$L = \{ w \mid w \in \{a,b,c\}^* \}$

number of a's < # b's
and # of a's < # c's

L is not Context free.

Suppose L is context free, w/ pumping length p.

Choose $s = a^p b^{p+1} c^{p+1}$

By the P.L. we can split s into 5 parts, uvxyz

vxy can contain at most 2 distinct types of symbols.

$|vxy| \leq p$

case 1: v and y ~~are all~~ contain a's

so v and y contain no c's

so uv^2xy^2z has at least as many a's as c's

so $uv^2xy^2z \notin L$

case 2: v and y contain no a's

so uv^0xy^0z contains fewer of b's or c's (or both) than a's and so is not in L.

So L is not a CFL.

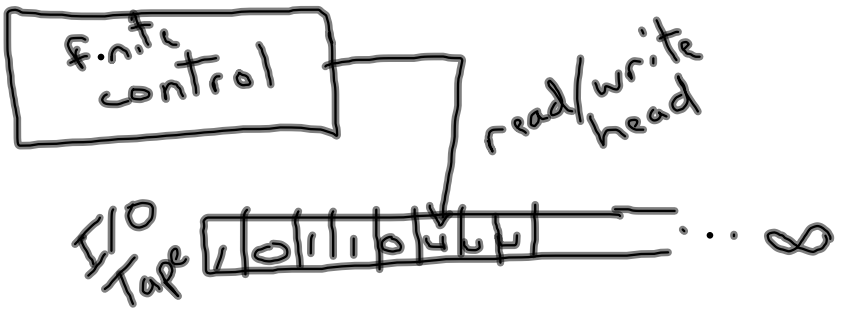
$A \to B$
$\sim B \to \sim A$

~~$B \to A$~~
~~$\sim A \to \sim B$~~

Turing Machines

Church-Turing Thesis

Turing Machines can compute any computable function.



- read/write from tape
- move r/w head left/right
- accept/reject states (:immediate)
- start the r/w head on the left end
- special "blank" symbol ␣, b
- input str starts on left end of the tape

$$L = \{ w \# w \mid w \in \{0,1\}^* \}$$