IMS ENGINEERING COLLEGE	IMSEC/QF/48
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	Issue No: 02
Assignment 2	Issue Date: 1 May 2010
Prepared by: MR	Approved by: Director

Subject Name	TAFL	Subject Code	*KCS-402*
Date of Handout	2nd-March, 2021	Max Marks	
Date of Submission	5th-March, 2021		

Q1 a) Design a DFA that reads strings made up of letters in the word Σ = { A, I, L, M, R, S, T } and recognize those strings that contain the word "**IMS**" as a substring.

b) Write a DFA to accept the language L = {w : |w| mod 5 ≠ 0 } over Σ = { a, b }

c) Design FA to accept L, where L = {Strings in which 'a' always appears tripled } over the set Σ = { a, b }. (Whenever 'a' appears it will repeat 3 times)

d) Draw DFA for the following over the set Σ = { 0, 1 }
i) L = { w : |w| mod 3 = 0 }
ii) L = { w : |w| mod 3 > 1 }

Q2 a) Design a DFA which accepts the set of strings over alphabets **Σ = {1, 2, 3, 4 }** such that string when interpreted as decimal numbers, sum of their digits are divisible by **5** and check the string **"241332"** is accepted by your machine or not (give justification)

b) Design FA to check whether given **decimal number** is divisible by 2 or not

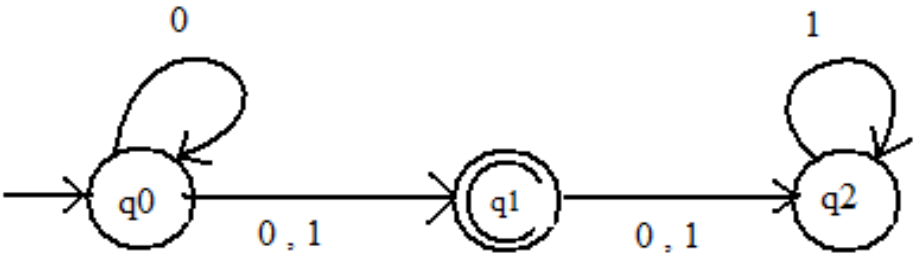
c) Design FA to check whether given **decimal number** is divisible by 3 or not

d) Design a DFA that accept the **binary number** divisible by 5 over Σ = {0, 1 }.

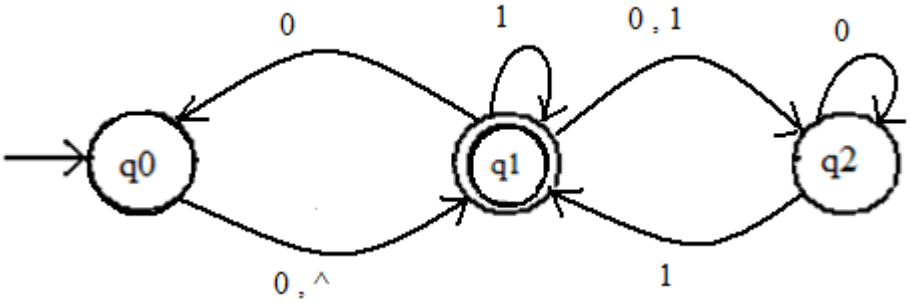
Q3 a) Find dfa's for the following language over Σ = { a, b }
L = { w : $n_a(w)$ mod 3 > $n_b(w)$ mod 3 }

b) Find dfa's for the following language over Σ = { a, b }
L = { w : $n_a(w)$ mod 3=0 && $n_b(w)$ mod 2 =0}

Q4 a) Convert the following nfa into equivalent deterministic machine.



b) Convert the following nfa into equivalent dfa



Q5 a) Find a deterministic accepter equivalent to

M = ({ q_0 , q_1, q_2 }, { a, b}, δ, q_0, {q_2 })
δ given by

States \ Σ	a	b
→**q_0**	q_0, q_1	q_2
q_1	q_0	q_1
q_2	---	q_0, q_1

b) Construct a deterministic finite automaton equivalent to

M = ({ q_0 , q_1, q_2, q_3 }, { 0, 1}, δ, q_0, {q_3 })
δ given by

States \ Σ	a	b
→**q_0**	q_0, q_1	q_2
q_1	q_2	q_1
q_2	q_3	q_3
q_3	---	q_2

Q6 a) The transition table of a nondeterministic finite automaton M is given in following table. Construct a deterministic finite automaton equivalent to M

States \ Σ	0	1	2
→q_0	q_1, q_4	q_4	q_2, q_3
q_1	---	q_4	----
q_2	---	---	q_2, q_3
q_3	---	q_4	----
q_4	---	---	----

b) Construct a minimum state automation equivalent to given automaton

States \ Σ	a	b
→q_0	q_0	q_3
q_1	q_2	q_5
q_2	q_3	q_4
q_3	q_0	q_5
q_4	q_0	q_6
q_5	q_1	q_4
q_6	q_1	q_3