Quiz 2

1. (5) Convert *G* to a PDA using the method described in class

PDA

1. (10) Convert *G* to Chomsky Normal Form

Add S and remove :

Remove single rewrites:

Remove mixed/multiple terminals:

Remove long rewrites to get CNF:

1. (10) Let *FINITETM* = { <*M*> | *M* is a Turing machine, and *L*(*M*) is finite }.  Show that *FINITETM* is undecidable.

We know that all finite languages are regular, therefore if we prove that *REGULARTM* = { <*M*> | *M* is a Turing machine, and *L*(*M*) is regular} is undecidable, we know that *FINITETM* also has to be undecidable

Proof: Assume BWOC that is decidable, by definition of decidability let is its decider

Then we build a where:

* We receive Turing machine M and string s
* We mimic
* We construct a new Turing machine that,
  + Receives string
  + Accepts if is in for some
  + Otherwise simulates on and mimic if accepts, rejects or fails to halt

Interrogate for regularity using and accept or reject in agreement. This causes a dichotomy and makes decide and creates a contradiction, therefore is undecidable