CMPUT 329 - Computer Organization and Architecture II
Quiz # 5 — Fall 2003

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Name:

CMPUT 329 Honor Code

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Edmonton, November, 2003.

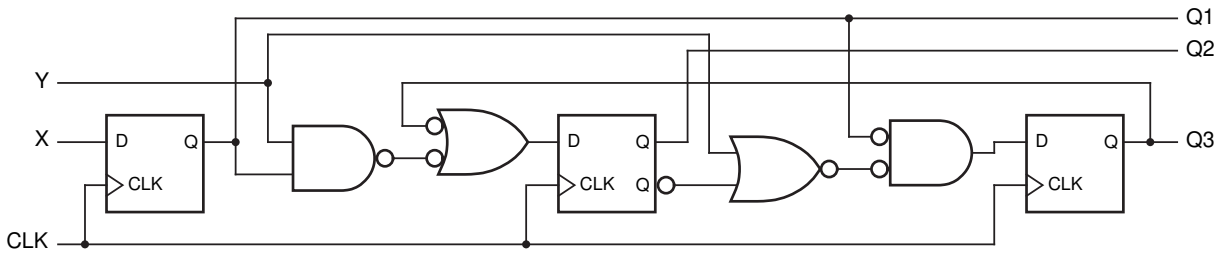

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Figure 1: A sequential circuit using D Flip-flops.

Current State	Next State			
Q1 Q2 Q3	X=0 & Y=0	X=0 & Y=1	X=1 & Y=0	X=1 & Y=1
000				
001				
010				
011				
100				
101				
110				
111				

Table 1: State Transition Table for the sequential circuit of Figure 1.

Question 1 (50 points):

In this question you will analyse the sequential circuit shown in Figure 1.

a. (25 points) Write the excitation equations and the output equations for the circuit.

b. (25 points) Complete the State Transition Table 1.

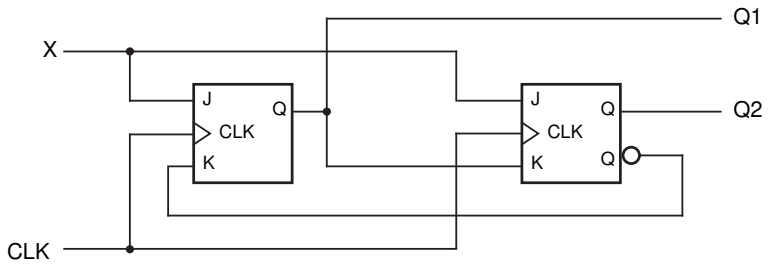

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Figure 2: A sequential circuit using JK Flip-flops.

Question 2 (30 points):

For this question, it might be useful to recall the Application table for J-K flip-flops that is presented on page 577 of your textbook:

Q	Q+	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

This table provides the values that you have to have in the inputs J and K of the J-K flip-flop when you want to effect a transition from the current state Q to the next state Q+. An X in the table indicates a don't care.

You wil analyse the sequential circuit built with two J-K flip-flops shown in Figure 2. Assume that the four states in this machine are A, B, C, and D, and the following state assignment: (A:00), (B:01), (C:10), and (D:11). Assume also that 01 indicates that Q1=0 and Q2=1.

a. (25 points) Complete the following state transition table.

Current State	Next State		Outputs	
Q1 Q2	X=0	X=1	Q1	Q2
00				
01				
10				
11				

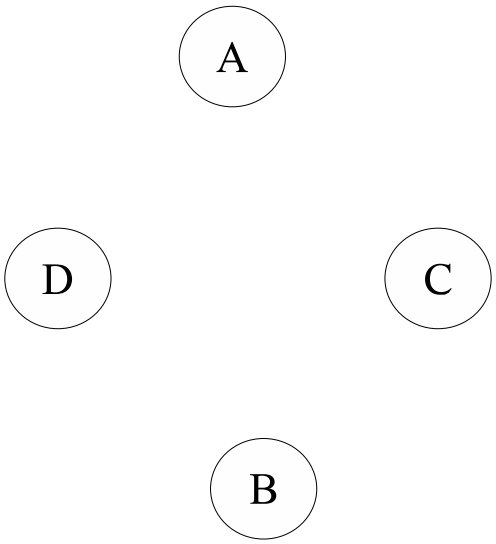

Figure 3: State Diagram for FSM implemented by circuit of Figure 2.

b. (25 points) Complete the drawing of the state diagram of Figure 3 for the finite state machine implemented by the circuit of Figure 2.