Matplotlib - Python Plotting

```
\begingroup%
\makeatletter%
\begin{pgfpicture}%
\pgfpathrectangle{\pgfpointorigin}{\pgfqpoint{5.655756in}
↪  {4.311000in}}%
\pgfusepath{use as bounding box, clip}%
\begin{pgfscope}%
\pgfsetbuttcap%
\pgfsetmiterjoin%
\definecolor{currentfill}{rgb}{1.000000,1.000000,1.000000}%
\pgfsetfillcolor{currentfill}%
\pgfsetlinewidth{0.000000pt}%
\definecolor{currentstroke}{rgb}{1.000000,1.000000,1.000000}%
\pgfsetstrokecolor{currentstroke}%
\pgfsetdash{}{0pt}%
\pgfpathmoveto{\pgfqpoint{0.000000in}{0.000000in}}%
\pgfpathlineto{\pgfqpoint{5.655756in}{0.000000in}}%
\pgfpathlineto{\pgfqpoint{5.655756in}{4.311000in}}%
```

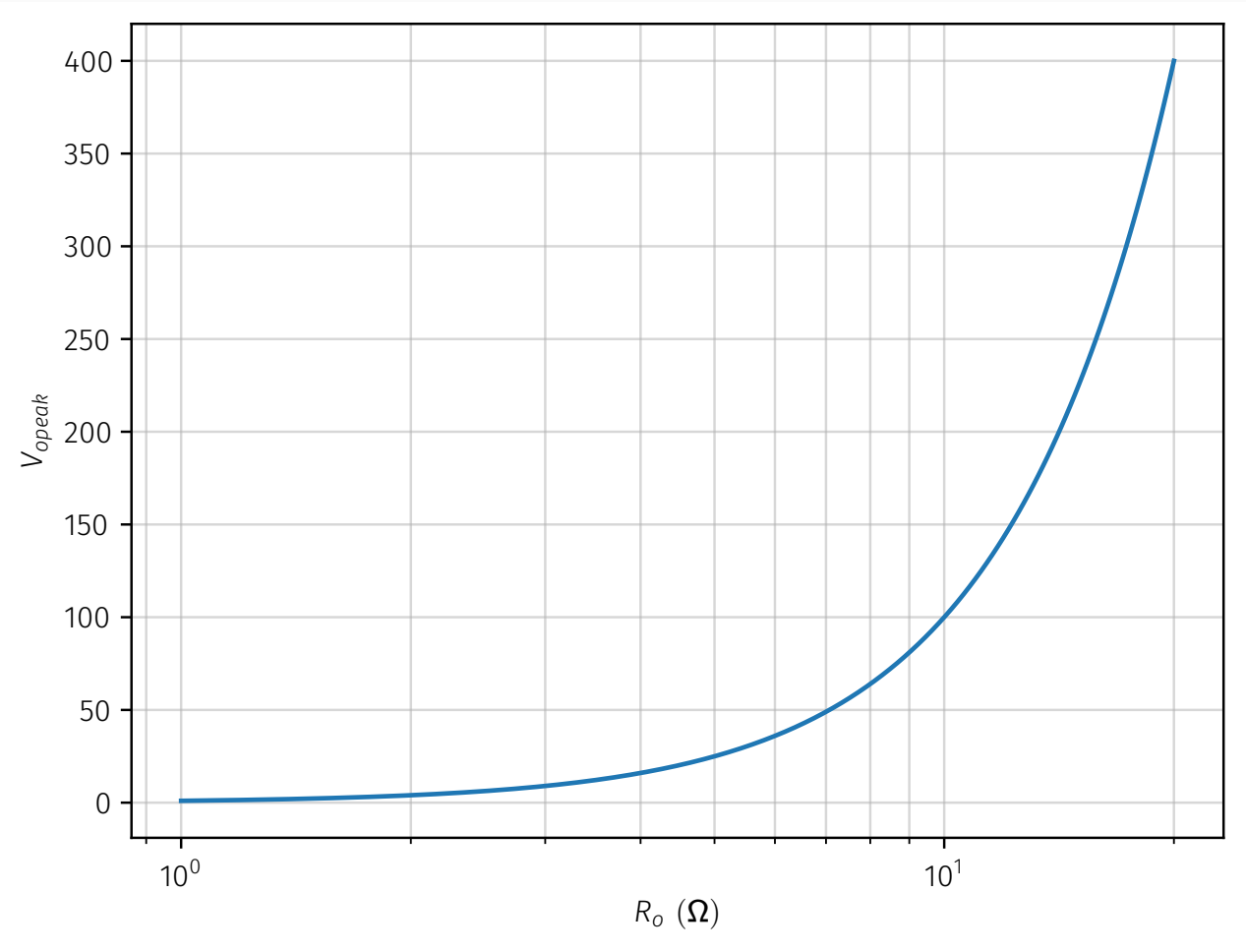


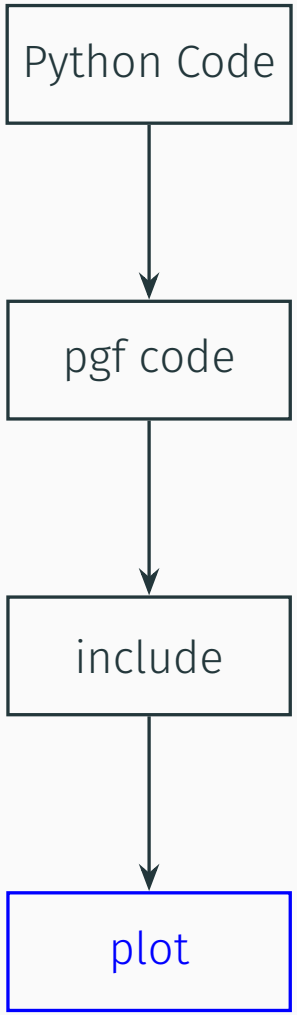
Matplotlib - Python Plotting

```
\begin{figure}[H]
\begin{centering}
\includegraphics[width=0.5\textwidth]
↪  {\assetPath/Code/examplePlot.tex}
\caption{A figure produced with matplotlib}
\label{fig:test}
\end{centering}
\end{figure}
```



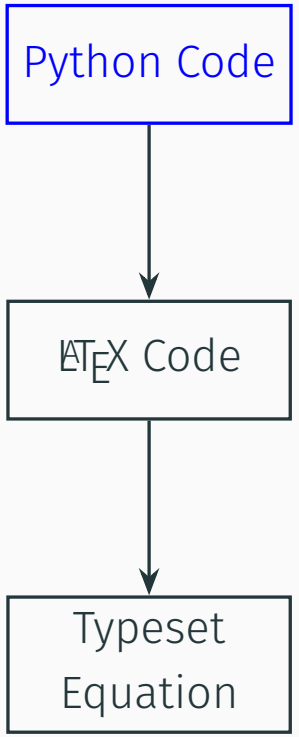
Matplotlib - Python Plotting





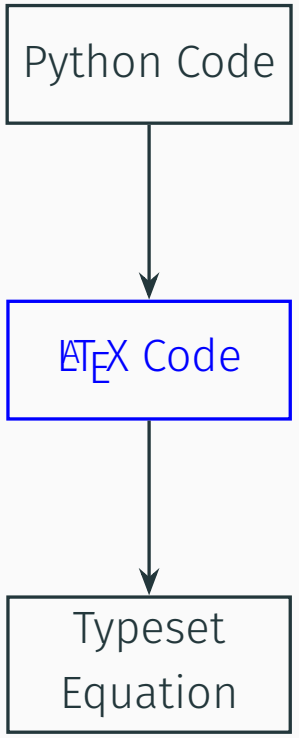
Sympy - Symbolic Math in Python

```python
from sympy import *

a, b, c, d, e = symbols(' a b c d e', positive=True,
↪  real=True)

myEqt = e*a**b + c/d
myEqtDerPre = Derivative(myEqt, b)
myEqtDer = Eq(myEqtDerPre, myEqtDerPre.doit())
myEqtIntPre = Integral(myEqt, a)
myEqtInt = Eq(myEqtIntPre, myEqtIntPre.doit())
print(latex(myEqt, mode="equation"))
print(latex(myEqtDer, mode="equation"))
print(latex(myEqtInt, mode="equation"))
```



Sympy - Symbolic Math in Python

```
\begin{equation}a^{b} e + \frac{c}{d}\end{equation}
\begin{equation}\frac{\partial}{\partial b} \left(a^{b} e +
↪  \frac{c}{d}\right) = a^{b} e \log{\left(a
↪  \right)}\end{equation}
\begin{equation}\int \left(a^{b} e + \frac{c}{d}\right)\, da =
↪  \frac{a c}{d} + \frac{a^{b + 1} e}{b + 1}\end{equation}
```

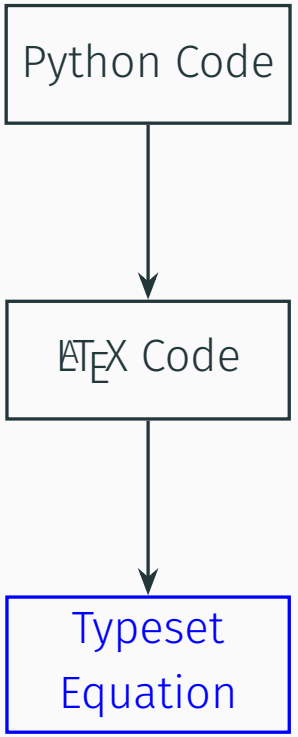


Sympy - Symbolic Math in Python

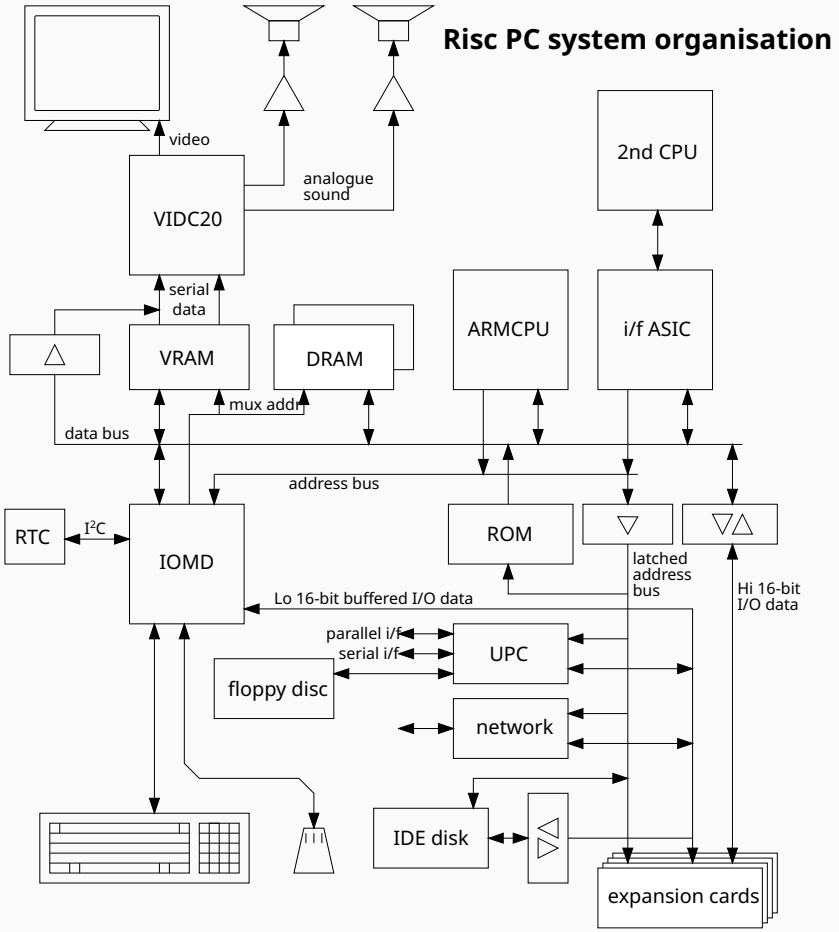
$$a^b e + \frac{c}{d} \tag{1}$$

$$\frac{\partial}{\partial b}\left(a^b e + \frac{c}{d}\right) = a^b e \log(a) \tag{2}$$

$$\int \left(a^b e + \frac{c}{d}\right) da = \frac{ac}{d} + \frac{a^{b+1} e}{b+1} \tag{3}$$



Inkscape - Drawing and Manipulating Vector Graphics



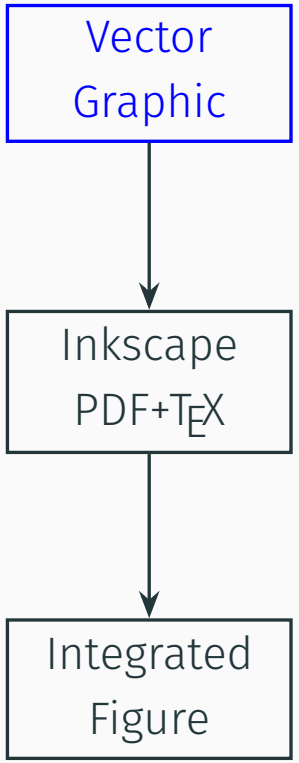
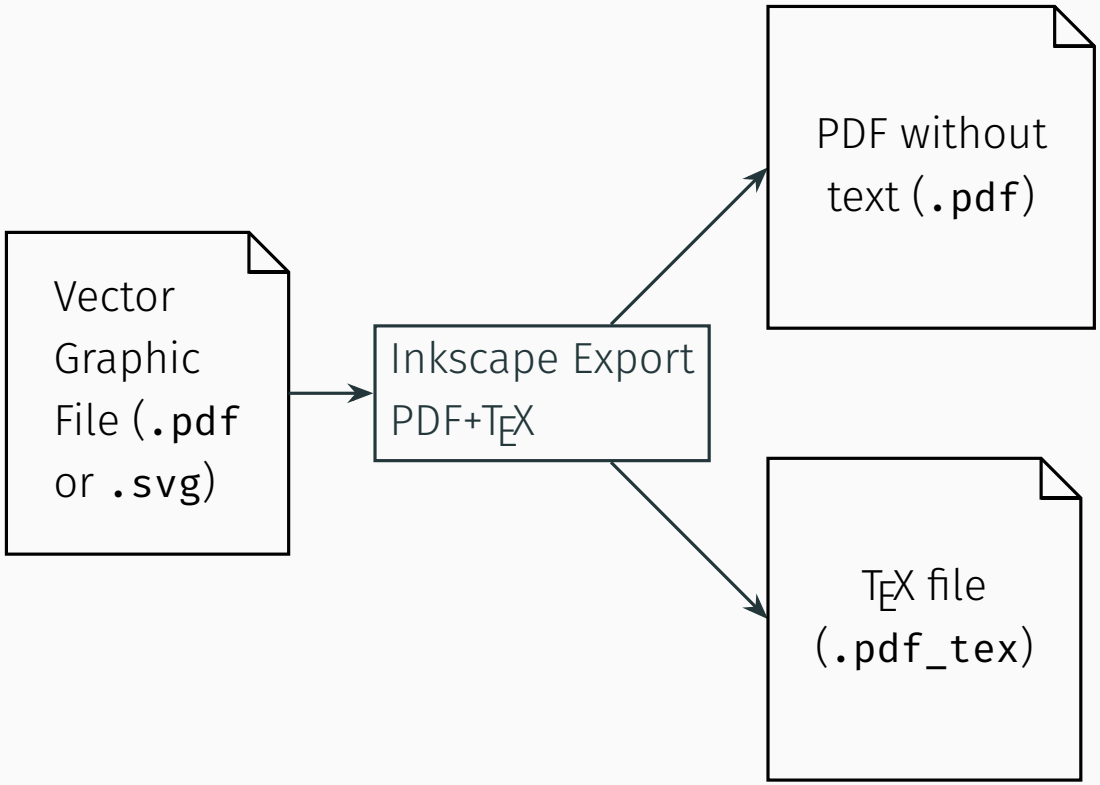
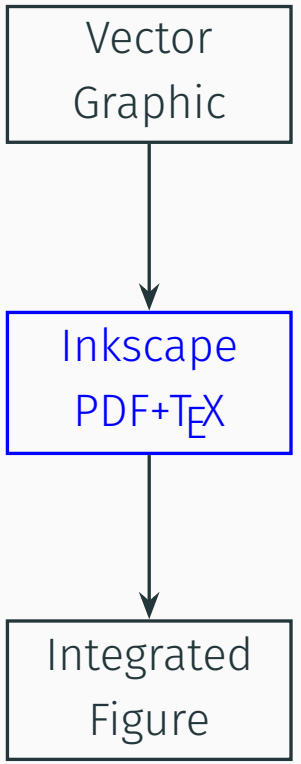


Figure 1: Original vector graphic block diagram of the Acorn Risc PC [1]

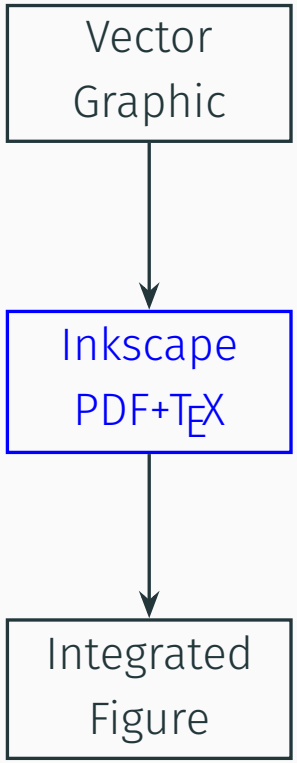
Inkscape - Drawing and Manipulating Vector Graphics





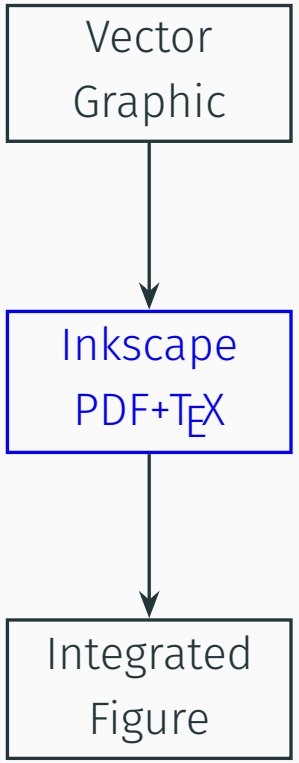
Inkscape - Drawing and Manipulating Vector Graphics

```
\begingroup%
  \makeatletter%
  \providecommand\color[2][]{%
    \errmessage{(Inkscape) Color is used for the text in
    ↪  Inkscape, but the package 'color.sty' is not loaded}%
    \renewcommand\color[2][]{}%
  }%
  \providecommand\transparent[1]{%
    \errmessage{(Inkscape) Transparency is used (non-zero) for
    ↪  the text in Inkscape, but the package
    ↪  'transparent.sty' is not loaded}%
    \renewcommand\transparent[1]{}%
  }%
  \providecommand\rotatebox[2]{#2}%
  \newcommand*\fsize{\dimexpr\f@size pt\relax}%
  \newcommand*\lineheight[1]{\fontsize{\fsize}
 ↪  {#1\fsize}\selectfont}%
  \ifx\svgwidth\undefined%
    \setlength{\unitlength}{621.63151538bp}%
    \ifx\svgscale\undefined%
      \relax%
    \else%
      \setlength{\unitlength}{\unitlength * \real{\svgscale}}%
    \fi%
```

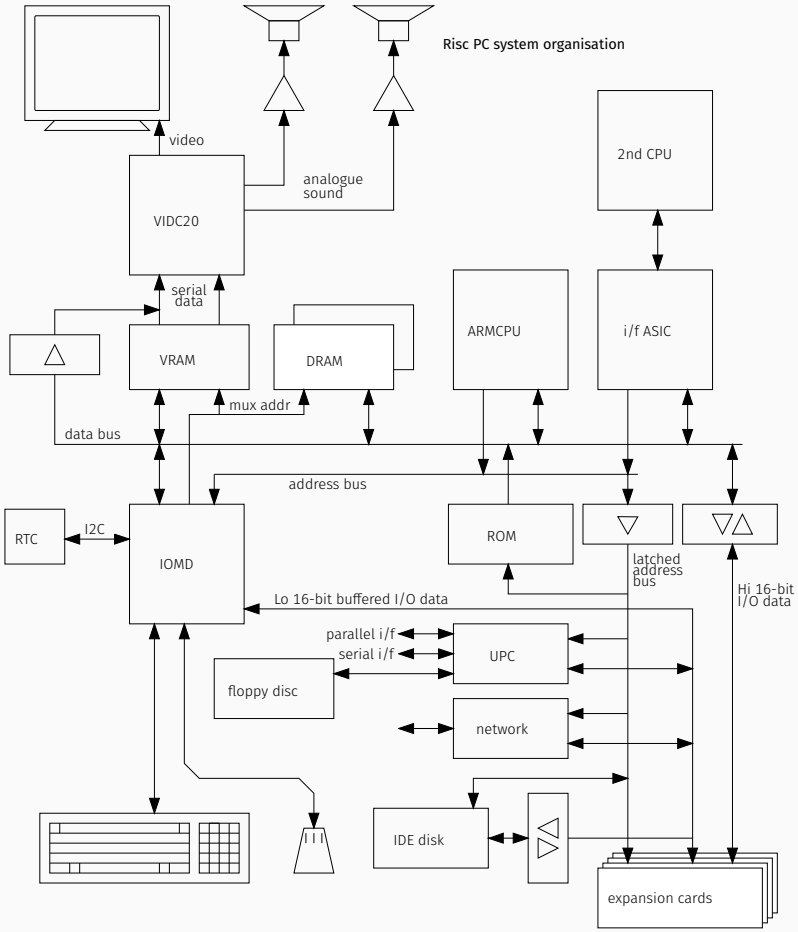


Inkscape - Drawing and Manipulating Vector Graphics

```
\begin{figure}[H]
\begin{centering}
\includestandalone[mode=tex, height=0.7\textheight]
↪  {\assetPath/Images/InkscapeDemo/Acorn-RiscPC-LaTeX-subbed-
↪  path}
\caption{Inkscape PDF+\TeX}
\label{fig:test}
\end{centering}
\end{figure}
```



Inkscape - Drawing and Manipulating Vector Graphics



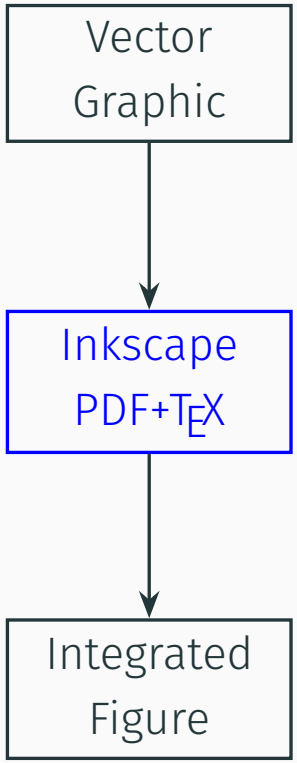
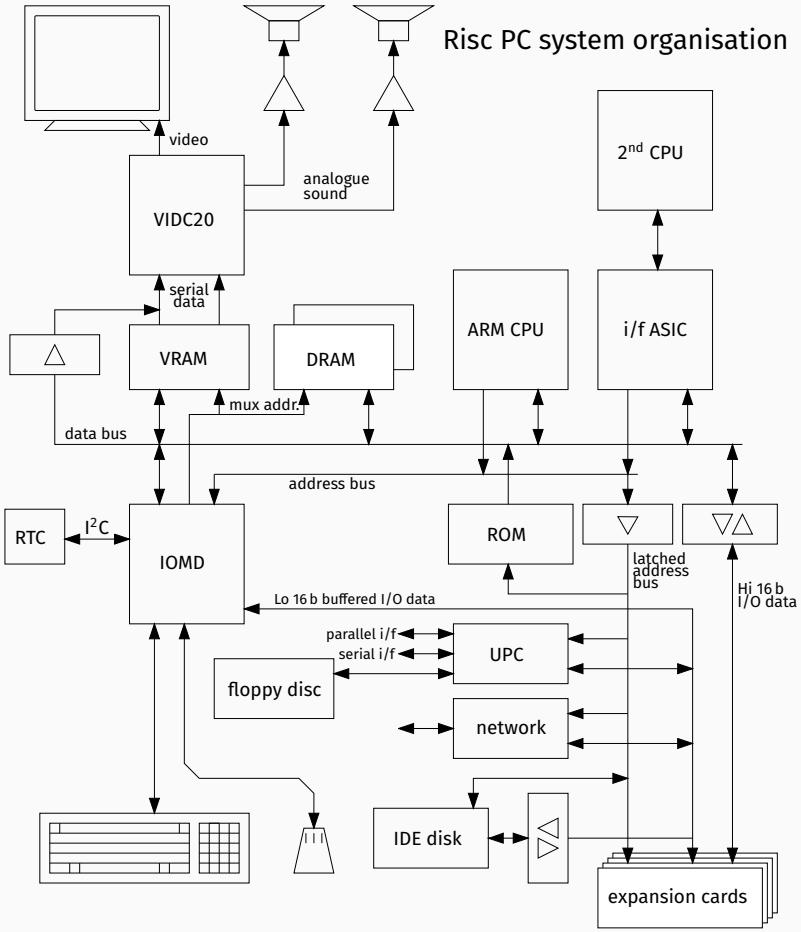


Figure 1: Directly incorporating Inkscape PDF+TEX export of the Acorn Risc PC block diagram

Inkscape - Drawing and Manipulating Vector Graphics



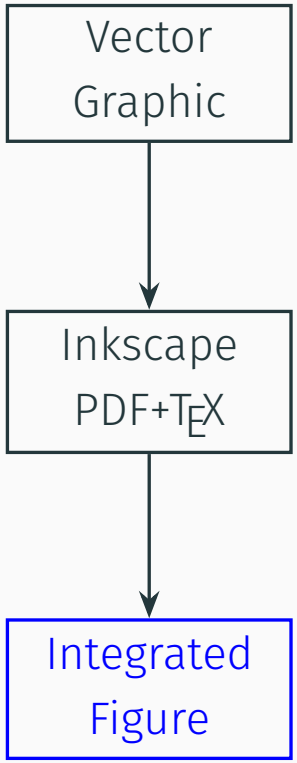


Figure 1: Inkscape PDF+TEX of the Acorn Risc PC block diagram with substitution of text via LuaLATEX

Backmatter

References

[1] P. Howkins, "Acorn-RiscPC-System-Organisation," Wikimedia. (Feb. 2013), [Online]. Available: https://commons.wikimedia.org/wiki/File:Acorn-RiscPC-System-Organisation.svg.

Acronyms

ASIC Application Specific . 36

CPU Central Processing Unit. 36

DRAM Dynamic Random Access Memory. 36

i/f longform. 36

I/O Input/Output. 36

I^2C Inter-Integrated Circuit. 36

IDE Integrated Drive Electronics. 36

IOMD Input/Output Memory Device. 36

mux multiplexer. 36

PC Personal Computer. 36

ROM Read-Only-Memory. 36

RTC Real Time Clock. 36

UPC longform. 36

VRAM Video Random Access Memory. 36