



Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Midterm Examination, Fall 2024

Course Code: SE234 ; Course Title: Theory of Computing

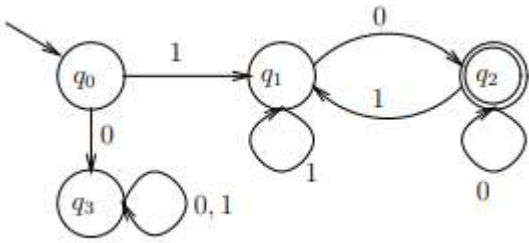
Sections & Teachers: All & FBR

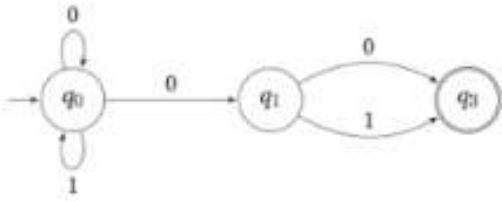
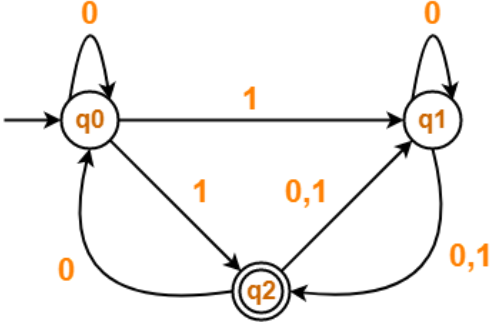
Time: 1 Hour 30 Mins

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)	Identify the system in the following case. Are they finite or context free? a) Automated ticket booking system b) Automated Door c) Self driving Car d) ChatGPT	[Marks-2]	CLO-1 Level-4
	b)	Let $\Sigma = \{a, b\}$ and let $L = \{ w \in \Sigma^* \mid \text{the first and last character of } w \text{ are not the same} \}$. Construct a DFA for L.	[Marks-3]	
	c)	Identify the following finite automata by mentioning the significant difference between determinism and non-determinism. 	[Marks-3]	
	d)	Choose the method that is best suited for implementation from DFA and NFA, the two approaches to building finite automata, and provide an explanation.	[Marks-2]	
2.	a)	Use formal definition to precisely identify the following automata, and demonstrate computation for the string "0000.".	[Marks-3]	CLO-2 Level-4

	 $Q = \{q_0, q_1, q_2\}$		
	b) Apply “Subset construction” method to convert the following Non-Deterministic Finite Automata (NFA) to Deterministic Finite Automata (DFA)- 	[Marks-4]	
	c) Design a non-deterministic finite automata for the following language of binary input $L = \{w : w \text{ contains three consecutive } 111\}$	[Marks-3]	
3.	a) Explain Regular Expression with examples .	[Marks-3]	CLO-3 Level-3
	b) Construct Regular Expression for the language of all strings over $\{a, b\}$ where: $L = \{\epsilon, a, b, aa, ab, ba, bb\}$	[Marks-2]	