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660

School of Computer Science and Engineering Department Computer Engineering and Technology

TYB.Tech.(CSE/CSF) (Academic Year 2023-24) Mid Term Exam - Semester IV

Course Name:- Theory of Computation Maximum Marks: 15 Course Code:- CET2008B

Time: 45 Minutes

Date: 03/04/2024

Instructions:-

1. Solve "Q1 or Q2" and "Q3 or Q4".
2. Figure to the right indicates full marks.
3. Use of cellphone is prohibited till the examination hall.
4. Neat diagrams must be drawn wherever necessary.
5. Assume suitable data, if necessary and clearly state.
6. Use of scientific calculator is allowed

Q1. A. Mention the tuples of DFA with meaning. Convert the following NFA to DFA. [4 Marks]

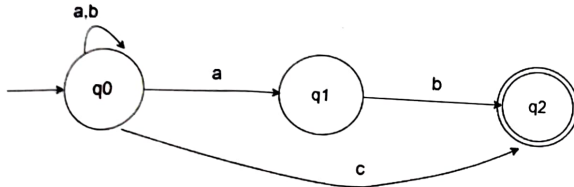
Q \ Σ	0	1
p(initial state)	{p,q}	{p}
q	ϕ	{r}
r(final state)	{p,r}	{q}

Q1. B. Consider the following Mealy machine. Convert it to a Moore machine. [4 Marks]

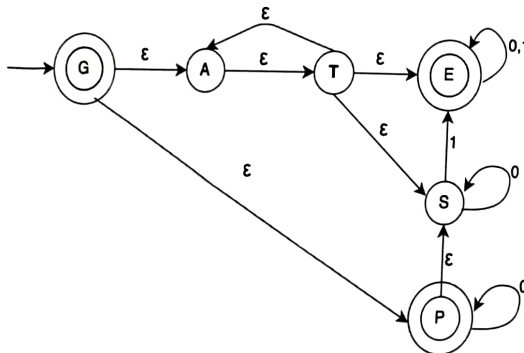
Present State	Next State			
	a=0		a=1	
	State	Output	State	Output
q1	q1	1	q2	0
q2	q4	1	q4	1

q3	q2	1	q3	1
q4	q3	0	q1	1

Q2. A. State the tuples of NFA with meaning, convert the following non-deterministic finite state automaton (NFA) to an equivalent deterministic finite state automaton (DFA). [4 Marks]

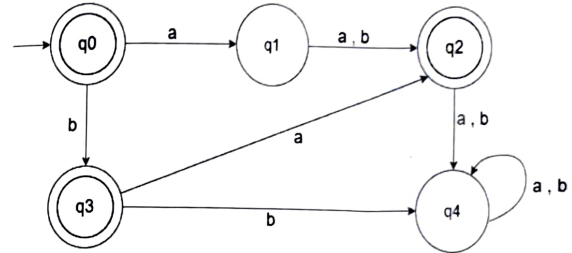


Q2. B. What is Epsilon closure of a state? NFA with epsilon moves is given below. Write down the epsilon closure of each state. [4 Marks]

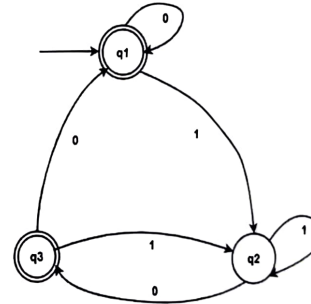


Q3. A. Draw the NFA with (epsilon) ϵ -moves for the Regular Expression $R = (a^* + b^*)$. Your NFA with ϵ -moves should have Exactly 10 States. [3 Marks]

Q3. B. Find the Regular Expression that represents the language Accepted by the given DFA and clearly mention the tuples values for the given DFA: [4 Marks]



Q4. A. Construct Regular Expression for the given DFA using ARDEN's Theorem. State the conditions for applying the ARDEN's Theorem. [4 Marks]



Q4. B. Prove that the given language L is not a regular language where, $L = \{0^m.1^n.0^{m+n} \mid m \geq 1, n \geq 1\}$. [3 Marks]