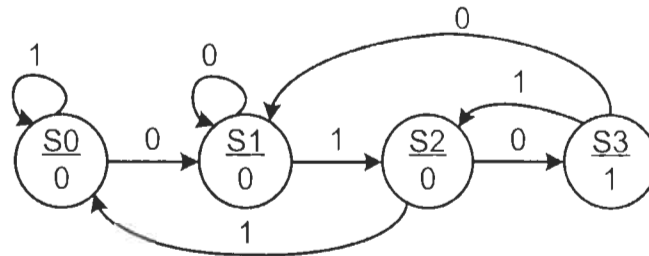


Name: SOLUTIONS

Lab Section: _____

The following state diagram describes a finite state machine (FSM) with one input X and one output Z . The machine is used to detect the input sequence "010".



(a) (1 point) What is the minimum number of D-Flip Flops needed to implement this FSM? 2

(b) (1 point) Is the FSM of type Mealy or Moore? Moore

(c) (2 points) Fill in the state table below.

(d) (2 points) Choose and list a flip-flop assignment (no restrictions) using the minimum number of flip-flops and list in the table below.

Present State	Next state $X=0$ $X=1$	Output Z
S_0	S_1^{01} S_0^{00}	0
S_1	S_1^{01} S_2^{10}	0
S_2	S_3^{11} S_0^{00}	0
S_3	S_1^{01} S_2^{10}	1

Present state (Circuit state)	Flip-flop state assignment
S_0	00
S_1	01
S_2	10
S_3	11

Assume
FF
names

(e) (4 points) Develop and clearly indicate next state and output equations for the FSM.

A^+ :

		AB			
X		00	01	11	10
0		0	0	0	1
1		0	1	1	0

$$A^+ = XB + \bar{X}A\bar{B}$$

A^+ 2pts
 B^+ 1pt
 Z 1pt

B^+ :

		AB			
X		00	01	11	10
0		1	1	1	1
1		0	0	0	0

$$B^+ = \bar{X}$$

$$Z = AB \quad \text{by inspection of state table}$$