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SCHOOL OF COMPUTING SCIENCE AND ENGINEERING (SCSE)

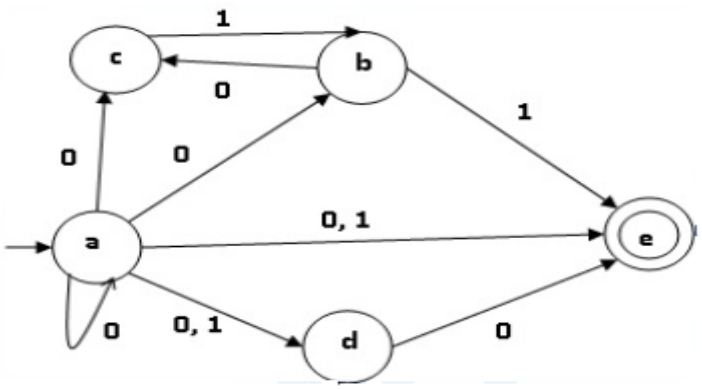
CSE2004 - THEORY OF COMPUTATION AND COMPILER DESIGN

Answer all Questions

1. Convert an NFA to a DFA given NFA M = (Σ,Q,δ,q0, F) Σ={0,1}, Q = { q0, q1, q2 ,q3}, F= { q0}.

δ	**0**	**1**
→q_0	{ q_0}	{ q_0, q_1}
q_1	{ q_2}	{ q_2}
q_2	{ q_3}	{ q_3}
*q_3	Ø	Ø

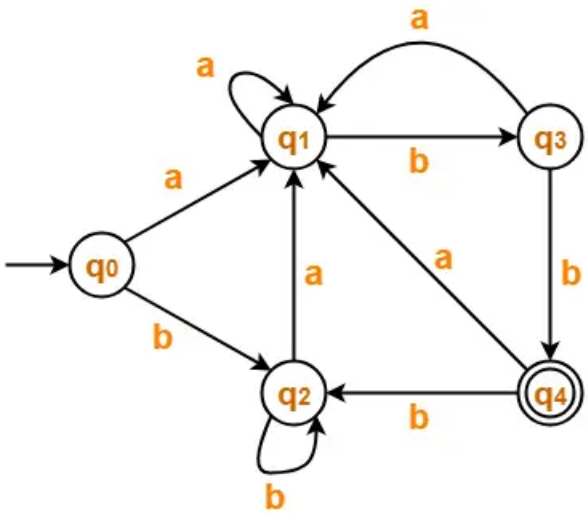
2. Write Regular Expression for the set of strings over {0,1} that starts with two 0s and ends with two 1s. Also draw its equivalent finite automata.
3. Construct a DFA that accept all strings containing exactly 3 a's and 2 b's over alphabet Σ={a,b}. Draw its state diagram and write its tuples.
4. Write the regular expression, that represents the language of all strings over the alphabet {a, b}, where the letter 'a' occurs for even number of times. Additionally, draw equivalent finite automaton corresponding to the regular expression.
5. Convert an NFA to a DFA given NFA M = (Σ,Q,δ,q0, F) Σ={0,1}, Q = { a,b,c,d,e}, F= { e}.



6. Create a Deterministic Finite Automaton (DFA) that is equivalent to the given Nondeterministic Finite Automaton (NFA) M = ({p, q, r}, {0, 1}, δ, p, {q, s}), where the transition function δ is described in the provided table.

δ	**0**	**1**
→p	{ q,s}	{ q}
*q	{r}	{ q,r}
r	{ s}	{ p}
*s	Ø	{ p}

7. Draw a deterministic and non-deterministic finite automata which accept a string containing "ing" at the end of a string in a string of {a-z}, e.g., "anything" but not "anywhere".
8. Construct the minimized DFA based on the provided finite state transition. Verify the input value S= "aabbabb" accepted by minimized DFA machine.



9. Give the Regular Expression for set of all strings ending in 00.
10. Give Regular Expressions for the following

    L1-set of all strings of 0 and 1 ending in 00

    L2-set of all strings of 0 and 1 beginning with 0 and ending with 1
11. Write Regular Expression for the set of strings over {0,1} that have atleast one.
12. Write a Regular Expression for set of strings that consists of alternating 0's and 1's.
13. Obtain DFA for the following over alphabet set {a, b}:
    i. Set of all strings with an odd number of a's and even number of b's}
    ii. Set of all strings ending either in ab or ba.
14. Draw the Transition diagram as well as the transition table of the DFA for accepting the binary numbers divisible by 3.