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Daffodil International University

Department of Software Engineering

Faculty of Science & Information Technology

Midterm Examination, Spring 2024

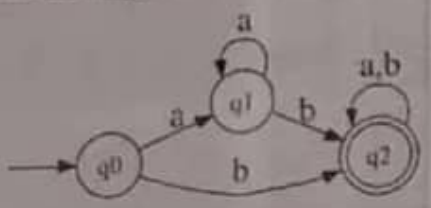
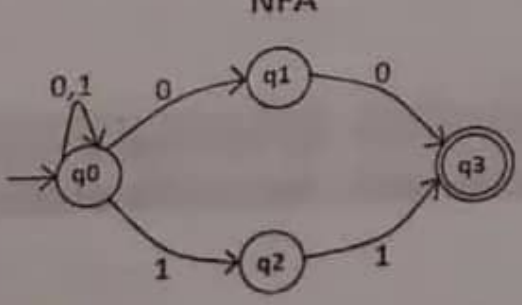
Course Code: SE234 ; Course Title: Theory of Computing

Sections & Teachers: All (FBR)

Time: 1 Hour 30 Mins **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	*a)*	Let the alphabet Σ be the standard 26 letters {a,b,c,d…,z}. If A= {good, bad} and B = {boy, girl} , then **find out** A ∪ B (union)and A.B (concatenation)	[Marks-2]	CLO-1 *Level-4*
	b)	I. **Design** state diagram of Deterministic finite Automata for language L of binary symbol. L= {w |w is the empty string ε or ends in a 0} II. **Design** DFA where L = {w| w is 111 for binary input}.	[Marks-3+2]	
	c)	**Demonstrate** the following DFA and show epsilon acceptance. 	[Marks-2+1]	
2.	*a)*	**Contrast** the cases where using a DFA is more advantageous than using an NFA.	[Marks-3]	CLO-2 *Level-4*
	b)	**Apply** subset construction method to convert the following Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA)- 	[Marks-4]	

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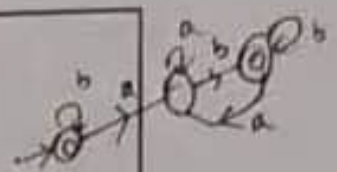
	c)	**Design** a Non deterministic finite automata for input {a,b} where L = {w| w where any numbers of a's followed by any number of b's}	[Marks-3]	
3.	a)	List 4 applications of Regular expression.	[Marks-2]	CLO-3 *Level-3*
	b)	**Construct** Regular Expression for the following Language: L= {w| w starts with b and length os even {b,c}} $b(b+c)^*$	[Marks-3]	