

An Introduction to \LaTeX

Make Documents Like A PROgrammer

Wesley T. Honeycutt

University of Oklahoma

October 15, 2018

⁰https://github.com/BlueNalgene/Introduction_to_LaTeX



What is LATEX?

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IDE's

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Basics and Principles

oooooooooooooooooooo

Tools

oooooooooooooooooooo

Advanced Features

oooooooooooooooooooo

Learning More

oooo

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IDE's

Basics and Principles

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History

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History

- ▶ In 1978, Donald Knuth created the \TeX programming language in a fit of frustration with how ugly photoprinting looked.
 - ▶ In 1983, Leslie Lamport released \LaTeX (Layman's \TeX), a set of macros which made \TeX usable by mortals.

History

- ▶ In 1978, Donald Knuth created the T_EX programming language in a fit of frustration with how ugly phototyping looked.
- ▶ In 1983, Leslie Lamport released L^AT_EX (Layman's T_EX), a set of macros which made T_EX usable by mortals.
- ▶ There are many other variants such as :

BIBT_EX ConT_EXt LuaT_EX LyX pdfL^AT_EX X_EL^AT_EX

L^AT_EX is...

... a sophisticated document preparation system.

L^AT_EX has...

- ▶ Stylistic uniformity
- ▶ Bibliography support
- ▶ Sophisticated structuring abilities
- ▶ Reference tracking
- ▶ Highly extendible capabilities

L^AT_EX is not...

... a word processor.

L^AT_EX does not...

- ▶ Spell-check your documents
- ▶ Give you complete control over formatting
- ▶ Provide a graphical interface for editing

"You take care of writing, and we'll take care of presentation."

You might be used to WYSIWYG

W
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Y
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S
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I
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W
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Y
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G
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L^AT_EX is WYSIWYM

W
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Y
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S
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e

I
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W
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M
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a
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Presentation matching what you wrote, not how it was written

This text is spaced specially.

```
1 This text is  
2 spaced specially.
```

Paragraphs are easy.

```
1 Paragraphs are easy.
```

Use double line breaks.

```
2  
3 Use double line breaks.
```

Never break the unbreakable unless you want to.

```
1 Never break the unbreakable  
unless you want to.
```

You can force connections of words in a line or force spaces and linebreaks.

```
2  
3 You~can~force~connections~of~  
words~in~a~line~or~\\ force  
\\ spaces and\\linebreaks.
```

If you like to suffer

LATEX is coded as plaintext. If you really want to, you can do everything in a Notepad-like text editor.

The code is processed via command line:

```
pdflatex thefile.tex
```

There are add-ons for popular text editors

- ▶ *vim*: \LaTeX suite for vim

There are add-ons for popular text editors

- ▶ *vim*: [LATEXsuite for vim](#)
- ▶ *emacs*: [Latexmk](#)

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- ▶ *Notepad++*: Requires multiple tweaks

There are add-ons for popular text editors

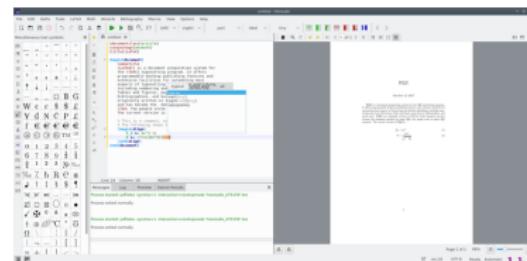
- ▶ *vim*: [LATEXsuite for vim](#)
- ▶ *emacs*: [Latexmk](#)
- ▶ *Notepad++*: [Requires multiple tweaks](#)
- ▶ *Sublime Text*: [LATEXTools](#)

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- ▶ *vim*: [L^AT_EXsuite for vim](#)
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- ▶ *Sublime Text*: [L^AT_EXTools](#)
- ▶ *Atom*: [L^AT_EXapm](#)

Lots of L^AT_EX IDE's

►    TeXstudio



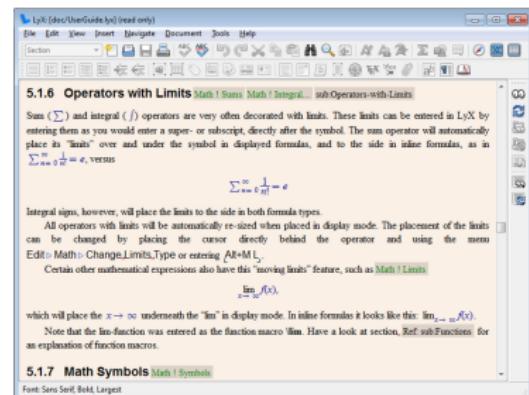
Lots of L^AT_EX IDE's

- ▶ TeXstudio
- ▶ Texmaker



Lots of LATEX IDE's

- ▶ TeXstudio
- ▶ Texmaker
- ▶ LyX



Lots of L^AT_EX IDE's

- ▶ TeXstudio
- ▶ Texmaker
- ▶ LyX
- ▶ MacTeX

Welcome to MacTeX

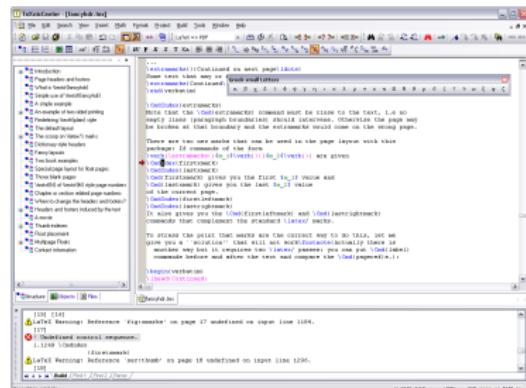
Welcome to MacTeX
Welcome to MacTeX
Welcome to MacTeX

fogadottás
ようこそ
bienvenido
како
chào mừng
歡迎
добродохно

Welcome to MacTeX
Welcome to MacTeX

Lots of LATEX IDE's

- ▶ TeXstudio
- ▶ Texmaker
- ▶ LyX
- ▶ MacTeX
- ▶ MiKTeX



Lots of \LaTeX IDE's

- ▶ TeXstudio
- ▶ Texmaker
- ▶ LyX
- ▶ MacTeX
- ▶ MiKTeX
- ▶ TeX Live

Online collaborative options

- ▶ Overleaf/ShareLaTeX



Online collaborative options

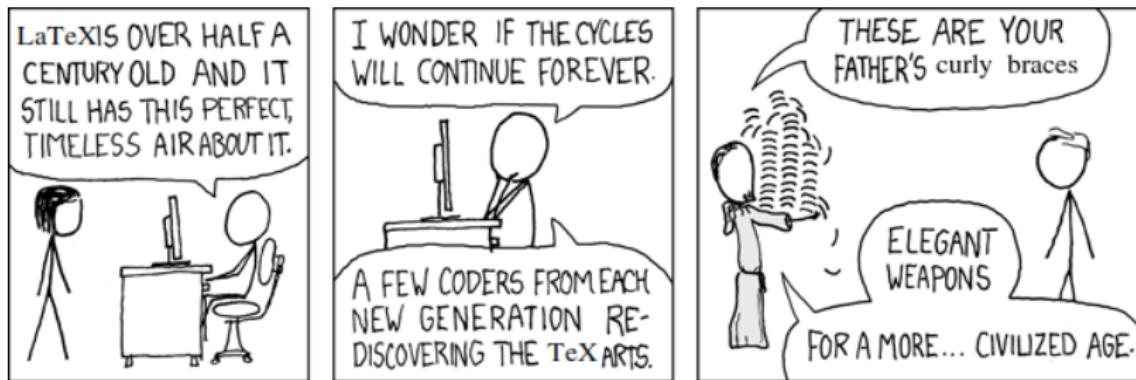
- ▶ Overleaf/ShareLaTeX
- ▶ Authorea

AU
—

Online collaborative options

- ▶ Overleaf/ShareLaTeX
- ▶ Authorea
- ▶ There are others which I have no experience with.

Learn to love braces



⁰With apologies to Randall Munroe

Commands and Environments

Uncentered

1 Uncentered

Centered Environment

```
1 \begin{center}  
2     Centered Environment  
3 \end{center}
```

Command Centered

```
1 \centering  
2 Command Centered
```

The Logical Structure of a L^AT_EX Document

Preamble

- ▶ Declare the document type you will be making:
`\documentclass[options]{class}`

The Logical Structure of a LATEX Document

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`\documentclass[options]{class}`
- ▶ Declare what packages you will need:
`\usepackage[options]{package}`

The Logical Structure of a LATEX Document

Preamble

- ▶ Declare the document type you will be making:
`\documentclass[options]{class}`
- ▶ Declare what packages you will need:
`\usepackage[options]{package}`
- ▶ Define any custom functions or environments

The Logical Structure of a LATEX Document

Preamble

- ▶ Declare the document type you will be making:
`\documentclass[options]{class}`
- ▶ Declare what packages you will need:
`\usepackage[options]{package}`
- ▶ Define any custom functions or environments
- ▶ Declare important variables

The Logical Structure of a LATEX Document cont'd

Body

- ▶ Initialize the document in an environment

```
\begin{document}
```

...

```
\end{document}
```

The Logical Structure of a LATEX Document cont'd

Body

- ▶ Initialize the document in an environment
 - \begin{document}
 - ...
 - \end{document}
- ▶ Within this environment you will:

The Logical Structure of a LATEX Document cont'd

Body

- ▶ Initialize the document in an environment
 - \begin{document}
 - ...
 - \end{document}
- ▶ Within this environment you will:
 - ▶ Create the title page or section:
\maketitle

The Logical Structure of a LATEX Document cont'd

Body

- ▶ Initialize the document in an environment
 - \begin{document}
 - ...
 - \end{document}
- ▶ Within this environment you will:
 - ▶ Create the title page or section:
\maketitle
 - ▶ Write your document

The simplest document



The simplest

Wes Honeycutt

October 15, 2018

Lorem ipsum dolor et amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, pharetra ac, adipiscing viverra, tellus. Cum sociis natoce grande
mauris. Nam arcu libero, nonummy egest, consectetur id, vulputate a, magna.
Duis velicula augue eu neque. Pellentesque habitant morbi tristique senectus
et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra
congue, nunc etiam velit, etiam etiam etiam etiam etiam etiam etiam etiam etiam
en tellus sit amet tortor gravida pellentes. Integer sapien est, luctus la, pretium
quis, viverra ac, nunc. Praesent egest sem vel leo ultrices bibendum. Aenean
faucibus. Morbi dolor nulla, malesuada et, pretium at, mollis ac, nuda. Cur-
sus etiam
en, accumsan eleifend, sagittis quis, diam. Donec egest enim sit amet odio dignissim
ratrum.

1

```
\documentclass{article}
\usepackage{lipsum}
\title{The simplest}
\author{Wes Honeycutt}
\begin{document}
\maketitle
\lipsum[1]
\end{document}
```

Making the \maketitle

The title can include several elements, which are declared by the user.

Making the \maketitle

The title can include several elements, which are declared by the user.

- ▶ \title{The Title}

Making the \maketitle

The title can include several elements, which are declared by the user.

- ▶ \title{The Title}
- ▶ \author{The Author's Name}

Making the \maketitle

The title can include several elements, which are declared by the user.

- ▶ \title{The Title}
- ▶ \author{The Author's Name}
 - ▶ This can include \thanks{Some Institution}

Making the \maketitle

The title can include several elements, which are declared by the user.

- ▶ \title{The Title}
- ▶ \author{The Author's Name}
 - ▶ This can include \thanks{Some Institution}
- ▶ \subtitle{A Clever Subtitle}

Making the \maketitle

The title can include several elements, which are declared by the user.

- ▶ \title{The Title}
- ▶ \author{The Author's Name}
 - ▶ This can include \thanks{Some Institution}
- ▶ \subtitle{A Clever Subtitle}
- ▶ \subject{A Subject Heading}

Our Sample Title Page

```
\title{The Pitfalls of LaTeX}

\author{
    Wesley T. Honeycutt
    \thanks{University of Oklahoma Department of Biology}
    \and Leon the Cat}

\subtitle{Stackexchange was down and other horror stories}

\subject{A Joke Paper}
```

\documentclass{article}

Stack Exchange was down and other horror stories A Joke Paper

The Pitfalls of LaTeX

Wesley T. Honeycutt * Leon the Cat
October 15, 2018

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec quam felis, ultricies nec, scelerisque et netus et malesuada fames ac turpis egestas. Mauris sit les. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean laoreet. Morbi dolor nulla, malesuada eu, pulvinar sit, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue en, accumsan eleifend, sagittis quis, diam. Duis egot orci sit amet orci dignissim rutrum.

\documentclass{scrbook}

A Joke Paper

The Pitfalls of \LaTeX

Stack Exchange was down and other horror stories

Wesley T. Honeycutt * Leon the Cat

October 15, 2018

Lore ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy egmont, consectetuer id, vulputate ac, magna. Donec volutpat angue eu tempus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean facilisis. Morbi dolor nulla, malesuada en, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

*University of Oklahoma Department of Biology

\documentclass{report}

Stack Exchange was down and other horror stories A Joke Paper

The Pitfalls of LaTe \bar{x}

Wesley T. Honeycutt ¹ Leon the Cat

October 15, 2018

¹University of Oklahoma Department of Biology

\documentclass{elsarticle}

Stack Exchange was down and other horror stories A Joke Paper

The Pitfalls of LaTeX

Wesley T. Horowitz 2

Join the Cat. Learn just a dol-

si at, consecutae adipiscit elid. Ut purus elid, vestitulum ut, placher-
ac, adipiscit vita, felis. Curabitur dictum gravidae matris. Nam arcu liberum
suumenit egit, consecutae si, vulpatate a, magis. Dicere vehicula augeo in
sequi. Proliferatae habitat, matri tristipue sequitur et netus et malorum
funes ac turpis egrotat. Matris ut, netus clausus sem. Nullus
et locutus vestimenta una frangit ulices. Praesulsa est etiam sonitus
frumentorum. Interrogatio sentit, ac facili, in, pretiosa, vivere, ac, ministrare.
Prandium, nesciunt, ac vel utrilibet sibi, nesciunt, nesciunt. Curator, nesciunt,
necula, nesciunt, ne polvulus, ac, nullis, ac, nesciunt. Curator, nesciunt,
nullis, Danc variis orci egit sequitur. Danc nullis mihi, congue en, accumbens adipisci-
sequitur qui, dian. Danc egit sciri et sumit orci digastrum rutrum.

Publisher Distributed Classes

The previous example shows how different classes rearrange the same elements.

Publisher Distributed Classes

The previous example shows how different classes rearrange the same elements.

Academic Publishers

Elsevier - `elsarticle`

Springer - `llncs`

IEEE - `IEEEtran`

AMS - `amscls`

ACS - `achemso`

Some More Academic Publishers With Classes

- ▶ aaai www.aaai.org
- ▶ AAAS/science www.sciencemag.org
- ▶ American Chemical Society Publications
- ▶ Addison-Wesley
- ▶ algebra universalis
- ▶ American Institute of Physics www.aip.org
- ▶ American Meteorological Society www.ametsoc.org
- ▶ American Physical Society authors.aps.org
- ▶ Beech Stave Press
- ▶ Birkhuser
- ▶ Cambridge University Press
- ▶ CRC
- ▶ Documenta Mathematica www.math.uiuc.edu
- ▶ Docscape
- ▶ Engine House Books

Some More Academic Publishers With Classes

- ▶ Fondo de Cultura Econmica
- ▶ Informs joc.pubs.informs.org
- ▶ Institut Mittag-Leffler (Royal Swedish Academy of Sciences)
- ▶ www.arkivformatematik.org
- ▶ IOP (institute of physics) authors.iop.org
- ▶ John Benjamins Publishing Company
- ▶ London Mathematical Society books www.lms.ac.uk
- ▶ Louisiana State University Press
- ▶ Mathematical Association of America www.maa.org
- ▶ National Research Council of Canada
- ▶ Oxford University Press www.oup.co.uk
- ▶ Princeton University Press press.princeton.edu
- ▶ Publications de l'Institut Mathmatique (Beograd)
www.emis.de

Some More Academic Publishers With Classes

- ▶ SAS Institute
- ▶ SIAM books www.siam.org
- ▶ Springer math www.springer.com
- ▶ Springer physics www.springer.com
- ▶ Thomson Delmar Learning
- ▶ UIT Cambridge
- ▶ Unipress (Institute of High Pressure Physics, Polish Academy of Sciences)
www.unipress.waw.pl
- ▶ University of California Press
- ▶ Wiley www.wiley.com
- ▶ William Andrew Publishing
- ▶ World Scientific
- ▶ WordTech

Text Formats

Be **Bold!**

Italicize!

Underline to accentuate!

Write with *emphasis*!

- 1 Be `\textbf{Bold}!\\`
- 2 `\textit{Italicize}!\\`
- 3 `\underline{Underline} to
accentuate!\\`
- 4 Write with `\emph{emphasis}!\\`

Font Size

```
1 {\Huge I'm shrinking}\\\n2 {\huge I'm shrinking}\\\n3 {\LARGE I'm shrinking}\\\n4 {\Large I'm shrinking}\\\n5 {\large I'm shrinking}\\\n6 {\normalsize I'm shrinking}\\\n7 {\small I'm shrinking}\\\n8 {\footnotesize I'm shrinking}\\\n9 {\scriptsize I'm shrinking}\\\n10 {\tiny I'm shrinking}\\\n
```

Section Hierarchy

```
\section{The Topmost}
  \subsection{A Little Deeper}
    \subsubsection{Deeper Still}
```

...

Lists

- ▶ Boomer
- ▶ Sooner
- ▶ Oklahoma

1. Boomer
2. Sooner
3. Oklahoma

```
1 \begin{itemize}
2   \item Boomer
3   \item Sooner
4   \item Oklahoma
5 \end{itemize}
```

```
1 \begin{enumerate}
2   \item Boomer
3   \item Sooner
4   \item Oklahoma
5 \end{enumerate}
```

Nested Lists

- ▶ Boomer
 - ▶ Sooner
 - ▶ Oklahoma

1. Boomer
 - 1.1 Sooner
2. Oklahoma

```
1 \begin{itemize}
2   \item Boomer
3   \begin{itemize}
4     \item Sooner
5   \end{itemize}
6   \item Oklahoma
7 \end{itemize}
```

```
1 \begin{enumerate}
2   \item Boomer
3   \begin{enumerate}
4     \item Sooner
5   \end{enumerate}
6   \item Oklahoma
7 \end{enumerate}
```

Exotic Page Sizes

You can alter the \geometry of a page.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultricies. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

```
\documentclass{article}
\usepackage{lipsum}
\usepackage[paperheight=5in,
           paperwidth=4in,
           margin=0.5in,
           heightrounded,
           showframe]{geometry}
\begin{document}
\lipsum[1]
\end{document}
```

Graphics

Graphics are included with size information, but not location.



```
1 \includegraphics[width=0.75\ linewidth]{leonbike.png}
```

They still need somewhere to go!

Graphics Locations

You can put graphics within containers.

- 😺 My cat's name is Leon
- 😺 He is a handsome little man
- 😺 Also a jerk

```
\documentclass{article}
\usepackage[paperheight=2
           in,paperwidth=2in,
           margin=0in]{geometry}
\usepackage{graphicx}
\newcommand*\meow{\includegraphics[width=1em]{leon.png}}
\begin{document}
\begin{itemize}
\item[\meow] My cat's name is Leon
\item[\meow] He is a handsome little man
\item[\meow] Also a jerk
\end{itemize}
\end{document}
```

Floats

Floats hold things for you.

- ▶ *h* - Put it about *here*

Floats

Floats hold things for you.

- ▶ *h* - Put it about *here*
- ▶ *t* - Put it on the *top* of a page

Floats

Floats hold things for you.

- ▶ *h* - Put it about *here*
- ▶ *t* - Put it on the *top* of a page
- ▶ *b* - Put it on the *bottom* of a page

Floats

Floats hold things for you.

- ▶ *h* - Put it about *here*
- ▶ *t* - Put it on the *top* of a page
- ▶ *b* - Put it on the *bottom* of a page
- ▶ *p* - Put it on a dedicated *page*

Floats

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- ▶ *h* - Put it about *here*
- ▶ *t* - Put it on the *top* of a page
- ▶ *b* - Put it on the *bottom* of a page
- ▶ *p* - Put it on a dedicated *page*
- ▶ ! - Listen to me you little...

Floats

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- ▶ *b* - Put it on the *bottom* of a page
- ▶ *p* - Put it on a dedicated *page*
- ▶ *!* - Listen to me you little...

Feel free to mix and match.

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- ▶ *p* - Put it on a dedicated *page*
- ▶ *!* - Listen to me you little...

Feel free to mix and match.

- ▶ *tb* - Put it on the top or bottom of the page, whatever works

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- ▶ *t* - Put it on the *top* of a page
- ▶ *b* - Put it on the *bottom* of a page
- ▶ *p* - Put it on a dedicated *page*
- ▶ *!* - Listen to me you little...

Feel free to mix and match.

- ▶ *tb* - Put it on the top or bottom of the page, whatever works
- ▶ *htbp* - I don't care where you put it

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- ▶ *h* - Put it about *here*
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- ▶ *p* - Put it on a dedicated *page*
- ▶ *!* - Listen to me you little...

Feel free to mix and match.

- ▶ *tb* - Put it on the top or bottom of the page, whatever works
- ▶ *htbp* - I don't care where you put it
- ▶ *h!* - If you don't put it here I swear to Papa Knuth I will
`apt remove you`

Tables

Tables are made within the `tabular` float environment.

	col1	col2	col3
row1	a	b	c
row2	aa	bb	cc
row3	aaa	bbb	ccc

```
1 \begin{tabular}[htbp]{l|c|c|c}
2   ~ & col1 & col2 & col3\\
3   \hline
4   row1 & a & b & c \\
5   row2 & aa & bb & cc \\
6   row3 & aaa & bbb & ccc \\
7 \end{tabular}
```

These can be as complicated as you want to make them.

III–V Compounds		Group III				
Group V	7 N	BN	AlN	GaN (3.4)	InN	TlN
	15 P	BP	AlP (2.55)	GaP (2.24)	InP (1.27)	TlP
	33 As	BAs	AlAs	GaAs (1.35)	InAs	TlAs
	51 Sb	BSb	AlSb	GaSb (9.67)	InSb	TlSb
	84 Bi	BBi	AlBi	GaBi	InBi	TlBi
	Atomic number in black above element			Energy band gap (eV) of some of the selected elements within bracket		

Math

$$x^2 + y^2 = z^2 \quad (1)$$

$$\frac{\hbar^2}{2m} \nabla^2 \Psi + V(\mathbf{r}) \Psi = -i\hbar \frac{\partial \Psi}{\partial t} \quad (2)$$

Inline $y = m * x + b$ equations.

```
1 \begin{equation}
2   x^2 + y^2 = z^2
3 \end{equation}
```

```
1 \begin{equation}
2   \frac{\hbar^2}{2m} \nabla^2 \Psi + V(\mathbf{r}) \Psi
3   = -i\hbar \frac{\partial \Psi}{\partial t}
4 \end{equation}
```

```
1 Inline $y = m*x+b$ equations.
```

Aligned math

$$0 = ax^2 + bx + c$$

$$0 = x^2 + \frac{b}{a}x + \frac{c}{a}$$

$$0 = x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} + \frac{c}{a} - \frac{b^2}{4a^2}$$

$$\frac{b^2}{4a^2} - \frac{c}{a} = \left(x + \frac{b}{2a}\right)^2$$

$$\frac{b^2 - 4ac}{4a^2} = \left(x + \frac{b}{2a}\right)^2$$

$$\frac{\pm\sqrt{b^2 - 4ac}}{2a} = x + \frac{b}{2a}$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = x$$

Citing and Referencing

- ▶ L^AT_EX can create perfect bibliographies with BIB^AT_EX

Citing and Referencing

- ▶ L^AT_EX can create perfect bibliographies with BIBT_EX
- ▶ BIBT_EX files are sets of information which contain everything relevant to citing a source

Citing and Referencing

- ▶ LATEX can create perfect bibliographies with BIBTEX
- ▶ BIBTEX files are sets of information which contain everything relevant to citing a source
- ▶ Most citation managers can export BIBTEX files

A BIBTEX Entry

```
@inproceedings{jacob2016,  
series = {20},  
title = {Monitoring of {{Carbon Dioxide}} and {{Methane  
Plumes}} from {{Combined Ground}}-{{Airborne Sensors}}},  
volume = {61},  
booktitle = {Convection and {{Boyancy Driven Flows}}: {{  
Environmental}}},  
publisher = {{APS}},  
author = {Jacob, Jamey and Mitchell, Taylor and Honeycutt,  
Wesley T. and Materer, Nicholas F. and Clark, Peter},  
month = nov,  
year = {2016}  
}  
  
@phdthesis{dissertation,  
address = {Stillwater, Oklahoma},  
type = {Dissertation},  
title = {Development and {{Applications}} of {{Chemical  
Sensors}} for the {{Detection}} of {{Atmospheric Carbon  
Dioxide}} and {{Methane}}},  
school = {Oklahoma State University}.  
}
```

I like using Zotero

The screenshot shows the Zotero desktop application window. On the left is a sidebar with a tree view of collections: 'My Library' (containing 'Aeroecology Biologging Initiative' with 'LunAero'), 'CO2 CH4 sensor' (with 'intro sensoronly', 'postdefence', 'unused'), 'E-Cigarettes', 'Misc/Unused', 'NASA Proposal - 5iC', 'ONAP', 'PAPERS' (with 'onlybuild', 'onlysensors', 'shortreview', 'Red Cedar'), 'Sensors', 'Strange Ideas', 'TEM Argonates', 'Wesley T Honeycutt' (selected), 'Xplosafe-Copper', 'My Publications', 'Duplicate Items', 'Unfiled Items', and 'Trash'. Below this is a 'Group Libraries' section with 'eos3test' (containing 'Duplicate Items', 'Unfiled Items', and 'Trash'). The main pane displays a table of items with columns: Title, Creator, Date, and Last Modified. The first three rows are visible: 'A Comparison of the Properties of Selecte...' by Honeycutt et al. (2017), 'Development and Applications of Chemical...' by Honeycutt (2017), and 'Monitoring of Carbon Dioxide and Methan...' by Jacob et al. (2015). A context menu is open over the last row, listing options: View Online, Remove Items from Collection..., Move Items to Trash..., Merge Items..., Export Items... (highlighted in blue), Create Bibliography from Items..., Generate Report from Items..., and Better BibTeX. A status bar at the bottom right indicates '5 items selected'. The bottom of the window has standard OS X-style navigation buttons.

Now I can easily cite a source.

Not only does the illustrious Dr. Honeycutt have a PhD in chemistry [1], but he likes to give technical talks [2, 3]. Other people even like giving presentations on his work [4]!

```
Not only does the
illustrious Dr.
Honeycutt have a PhD in
chemistry~\cite{
dissertation}, but he
likes to give technical
talks~\cite{talk2014,
talk2015}. Other people
even like giving
presentations on his
work~\cite{jacob2016}!
```

Then we create our bibliography

```
\bibliographystyle{natbib}  
\bibliography{bib}
```

References

- [1] Wesley T. Honeycutt. *Development and Applications of Chemical Sensors for the Detection of Atmospheric Carbon Dioxide and Methane*. Dissertation, Oklahoma State University, Stillwater, Oklahoma, May 2017.
- [2] Wesley T. Honeycutt, Hayden Hamby, Allen Apblett, and Nicholas F. Materer. Uptake kinetics of heavy metals from water using a high surface area supported inorganic metal oxide.[4] In *Abstracts of Papers, 247th ACS National Meeting & Exposition, Dallas, TX, United States, March 16-20, 2014*, pages ENVR-272. American Chemical Society, 2014. Copyright (C) 2015 American Chemical Society (ACS). All Rights Reserved.

- [3] Wesley T. Honeycutt, Evgueni B. Kadossov, Allen W. Apblett, and Nicholas F. Materer. Selectivity and kinetic behavior of heavy metal and radionuclides on supported ion-exchange adsorbant. In *Abstracts of Papers, 249th ACS National Meeting & Exposition, Denver, CO, United States, March 22-26, 2015*, pages I+EC-44. American Chemical Society, 2015. Copyright (C) 2016 American Chemical Society (ACS). All Rights Reserved.

- [4] Jamey Jacob, Taylor Mitchell, Wesley T. Honeycutt, Nicholas F. Materer, and Peter Clark. Monitoring of Carbon Dioxide and Methane Plumes from Combined Ground-Airborne Sensors. In *Convection and Boyancy Driven Flows: Environmental*, volume 61 of 20. APS, November 2016.

Super Powerful for Theses

Pop a chapter out,
boom... you got a paper.

My last school didn't have a template. So I had to make one myself.

But you are lucky! The OU math department has one.

The screenshot shows a web page titled "LaTeX - resources". The page includes a sidebar with links to "Site menu", "About", "Learning LaTeX", "Getting LaTeX", "Templates", and "Other useful things". The main content area has sections for "About", "Learning LaTeX", "Getting LaTeX", "Templates", and "Other useful things", each containing a list of links related to LaTeX resources.

About

This is a resource page for LaTeX for students (and faculty) at the Department of Mathematics at the University of Oklahoma. Please contact [Thomas.Madhus](#) for comments and suggestions for improvements.

Learning LaTeX

- Newest version of [The Not So Short Introduction To LaTeX](#)

Getting LaTeX

You need two things on your computer to use LaTeX. First you need to LaTeX itself. Then you need an editor. There are many different versions of both out there. Some cost money, but some are free.

- [LaTeX Homepage](#) (the official LaTeX homepage)
- [MiKTeX](#) (A LaTeX implementation for Windows)
- [TeXShop](#) (A LaTeX implementation for Mac OS X. Does not require a key for your editor!)
- [TeXworks](#) (Another free editor. Might be more complicated to install and use.)
- [WYSIWYG](#) (Not free. This editor has been installed on the computers at the math department)
- [WPS Office](#) (A good free program for Windows for creating pictures that can be included in your TeX-document.)

Templates

- Template for quizzes: [psfr-template.tex](#), [psfr-template.pdf](#)
- Template for homework assignments: [tex-hw-template.tex](#), [tex-hw-template.pdf](#)
- Template for exams: [exam-template.tex](#), [exam-template.pdf](#)
- Template for a Ph.D. thesis: [thesis-template.tex](#), [thesis-template.pdf](#) (Created by Eduardo Márquez-Pérez. Thank you Eduardo!)

Other useful things

- [List of articles](#)
- [Free PDF Reader for Windows \(free, small, and fast pdf-viewer.\)](#)
- [The \(Not So Short Introduction to LaTeX2e\)](#)

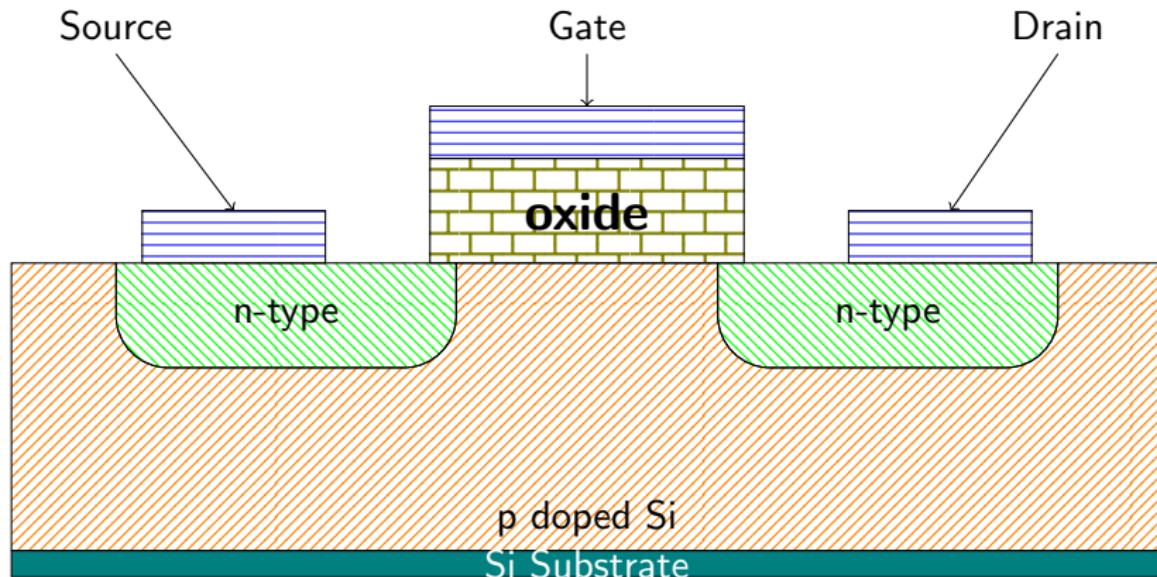
Graphics Generation with TikZ

High quality vector images can be produced from within LaTeX using a package called TikZ.

Additionally, Inkscape can export TikZ directly.

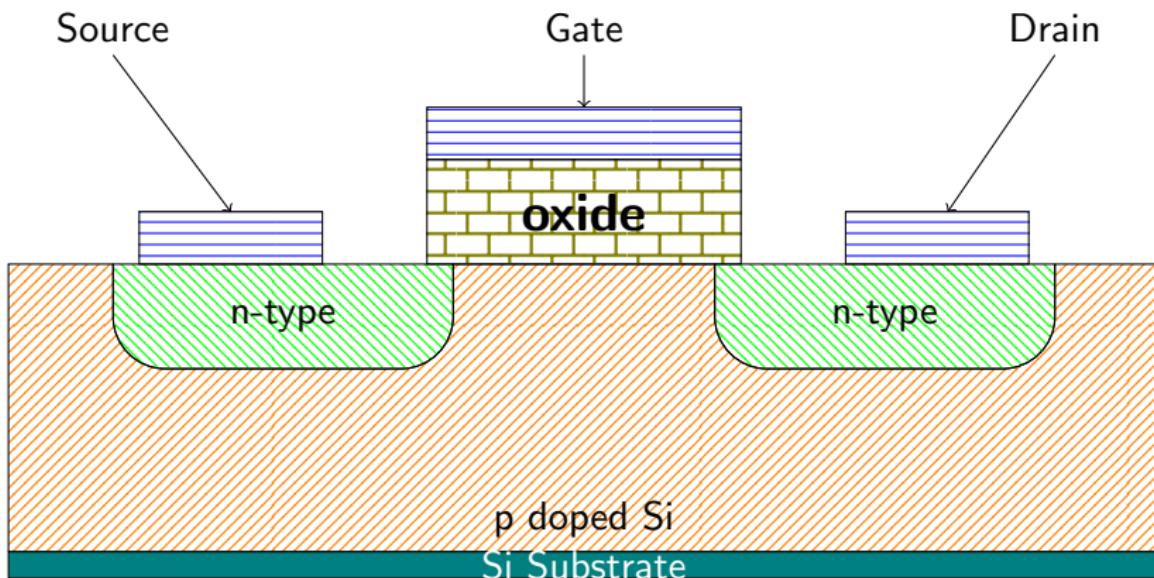
```
\begin{tikzpicture}
\draw \pdifff (0,.25) -- (0,3) -- (1,3) -- (1,2.5) to [out=270,in=180] (1.5,2) --
(3.75,2) to [out=0,in=270] (4.25,2.5) -- (4.25,3) -- (6.75,3) --
(6.75,2.5) to [out=270,in=180] (7.25,2) -- (9.5,2) to [out=0,in=270]
(10,2.5) -- (10,3) -- (11,3) -- (11,.25) -- (0,.25) node [midway,above] {p
doped Si};
\draw \metalthree (0,0) rectangle (11,.25) node [midway, color=white]
{Si Substrate};
\draw \oxide (4,3) rectangle (7,4) node [pos=.5,font=\bf\Large] {oxide};
\draw \metalone (4,4) rectangle (7,4.5);
\draw \ndiff (4.25,3) -- (1,3) -- (1,2.5) to [out=270,in=180] (1.5,2) --
(3.75,2) to [out=0,in=270] (4.25,2.5) -- (4.25,3) node at (2.625,2.5) [
align=center] {n-type};
\draw \ndiff (10,3) -- (6.75,3) -- (6.75,2.5) to [out=270,in=180] (7.25,2) --
(9.5,2) to [out=0,in=270] (10,2.5) -- (10,3) node at (8.375,2.5) [align=
center] {n-type};
\draw \metalone (1.25,3) rectangle (3,3.5);
\draw \metalone (8,3) rectangle (9.75,3.5);
\draw [->] (1,5) node [above] {Source} -- (2.125,3.5);
\draw [->] (10,5) node [above] {Drain} -- (8.975,3.5);
\draw [->] (5.5,5) node [above] {Gate} -- (5.5,4.5);
\node at (5.5,-.5) [align=center] {$V_{GS} < V_{threshold}$};
\end{tikzpicture}
```

MOSFET



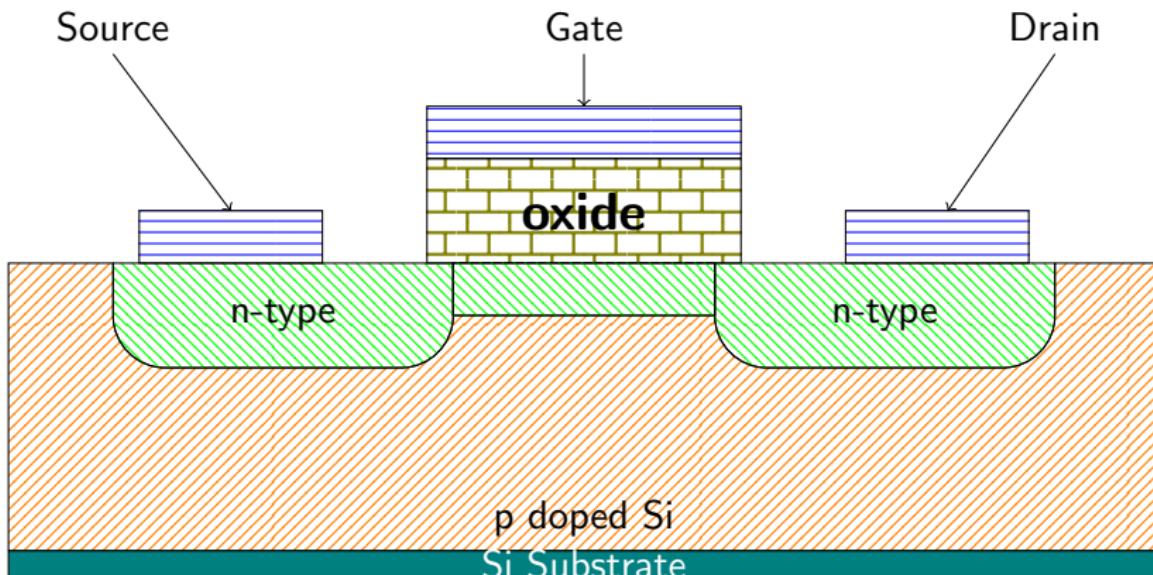
$$V_{GS} < V_{threshold}$$

MOSFET



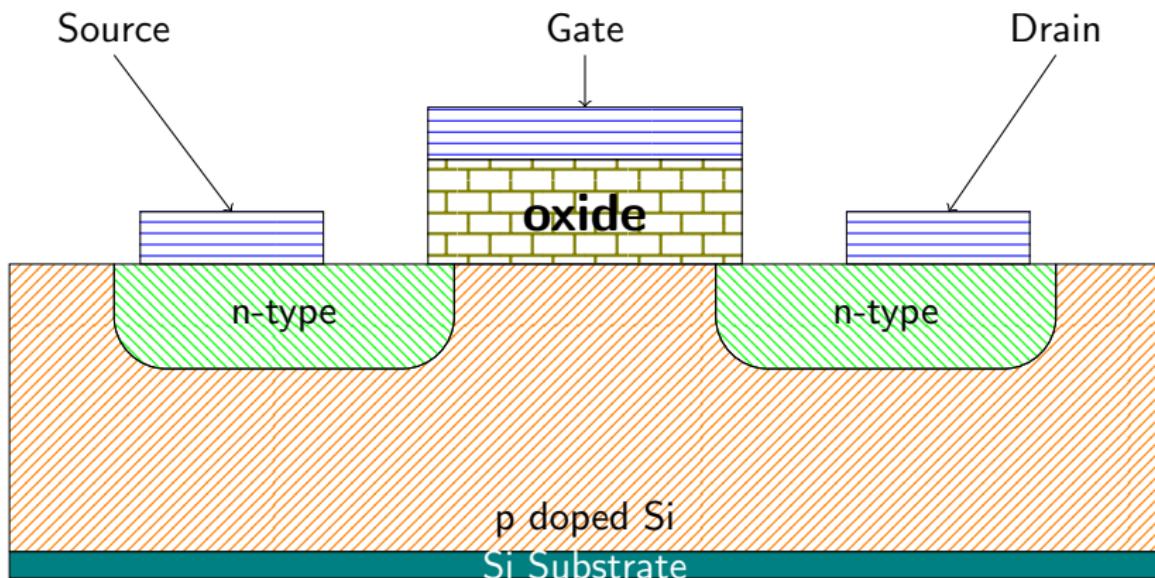
$$V_{GS} \geq V_{threshold}$$
$$V_{DS} < V_{GS} - V_{threshold}$$

MOSFET



$$\begin{aligned}V_{GS} &\geq V_{threshold} \\V_{DS} &< V_{GS} - V_{threshold}\end{aligned}$$

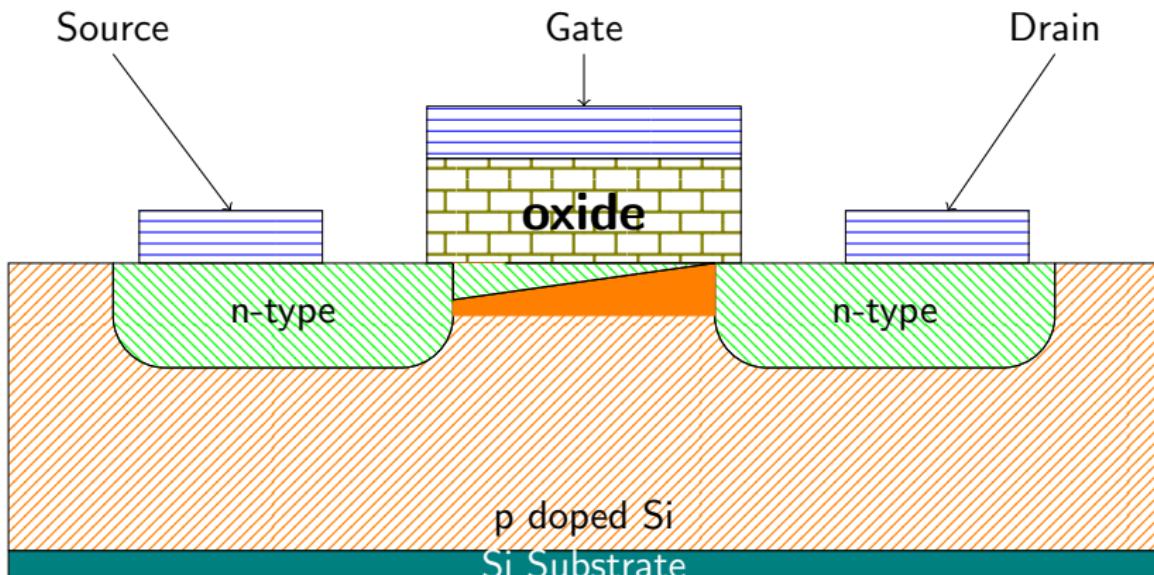
MOSFET



$$V_{GS} \geq V_{threshold}$$

$$V_{DS} = V_{GS} - V_{threshold}$$

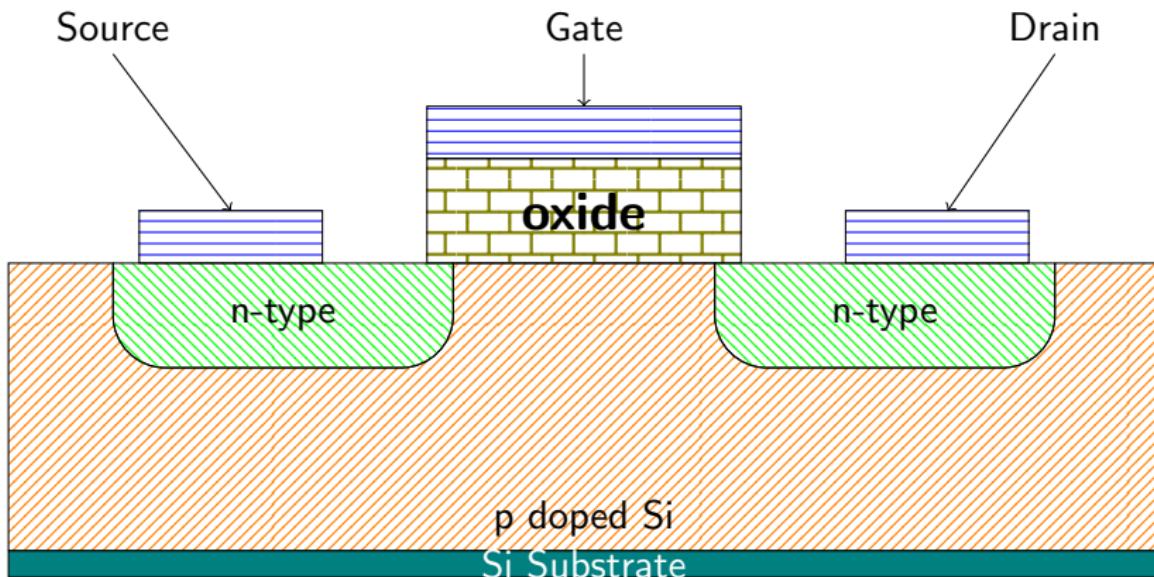
MOSFET



$$V_{GS} \geq V_{threshold}$$

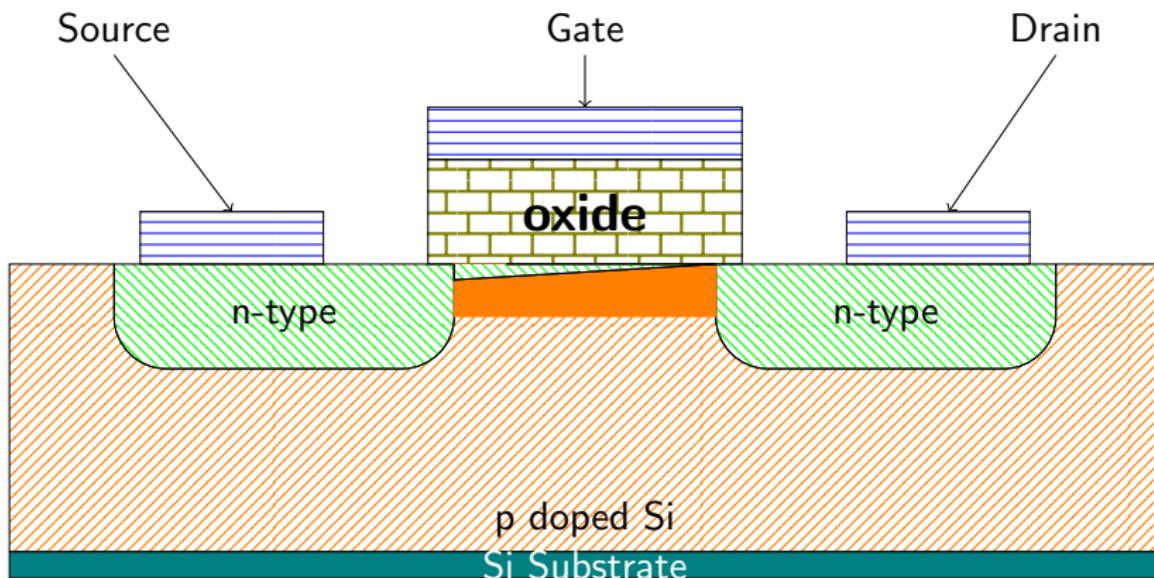
$$V_{DS} = V_{GS} - V_{threshold}$$

MOSFET



$$\begin{aligned}V_{GS} &\geq V_{threshold} \\V_{DS} &> V_{GS} - V_{threshold}\end{aligned}$$

MOSFET



$$V_{GS} \geq V_{threshold}$$
$$V_{DS} > V_{GS} - V_{threshold}$$

Make a Custom Class

October 11, 2018

2.7 LOCATION AND FACILITIES

Redcedar Products is seeking an industrial facility near Stillwater, Oklahoma to start operations. It is estimated that currently, 25% of the state is covered with eastern redcedar (Figure 1). As satellite imaging shows (Figure 2), Payne county contains a large number of these trees. This facility will be a manufacturing plant to produce foliage. This location offers the benefits of proximity to a large research institution which can benefit company growth. The facility will offer storage for purchased foliage and a factory containing extraction equipment. A small office will be utilized for administration activities and a small conference room.

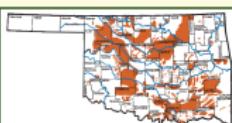


FIGURE 1: A CARTOON OF THE DISTRIBUTION OF REDCEDAR OVER OKLAHOMA.

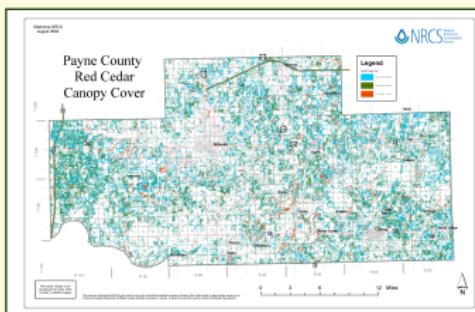


FIGURE 2: A DETAILED MAP OF THE REDCEDAR GROWTH IN PAYNE COUNTY PRODUCED FROM SATELLITE IMAGING COMPILED BY THE NRCS.



Make a Custom Class



<https://github.com/ludus-leonis/nipajin>

Make a Custom Class

Credincioñ: Domine misere. **Prentel:** Re Profeðata, carissime, prebendacis dñeis, misericordie nostræ, de Domine nostro Salvatore ut poneas Beatae Mariae, ut nos dñeis ad eum perducas.

Credincioñ: Domine misere. **Prentel:** Re Profeðata, carissime, prebendacis dñeis, misericordie nostræ, de Domine nostro Salvatore ut poneas Beatae Mariae, ut nos dñeis ad eum perducas.

Credincioñ: Prebendacis Nostre domini de Domine nostro, misericordie nostræ, de Domine nostro, misericordie nostræ.

Prentel: Pe nos bene si ueni pe alii si sunt state nostre, la Hostia, Domine, dñeis a nobis.

Credincioñ: Te, Domine. **Prentel:** Gi Te se curiae nostri alia, omnes ac inchoationes, Trinitati et Pueri et Spiritui Dñi, omni punctione in hoc saeculo.

Credincioñ: Domine misere. **Prentel:** Let us remember our most holy, pure, blessed, and glorious Lady, the Mother of God and ever virgin Mary, with all the saints.

Prentel: Let us remember our most holy, pure, blessed, and glorious Lady, the Mother of God and ever virgin Mary, with all the saints.

Prentel: Most holy Mother of God, have mercy upon us. **Prentel:** Let us arm ourselves and one another and all our life to Christ our God.

Credincioñ: In You, O Lord. **Prentel:** For to You belong all glory, honor, and worship to the Father and the Son and the Holy Spirit, now and forever and to the ages of ages.

Credincioñ: Amen. **Prentel:** Amen.

ANTIPHONIS INTAB¹ **THE FIRST ANTIPHON²**

Mari-Te-ru-lai-qi Pi-vi-lai-qi Sile-stu-lai-Dah, u-a-cam-qi pa-ra-ma-qi In-re-ell-
ye-ek-lar, A - min. Bi-noc-ek-ri - se - ah, u-e-fel-ah mea-pe Dira-nal. Si te-te re-te
di-lla-ant-ru mea, ea - mode, ei! Rih-ah
Sile-stu-lai-Dah, u-a-cam-qi pa-ra-ma-qi In-re-ell-
ye-ek-lar, A - min. Bi-noc-ek-ri - se - ah, u-e-fel-ah mea-pe Dira-nal. Si te-te re-te
di-lla-ant-ru mea, ea - mode, ei! Rih-ah

Bi-noc-ek-ri - se - ah, u-e-fel-ah mea-pe Dira-nal. Si te-te re-te
Bi-noc-ek-ri - se - ah, u-e-fel-ah mea-pe Dira-nal. Si te-te re-te

¹Antiphon: another name for the little psalm or hymn-like antiphony.

²The word antiphon comes from Greek, meaning steps. The first Antiphon encompasses the beginning of Psalm 132, and it is a song of praise to God.

<http://www.liturghie.net/>



Make a Custom Class

3. Creation de l'homme - Géode

https://github.com/raphink/geneve_1564

Make a Custom Class

Nexus.sty
A style file for LATEX

Alexis Flesch

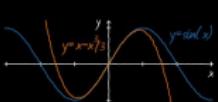
version 1.1

$$(a+b)^n = \sum_{k=0}^n \binom{n}{k} a^k b^{n-k}$$


$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

$$\zeta_k = |a|^{1/n} e^{i(\arg(a) + 2k\pi)/n}$$

$$e^{i\pi} + 1 = 0$$

$$\neg(p \vee q) \equiv (\neg p) \wedge (\neg q)$$


Contents

CHAPTER 1 This is a Chapter		Page 4
1.1	This is a section This is a subsection - This is a subsection	4
1.2	This is a section This is a subsection - This is a subsection	7
CHAPTER 2 This is a Chapter		Page 9
2.1	This is a section This is a subsection - This is a subsection	9
2.2	This is a section This is a subsection - This is a subsection	12
CHAPTER 3 This is a Chapter		Page 14
3.1	This is a section This is a subsection - This is a subsection	14
3.2	This is a section This is a subsection - This is a subsection	17
CHAPTER 4 This is a Chapter		Page 19
4.1	This is a section This is a subsection - This is a subsection	19
4.2	This is a section This is a subsection - This is a subsection	22
CHAPTER 5 This is a Chapter		Page 24
5.1	This is a section This is a subsection - This is a subsection	24
5.2	This is a section This is a subsection - This is a subsection	27
APPENDIX A This is a Chapter		Page 29
A.1	This is a section This is a subsection - This is a subsection	29
A.2	This is a section This is a subsection - This is a subsection	32

1 2 3 4 A B

Unique Words and Hyphenation

LATEX automatically hyphenates words in the dictionary. What if you have something that isn't common?

```
\hyphenation{Red-ce-dar May-ap-ple Ok-la-ho-ma che-mo-ther  
-apy through}
```

Do calculations

LATEX wasn't made for math, but you do have access to registers . . .

```
\usepackage{calc}
```



```
1 \newlength{\mylength}
2 \setlength{\mylength}{\textwidth}%
3 \noindent\rule{\mylength}{20pt}
4
5 \bigskip
6 \setlength{\mylength}{\textwidth-1cm}%
7 \noindent\rule{\mylength}{20pt}
8
9 \bigskip
10 \setlength{\mylength}{\textwidth-80pt+5mm-1bp}%
11 \noindent\rule{\mylength}{20pt}
```

Do calculations

. . . and floating points.

\usepackage{fp}

The following arithmetic is easy:

- ▶ $5 + 6 = 11$
- ▶ $2 + 3/5 \times \pi = 3.88496$

```
1 The following arithmetic is
   easy:
2 \begin{itemize}
3 \item \FPeval{\result}{clip
   (5+6)}%
4 \$5+6=\result$
5 \item \FPeval{\result}{round
   (2+3/5*pi,5)}%
6 \$2+3/5\pi=\result$
7 \end{itemize}
```

I use math for my consulting invoices.

Wesley Honeycutt

111 Chesapeake St.

(405) 555-5555

Norman, OK 73019

honeycutt@ou.edu

Invoice To:

Jimmy Gallogly
University of Oklahoma
660 Paddington Oval
Norman, OK 73019

Invoice Date:

October 15, 2018

Invoice Terms

Due on Receipt

Description of Services	Quantity	Unit Price	Amount
Purchased Materials			
Beard Growth Oil		\$337.39	\$337.39
Consulting Services			
July 9 th , 2018	1.00 hours	\$12.00	\$12.00
July 10 th , 2018	8.00 hours	\$34.00	\$272.00
July 11 th , 2018	3.00 hours	\$12.00	\$36.00
July 14 th , 2018	3.00 hours	\$34.00	\$102.00
July 15 th , 2018	3.00 hours	\$12.00	\$36.00
July 20 th , 2018	1.00 hours	\$34.00	\$34.00
July 21 st , 2018	2.00 hours	\$12.00	\$24.00
July 31 st , 2018	4.00 hours	\$34.00	\$136.00
Balance Due			\$989.39

\microtype aka Giving in to typesetting

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

\microtype aka Giving in to typesetting

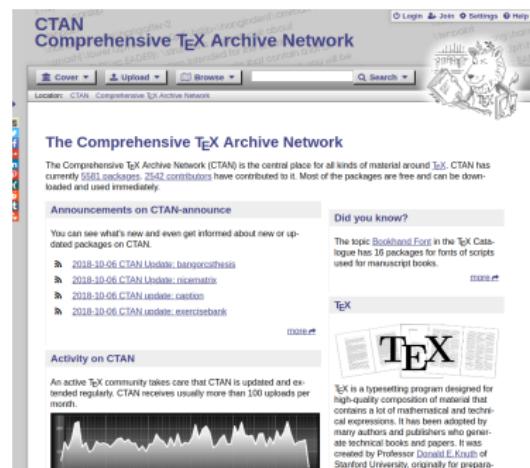
Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

RTFM

The Comprehensive TeX Archive Network is a package repository

This also includes manuals and examples



When in doubt: Google

T_EX is older than the Happy Meal.

When in doubt: Google

T_EX is older than the Happy Meal.

Someone has likely experienced your pain.

When in doubt: Google

T_EX is older than the Happy Meal.

Someone has likely experienced your pain.

<https://tex.stackexchange.com/>

At your local library

OU libraries has a LATEX expert:

Amanda Schilling

✉: [Stem Services](#)

📞: (405) 325-6126

✉: amanda.schilling@ou.edu

Office Hours: W/Th 8-9am in DAVIS
M 6-8pm in the Learning Lab



At your local library

OU libraries has a L^AT_EX expert:

Mark Laufersweiler

- 🔗: [Research Data Specialist](#)
- 📞: (405) 325-3710
- ✉️: laufers@ou.edu



Or contact me

I'm just a L^AT_EX junkie:

Wesley T. Honeycutt

- 🔗: [Personal Site](#)
- 📞: *I have an office phone?*
- ✉️: honeycutt@ou.edu
- 🌐: <https://github.com/BlueNalgene>

