Ma2201/CS2022
Quiz 1000

Foundations of C.S.

Spring, 2021

PRINT NAME: _____

$\mathcal{SIGN}$: _____

1. (**4 pts**) Consider the grammar

$$\begin{array}{rcl} G: S & \rightarrow & aBAb \mid \lambda \\ A & \rightarrow & a^2B \mid b^2 \\ B & \rightarrow & b^2A \mid a^2 \end{array} .$$

Create a Chomsky Normal Form Grammar G' with $L(G) = L(G')$.

You can use the conversion method we discussed, or you can you another method, but in that case, justify what you do.

2. (**3 pts**) Design a Chomsky Normal Form grammar whose language is the palindromes on $\{a, b\}$ which are of odd length and start with a. Your Chomsky Grammar should have no rule which not allowed in the definition in the Text.

3. (**3 pts**) Suppose we have a grammar which contains the two variables A and B and all the A and B rules are

$$\begin{array}{rcl} A & \rightarrow & AB \mid ab \mid BA \mid ba \mid ABABA \\ B & \rightarrow & BB \mid bb \mid AB \mid aa \mid BBABB \end{array}$$

Introduce new variables X and Y to remove the direct left recursion.