



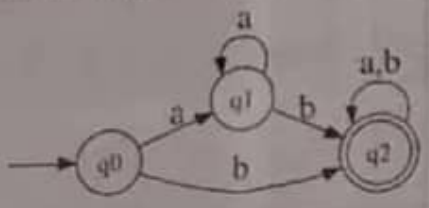
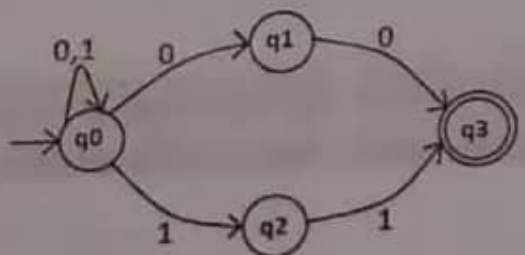
Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Midterm Examination, Spring 2024
Course Code: SE234 ; Course Title: Theory of Computing
Sections & Teachers: All (FBR)

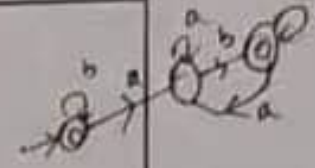
Time: 1 Hour 30 Mins

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 $\{a,b,c,d,\dots,z\}$. If $A = \{\text{good, bad}\}$ and $B = \{\text{boy, girl}\}$, then find out $A \cup B$ (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. $L = \{w \mid w \text{ is the empty string } \epsilon \text{ or ends in a } 0\}$ II. Design DFA where $L = \{w \mid w \text{ is 111 for binary input}\}$.	[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)- NFA 	[Marks-4]	

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

CLO-3
Level-3