LaTeX Cheat Sheet

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Text Editing

Just typing normal text will place what you type directly into the document. The text starts indented automatically.

Manually typing in a space in your code will create a new indented paragraph.
Using the "newline" command will create a new paragraph that is not indented.
You can manually remove an indent with the "noindent" command.

You can also write text to appear in separate columns. The number of columns is determined by the second bracketed value after the command.

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1 Section 1

1.1 Subsection 1

1.1.1 Subsubsection 1

2 Section 2

Section 1

Subsection 1

Subsubsection 1

Section 2

The design of the text can be changed on the fly. You can create **bold text**, *italic text*, SMALL CAPS TEXT, *slanted text*, `typewriter text`, and times new roman text. The text size can also be change as tiny, small, normal, and increasingly larger sizes: large, large, large, large, large, large .

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1. The first item in the default numbered list
   (a) First lettered item
      i. First roman numeral item
      ii. Second roman numeral item
   (b) Second lettered item
2. The second item in the default numbered list
3. The third item in the default numbered list

- [ ] First thought
- [x] Second thought
- [x] Third thought
- [ ] Fourth thought

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1. How many positive integers less than 100 have a remainder of 3 upon division by 7?

   a) 10 b) 11 c) 12
   d) 13 e) 14

Question 1. Your question.

Problem 4.
Your problem

Solution (15). Your solution

Math Mode and Equations

Some useful LaTeX math operations include:

1. $X^{10}y$
2. X_{10}
3. X_{10}^{10}
4. $f'(x)$
5. $X \to Y \Rightarrow Z$
6. $Pr(A \cup B \mid C \cap D)$
7. $\left(\left(\left(()\right)\right)\right)$
8. $\frac{x+7}{2x-5}$
9. $\dfrac{x+7}{2x-5}$
10. $\sqrt{x}$ and $\sqrt[3]{x}$
11. $\sum_{i=0}^{n}$
12. $\int_{x=0}^{1} f(x)\partial x$
13. $<, >, \geq, \leq, \neq, \pm, \therefore$
14. $\binom{n}{k}$
15. $\overline{X}$ and $\bar{X}$
16. ∞
17. $|X-2|$
18. $\boxed{y = mx + b}$
19. $\widehat{X}$
20. $X \sim N(\mu, \sigma^2)$
21. $\pi \approx 3.14$
22. $\sin(x)$ and $\cos(x)$
23. $X \cdot Y$
24. $\left(\dfrac{x}{2}\right)\Big|_0^1$
25. $\mathbf{X}$
26. $\boldsymbol{\pi}$
27. $\mathcal{X}$
28. $\mathbb{X}$

Detexify: For drawing symbols: `https://detexify.kirelabs.org/classify.html`
For all Greek symbols: `http://web.ift.uib.no/Teori/KURS/WRK/TeX/symALL.html`

Macros

Similar to SAS, a LaTeX macro will allow you to create your own commands to allow shorthand access to commands you will use a lot. Some useful macros have already been written in the "mymacros.sty" file under "PROJECT." These commands are then loaded in using the "library(mymacros)" command. Observe the differences in the following two codes which yield the same output:

$$Pr\left(\mathbf{A} \cup \overline{\mathbf{B}}\right) = Pr\left(\overline{\mathbf{A}} \cap \mathbf{B}\right)$$

$$Pr\left(\mathbf{A} \cup \overline{\mathbf{B}}\right) = Pr\left(\overline{\mathbf{A}} \cap \mathbf{B}\right)$$

More Math Examples

$$\lim_{x\to\infty} f(x) = 0 \tag{1}$$

$$\lim_{x\to\infty} f(x) = 0 \tag{2}$$

$$\frac{X - n\mu_x}{\sigma_x\sqrt{n}} = \frac{X - 12(16)}{1\sqrt{12}}$$

$$Z = \frac{\overline{x} - \mu_0}{\sigma/\sqrt{n}} \rightarrow \text{ If } |Z| > z_{1-\alpha/2}, \text{ reject } H_0$$

$$Pr\Big(\lim_{n\to\infty} \overline{X}_n = \mu\Big) = 1, \text{ so } \overline{X}_n \xrightarrow{a.s.} \mu$$

$$\begin{aligned}
\text{var}(U_1) &= \text{var}(aY_1 + bY_2) \\
&= \text{var}(aY_1) + \text{var}(bY_2) + 2\text{cov}(aY_1, bY_2) \\
&= \text{var}(aY_1) + \text{var}(bY_2) + 0 && \ldots Y_1 \textit{ and } Y_2 \textit{ uncorrelated} \\
&= a^2 \cdot \text{var}(Y_1) + b^2 \cdot \text{var}(Y_2) && \ldots a = b = 1 \\
&= \text{var}(Y_1) + \text{var}(Y_2) \\
&= \sigma_1^2 + \sigma_2^2
\end{aligned}$$

$$f_{XY}(x, y) = \begin{cases} xy/96, & 0 < x < 4 \text{ , } 1 < y < 5 \\ 0, & \text{elsewhere} \end{cases}$$

$$A^T = \begin{bmatrix} a_{11} & 0 & \ldots & a_{1n} \\ 0 & a_{22} & \ldots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \ldots & a_{nn} \end{bmatrix}$$

$$M_{n\times 1} = \begin{pmatrix} \mu_1 \\ \mu_2 \\ \vdots \\ \mu_n \end{pmatrix}$$

Tables and Figures

Tables Generator `https://www.tablesgenerator.com/`

Evaluation	Disease Status	
	HIV^+	HIV^-
Minority	$n_{1,1}$	$n_{1,2}$
Non-minority	$n_{2,1}$	$n_{2,2}$

$\lvert d_i \rvert$	f_i^+	f_i^-	Range	Rank
0.3	1	0	-	1
1.8	0	1	-	2
2.2	1	0	-	3
2.7	0	1	-	4
3.5	1	0	-	5
4.5	0	1	-	6
4.8	1	0	-	7

$\lvert d_i \rvert$	f_i^+	f_i^-	Range	Rank
6.7	1	0	-	13
9.6	1	0	-	14
10.3	0	1	-	15
11.5	1	0	-	16
12.2	1	0	-	17
12.6	0	1	-	18
13.9	1	0	-	19

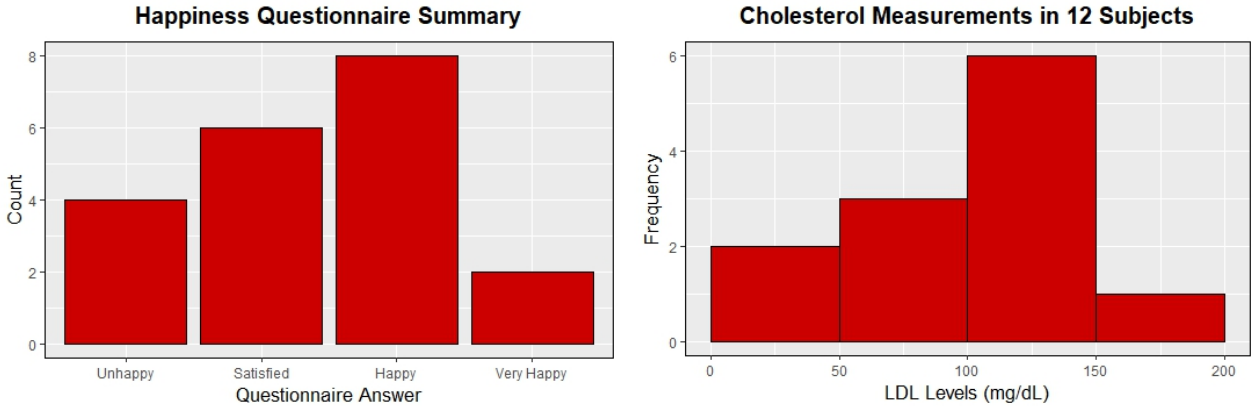
Multiple Regression Analysis					
	Estimate	Std. Error	t-value	$Pr(>\lvert t \rvert)$	R^2
$\boldsymbol{\beta}_0$	10.117840	3.185028	3.177	**0.00323**	0.8792
Variable 1	-0.007408	0.019549	-0.0318	**0.70586**	
Variable 2	0.209211	0.077238	2.709	**0.01026**	
Variable 3	0.082309	0.077796	1.059	**0.29727**	
Variable 4	-0.366571	0.057473	-6.378	**3.18e-07**	

Table 1: Adolescent Cranial Perimeter Measurements (cm)

41.0	39.5	43.2	40.5	42.3	44.5	38.5
42.5	40.3	46.3	45.6	44.2	40.1	43.5
40.2	42.7	45.0	45.2	46.7	39.4	41.0
39.0	39.6	43.0	42.8	47.9	46.5	40.2

	EXPOSURE		
DISEASE	Smoker $(+)$	Smoker $(-)$	
Cold	587	402	989
No Cold	2,743	2,578	5,321
	3,330	2,980	6,310

Figure 1: Logo for Overleaf.

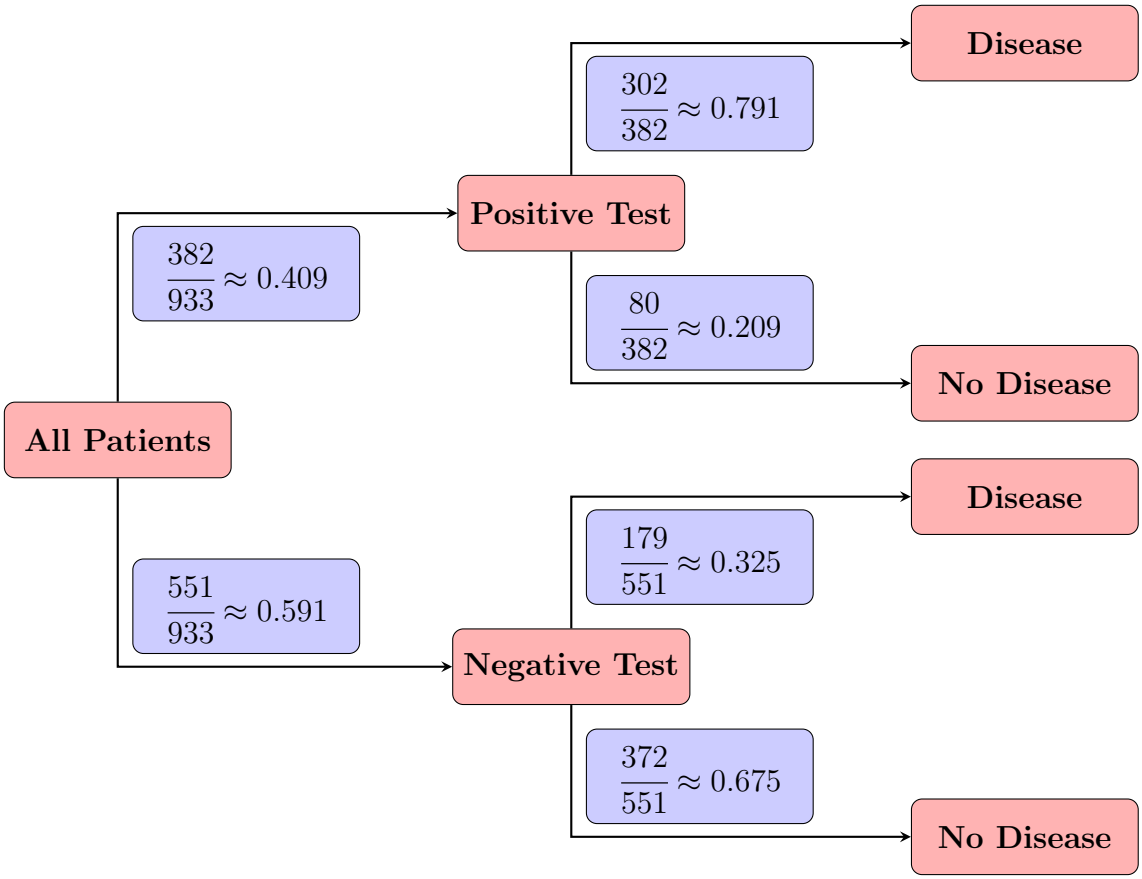


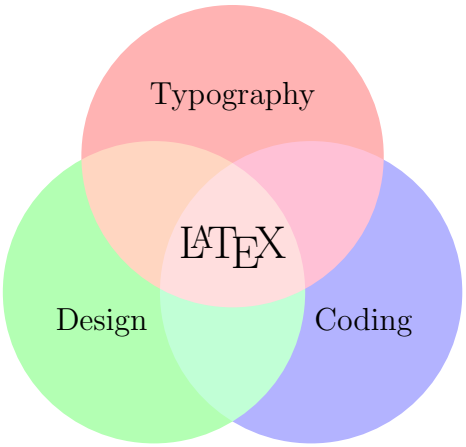
Charts, Diagrams, and Decision Trees

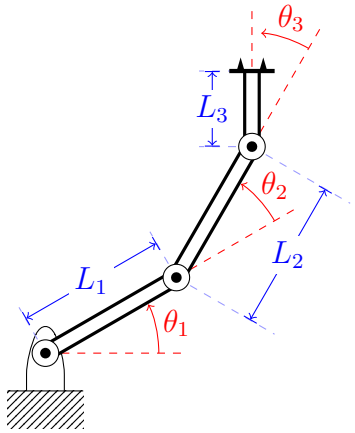
The "tikz" library in LaTeX is one of the most versatile visualization packages. It is useful for creating diagrams and visual aids like those seen below:

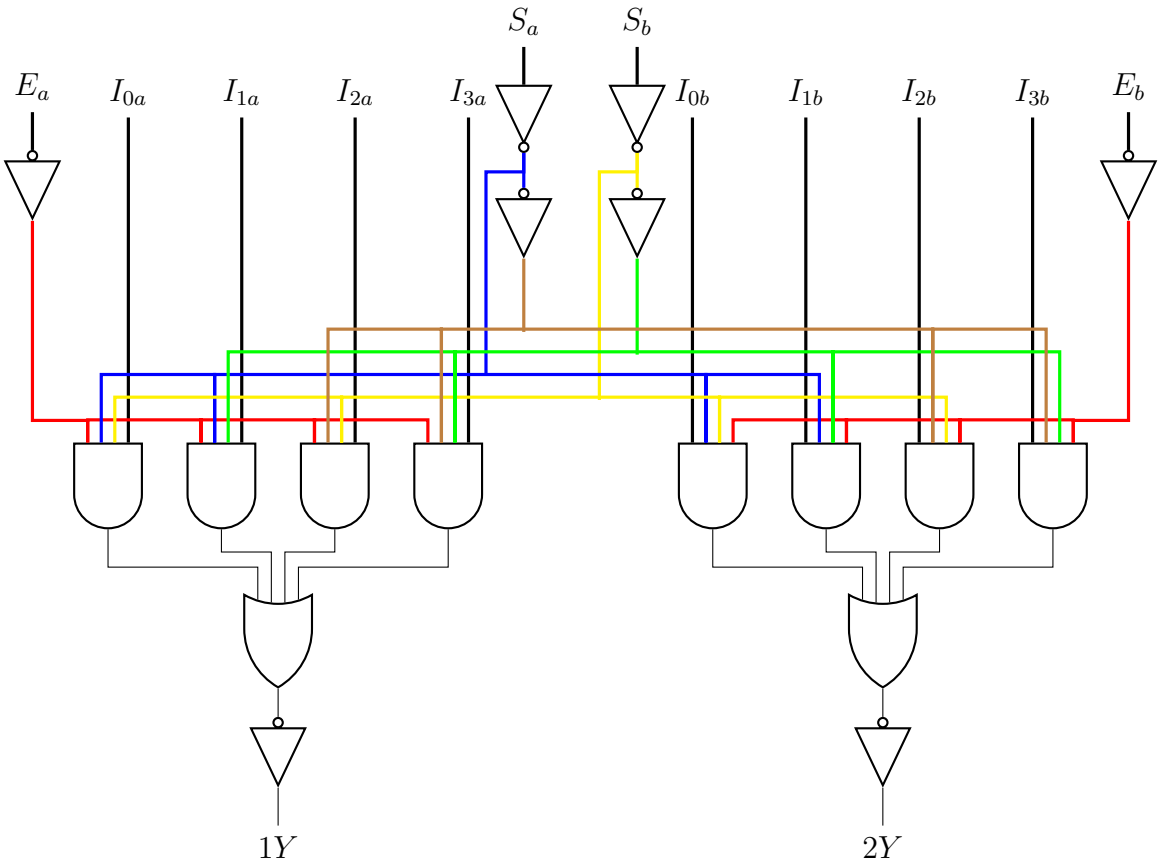
More examples: `http://www.texample.net/tikz/`

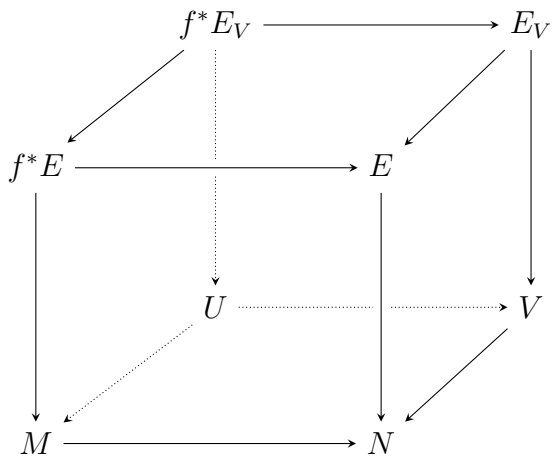
	DISEASE		
TEST RESULT	Present	Absent	
Positive	302	80	382
Negative	179	372	551
	481	452	933

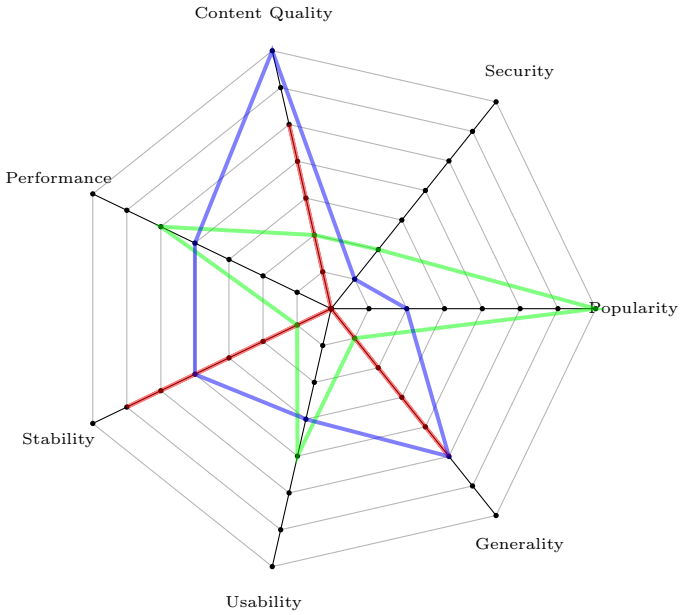



Typography
LaTeX
Design
Coding


θ_3
L_3
θ_2
L_2
L_1
θ_1


S_a
S_b
E_a
I_{0a}
I_{1a}
I_{2a}
I_{3a}
I_{0b}
I_{1b}
I_{2b}
I_{3b}
E_b
$1Y$
$2Y$





Spiderweb Diagram (7 Dimensions, 7-Notch Scale, 3 Samples)

Displaying Code in LaTeX

```
# Filename: ProgrammingBasics.R

# ---Simple Calculations---
2 + 3

x <- 2
y <- 3
x + y
x * y

# ---Data Structures---

# Vectors
workshop <- c(1, 2, 1, 2, 1, 2, 1, 2)
print(workshop)
workshop

gender <- c("f", "f", "f", NA, "m", "m", "m", "m")
q1 <- c(1, 2, 2, 3, 4, 5, 5, 4)
q2 <- c(1, 1, 2, 1, 5, 4, 3, 5)
q3 <- c(5, 4, 4,NA, 2, 5, 4, 5)
q4 <- c(1, 1, 3, 3, 4, 5, 4, 5)

# Selecting Elements of Vectors
q1[5]
q1[ c(5, 6, 7, 8) ]
q1[5:8]
q1[gender == "m"]
mean( q1[ gender == "m" ], na.rm = TRUE)
```