

Name:

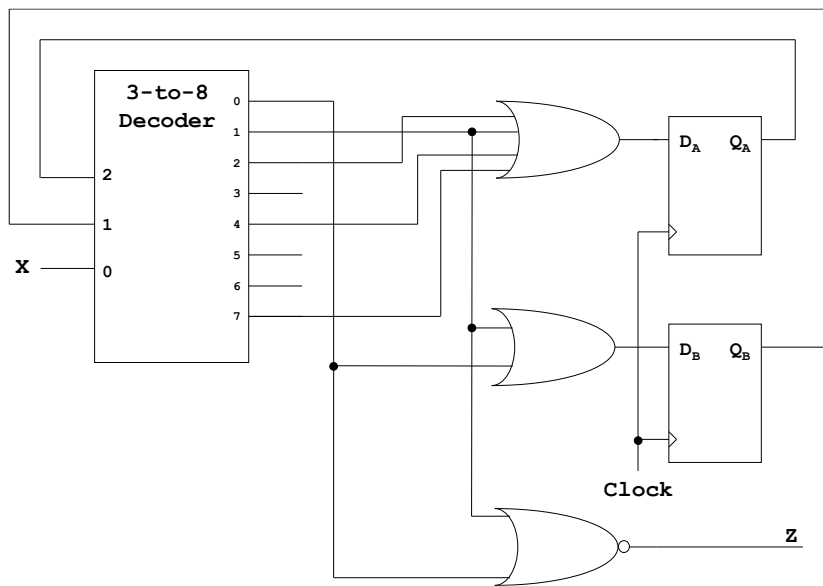
Id#

COE 202, Term 162
Fundamentals of Computer Engineering

Quiz# 5 Solution

Date: Tuesday, May 16

Q1. Consider the following sequential circuit:



(i) Provide a state table for the given circuit showing the Present State, the input **X**, the Next State, and the output **Z**.

$$D_A = \sum m(1,2,4,7), \quad D_B = \sum m(0,1), \quad Z = \prod M(0,1)$$

Q_A	Q_B	X	Q_A^+	Q_B^+	Z
0	0	0	0	1	0
0	0	1	1	1	0
0	1	0	1	0	1
0	1	1	0	0	1
1	0	0	1	0	1
1	0	1	0	0	1
1	1	0	0	0	1
1	1	1	1	0	1

(ii) Is the circuit type Mealy or Moore? Justify your answer.

Moore since $Z = \prod M(0,1) = (Q_A + Q_B + X)(Q_A + Q_B + X') = Q_A + Q_B$ which is a function of the present states only. This is also clear from the state table obtained in part (a).

Q2. Consider the following state table. Assume that the initial state of the circuit implementation of the given state table is ($Q_A Q_B = 10$). Draw the waveforms of Q_A , Q_B , and Z for the given 2 clock cycles in response to the shown applied input X . *Ignore propagation delays, setup times, and hold times. Assume that the circuit uses rising edge-triggered D-FF(s).*

Present State		X	Next State		Z
Q_A	Q_B		D_A	D_B	
0	0	0	0	1	1
0	0	1	1	1	0
0	1	0	1	0	0
0	1	1	0	0	0
1	0	0	1	0	0
1	0	1	0	0	1
1	1	0	0	0	1
1	1	1	1	0	1

