



Date: 01.02.2006

Time : 4.00pm - 5.30pm

Answer all questions

(Q1).

I.

- Define Mealy type sequential machine.
- Define Moor type sequential machine.
- Compare Mealy type sequential machines and Moor type sequential machines.

II.

Consider the flow table given bellow.

Status	Inputs		Outputs
	0	1	
0	0	2	0
1	0	2	1
2	1	3	0
3	1	3	1

- What is the type of this machine?
- Draw the state graph for this machine.
- Define the δ^* function and β^* function. Hence find the final state and the sequence of outputs for the sequence of inputs 1100101.

III.

- Draw the directed graph that describes the DFA with the following state transition.

Status	Inputs	
	#	?
+	-	/
-	*	/
*	*	-
/	-	*

Initial state +

Final States {-, *}

b. Which of the following words are accepted by the above DFA.

##??

#???

??#

??##?##

(Q2)

Let M_1, M_2 be Mealy machines.

- I. Define an Isomorphism between M_1 and M_2 .
- II. Suppose M_1, M_2, M_3 are Mealy machines. $M_1 \approx M_2$ and $M_2 \approx M_3$. Prove that,
 - a. $M_2 \approx M_1$
 - b. $M_1 \approx M_3$
 - c. If $\phi: M_1 \rightarrow M_2$ is a reduction,

show that, $M_2 \approx \frac{M_1}{\ker \Phi}$

(Q3)

Suppose M_1, M_2 and M_3 are three Mealy machines.

- I. Show that,
 - a. $(M_1 \parallel M_2) \approx (M_2 \parallel M_1)$
 - b. $M_1 \parallel (M_2 \parallel M_3) \approx (M_1 \parallel M_2) \parallel M_3$
- II. Is $(M_1 \oplus_{k_1} M_2) \approx (M_2 \oplus_{k_2} M_1)$, where $K_1: O_1 \rightarrow I_2$ and $K_2: O_2 \rightarrow I_1$? Justify your answer.

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