

CMSC 330 Spring 2017 Quiz #3

Name (as it appears on Gradescope) _____

Discussion Time (circle one) 10am 11am 12noon 1pm 2pm 3pm

Discussion TA (circle one) Aaron Alex Austin Ayman BT Daniel
Eric Greg Jake JT Sam Tal Vitung

Instructions

- Do not start this quiz until you are told to do so.
- You have 15 minutes for this quiz.
- This is a closed book quiz. No notes or other aids are allowed.
- For partial credit, show all of your work and clearly indicate your answers.

1a. (1 point) Describe the language accepted by the following grammar:

$S \rightarrow S \text{ and } S \mid S \text{ or } S \mid (S) \mid \text{True} \mid \text{False}$

boolean expressions

1b. (4 points) Write a left-most derivation of "(True and False) and True"

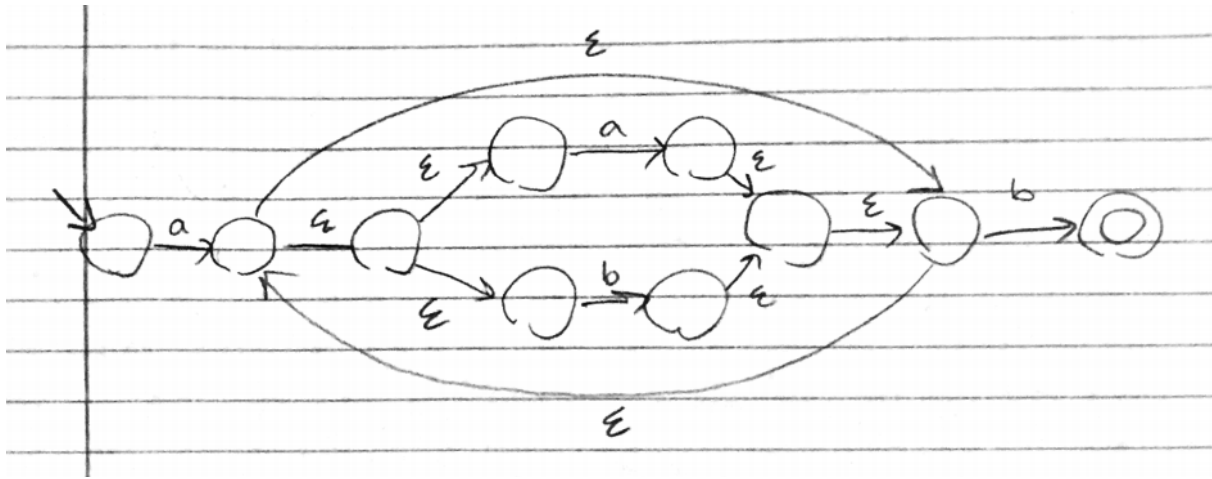
$S \rightarrow S \text{ and } S \rightarrow (S) \text{ and } S \rightarrow (S \text{ and } S) \text{ and } S \rightarrow (\text{True and } S) \text{ and } S \rightarrow (\text{True and False) and } S \rightarrow (\text{True and False) and True$

2. (5 points) Write a grammar for $a^x b^y a^z$, where $z = x + y$ and $x, y, z \geq 0$.

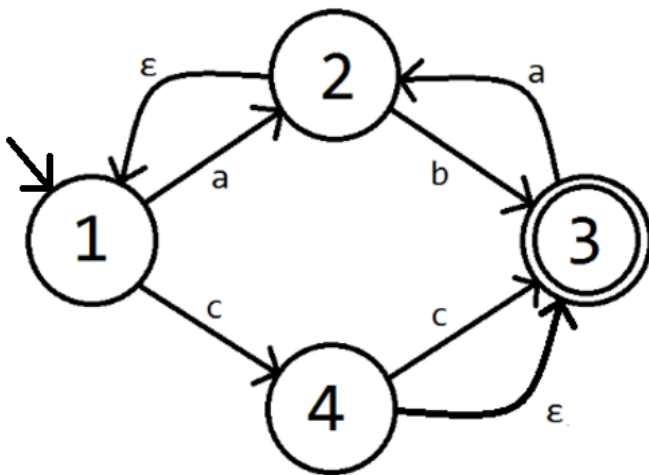
$S \rightarrow aSa \mid T$

$T \rightarrow bTa \mid e$

3. (5 points) Reduce the regular expression "a(a|b)*b" to an NFA.



4. (5 points) Reduce the following NFA to a DFA.



State	move	ϵ closure
1	$a \rightarrow 2$	1, 2
	$b \rightarrow \emptyset$	
	$c \rightarrow 4$	3, 4
1, 2	$a \rightarrow 2$	1, 2
	$b \rightarrow 3$	3
	$c \rightarrow 4$	3, 4
3, 4	$a \rightarrow 2$	1, 2
	$b \rightarrow \emptyset$	
	$c \rightarrow 3$	3
3	$a \rightarrow 2$	1, 2
	$b \rightarrow \emptyset$	
	$c \rightarrow \emptyset$	

