CS5003
Quiz 1011

Foundations of C.S.

Spring, 2017

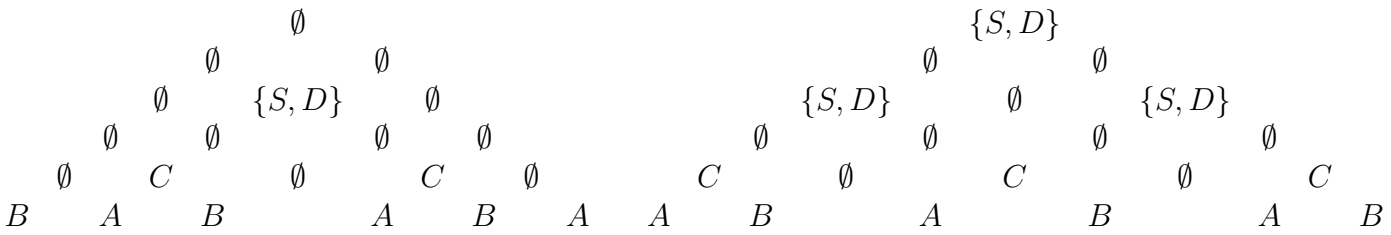
PRINT NAME: _____

$\mathcal{SIGN}$: _____

1. (4 points) Trace the CYK algoritm (fill in the upper triangle, or the pyramid) to establish whether or not the strings *bababa* and *ababab* are in the language of the grammar

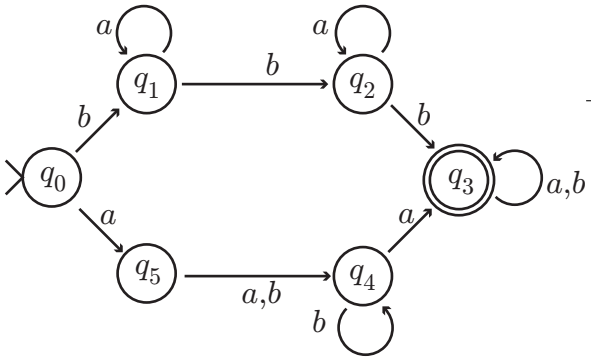
$$\begin{aligned} G: S &\rightarrow CD \mid CE \\ A &\rightarrow a \\ B &\rightarrow b \\ C &\rightarrow AB \mid AA \mid BB \\ D &\rightarrow CC \mid CD \mid DC \end{aligned}$$

♣The traces are



you can save time by just checking the string *abababa* and looking at the entries in the second row from the top. ♣

2. (6 points) Consider the Deterministic Finite Automaton M depicted below:



δ	a	b
q_0	q_5	q_1
q_1	q_1	q_2
q_2	q_2	q_3
q_3	q_3	q_3
q_4	q_3	q_4
q_5	q_4	q_4

a) On the back of this page construct the transition table for M.

b) Find any 6 letter string which is *not* in the language of the machine, $L(M)$.

♣ Many work, like *baaaaa* ♣

c) Give a regular expression for $L(M)$.

♣ There are two paths to the final state, at which there is a loop.
$(ba^*ba^*b \cup a(a \cup b)b^*a)(a \cup b)^*$ ♣