Assignment 1

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Note: This is by no means a full and complete introduction to latex (or maybe not an introduction at all). Its purpose is to mostly introduce some of the symbols and notation used throughout the course, if you already know some of the basics.

Exercise 1

(a) My solution to this exercise is a bunch of **logical symbols**: $\vee\wedge \Rightarrow\Leftrightarrow \neg \equiv\not\equiv\therefore\because$.
And some more: $\exists_x\forall_y$

(b) Can't forget the *set operations* and so forth:

$$\cap \cup \setminus^c \mathcal{PU} \in\notin\subseteq\not\subseteq \emptyset$$

(c) Some basic mathematical notation

$$\mathbb{R}\mathbb{N}\mathbb{Z}\mathbb{Q} <> \leq \geq \neq x^2 \sqrt{y}$$

(d) Here's a math table-like environment for setting up a series of derivations.

$$\begin{array}{ll} & T \\ \equiv & \{\text{rule to be proven } \Rightarrow\} \\ & ? \\ \equiv & \{\text{rule to be proven } \wedge\} \\ & F \end{array}$$

But if you don't want to use (a lot of) math inside a table, a normal table also works:

left	center	right
l	c	r
$x + y$	$\equiv$	$y + x$
	$a \wedge b$	
	q	
$\therefore$	x	

Exercise 2

(a) Regular expressions: $(a + \varepsilon)^*(a + b)ab$

(a) Useful for writing about Turing machines: $\square$

Exercise 3

For specifying algorithms:

Algorithm MyIncredibleAlgorithm(A, v)
Input: an array A of n numbers and a number v
Output: an index i such that $A[i] = 42$, or NotFound if no such index exists
1. $i \leftarrow 1$
2. **while** $i \leq n$ and $A[i] \neq 42$
3. **do** $i \leftarrow i + v^2$
4. **if** $i > n$
5. **then return** NotFound
6. **else return** i
7. **for** $i \leftarrow 1$ to n
8. **do** Something useful

For analysis, you may want to know $O, \Theta, \Omega(n \log n)$ (not to be confused with o, ω).