JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2023

B.Tech-VII Semester (CSE/IT/ECE)

COURSE CODE(CREDITS): ~~L-18B1WCI740~~ 18B11CI513 (3) MAX. MARKS: 15

COURSE NAME: Formal language and Automata

COURSE INSTRUCTORS: RKI,DHA, SGL, VKS MAX. TIME: 1 Hour

Note: (a)Marks are indicated against each question in square brackets. Attempt any 5 questions.

Q1. (i) What is the objective of learning automata theory? [1] [CO1]

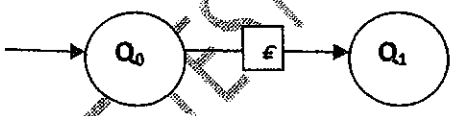
(ii) Design a FSA for a password protected door controller? Can we extend the door controller gets locked for 1 days on wrong attempt for 3 times (as happens in net banking system), if no then what kind of extra features need to be added. [1.5+0.5] [CO1, CO2]

Q2. (i) Please give some of the strings accepted in language (L) which accepts even number of 0 followed by 1 divisible by 5. Create the DFA or NFA for it. [0.5+1.5] [CO1, CO2]

(ii) What is the motivation for learning NFA? [0.5] [CO1, CO2]

Q3. (i) Can we transform a DFA with multiple final states into a DFA with single final state? [1] [CO1, CO2]

(ii)Why given below FSA is NFA? [1] [CO1, CO2]



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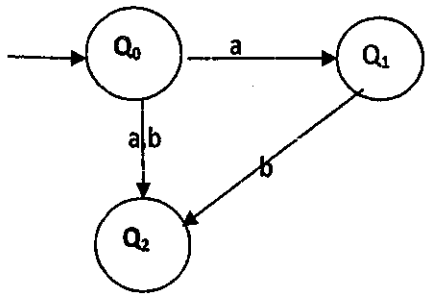


Consider Q_2 is the final state.

Show the execution tree for accepting string ab. [1] [CO1, CO2]

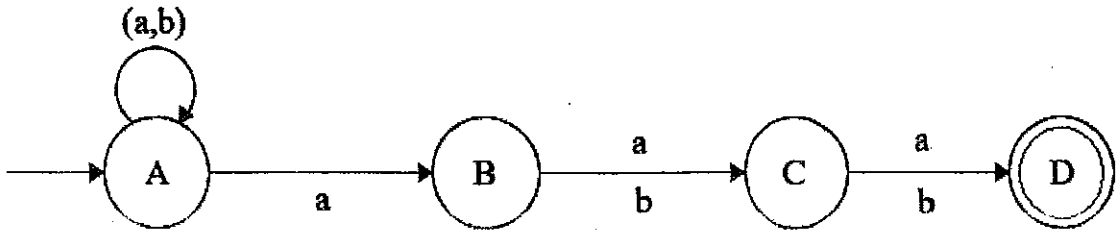
Q4. (i) Create a DFA to start with even number of 0 and odd length string or start with 1 and even number length string. [2] [CO1, CO2]

(ii) How many number of states will be in equivalent DFA for a NFA which has 5 states with all epsilon transition? [1] [CO2]

Q5. Create a DFA for L={w: $(n_a - n_b)$ mod 3=0}, here n_a and n_b represent number of a and b respectively. [3] [CO2]

Q6. Create a DFA for a language which accepts even number 0 and number of b produce remainder 2 when divisible by 5. [3] [CO2]

Q7. Which kind of string is accepted by below NFA. Convert NFA to DFA for that. [0.5+2.5] [CO2]



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