HOMEWORK II
CMPE 326 - Formal Languages & Automata
Due: May 17, 2021, 23:59

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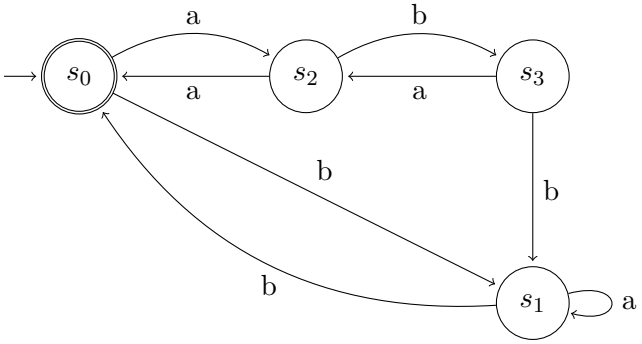
1. (15p) Consider the Context-free grammar G defined by:
   S $\rightarrow aS \mid bTbS \mid \varepsilon$
   T $\rightarrow aT \mid \varepsilon$

   a) Describe L(G). (5p)
   b) Convert G into a Pushdown Automaton (PDA). (10p)

2. (25p) Given the DFA below, covert it into the regular expression. Show your steps.



3. (20p) Convert the following CFG into the Chomsky Normal Form. Show each step.
   S $\rightarrow ABC \mid aBC$
   $A \rightarrow aAC \mid B$
   $B \rightarrow bB \mid \varepsilon$
   C $\rightarrow cC \mid \varepsilon$

4. (20p) Find a Context-free grammar for the following language L.
   L = { $a^n\ b^m\ c^i \mid 0 \leq m+n \leq i$ }

5. (20p) For L = { $a^i\ b^j \mid 0 \leq i \leq j \leq 2i$ }, construct a Pushdown Automaton (PDA).