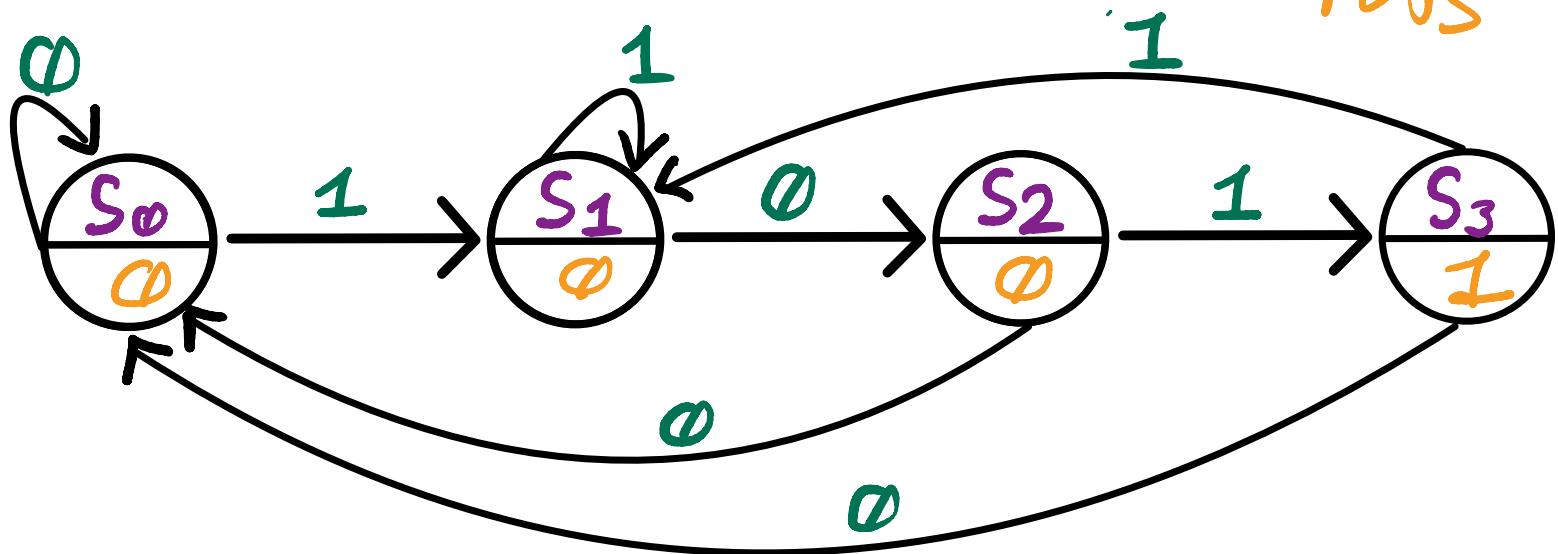


5.8. Design a Moore sequence recognizer that detects the nonoverlapping sequence "101." Use binary encoded state labels and design and draw the circuit schematic similar to the one shown in Fig. 5.16. (4 pts)

"101" sequence detecting of nonoverlapping Moore State
State Diagram:



Four States to represent we want two bits
so, two flip flops ($A \oplus B$)

Representation:

$$S_0 \rightarrow 00$$

$$S_1 \rightarrow 01$$

$$S_2 \rightarrow 10$$

$$S_3 \rightarrow 11$$

State Table:

Current State A B	Input X	Next State		Output Z
		A ⁺	B ⁺	
0 0	0	0	0	0
0 0	1	0	1	0
0 1	0	1	0	0
0 1	1	0	1	0
1 0	0	0	0	0
1 0	1	1	1	0
1 1	0	0	0	1
1 1	1	0	1	1

K-maps:

A⁺

		Bx		A	
		00	01	11	10
A	0	0	0	0	1
	1	0	1	0	0

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

B⁺

		Bx		A	
		00	01	11	10
A	0	0	1	1	0
	1	0	1	1	0

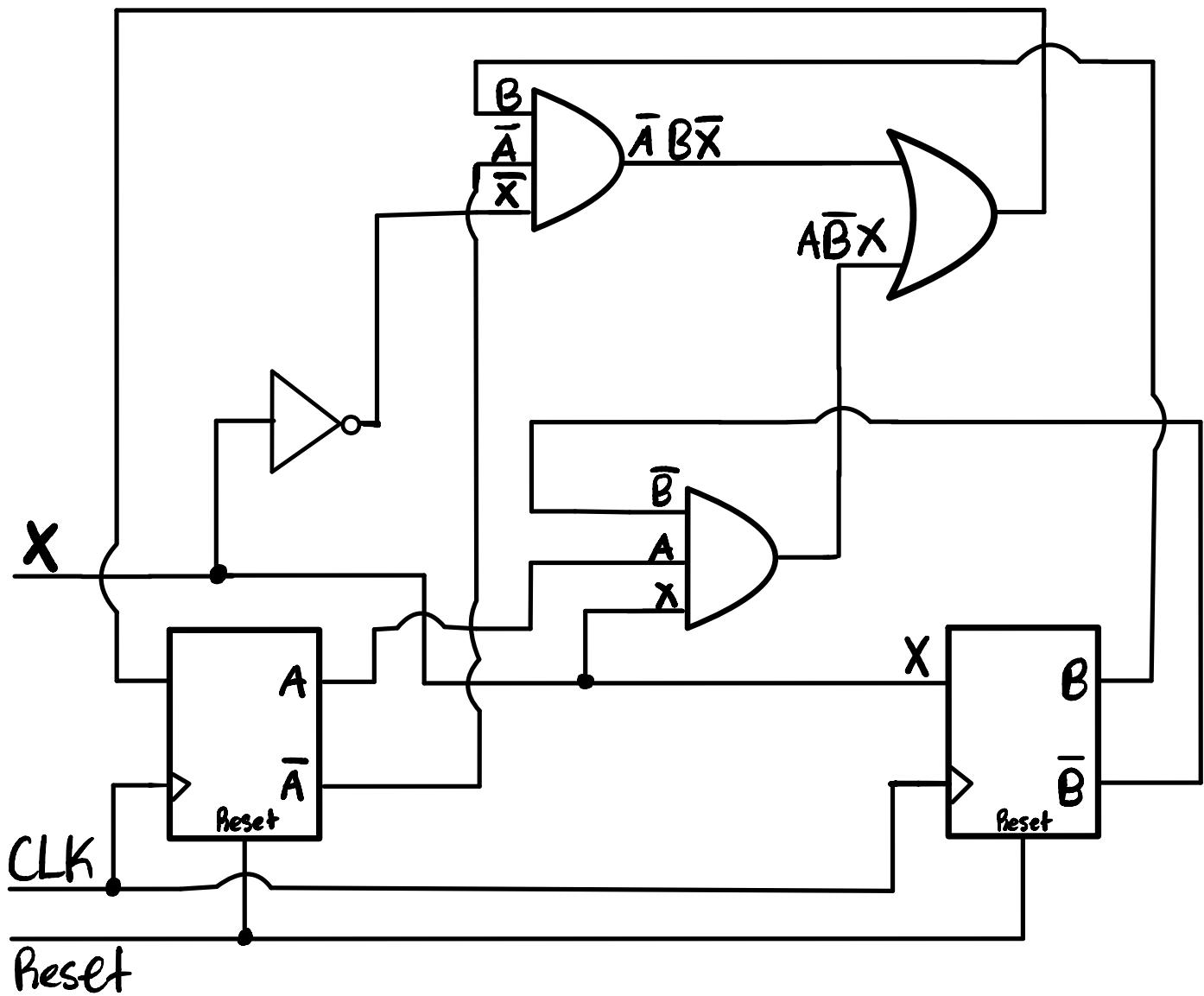
$$B^+ = X$$

Z

		Bx		A	
		00	01	11	10
A	0	0	0	0	0
	1	0	0	1	1

$$Z = AB$$

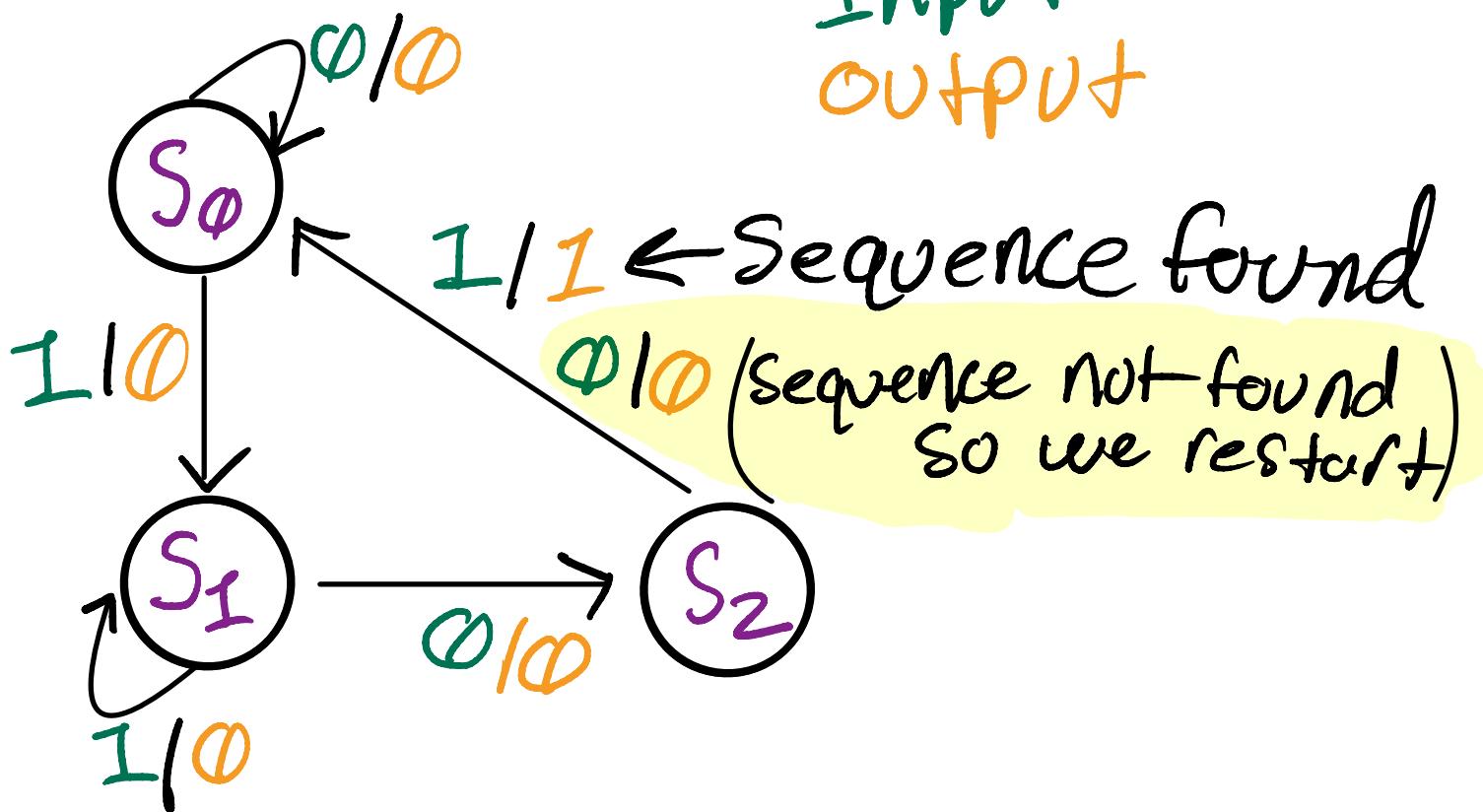
Circuit Schematic:



5.9. Design a Mealy sequence recognizer that detects the nonoverlapping sequence "101." Use binary encoded state labels and draw the circuit schematic similar to the one shown in Fig. 5.16. (4 pts)

"101" sequence detecting of nonoverlapping Mealy

State Diagram:



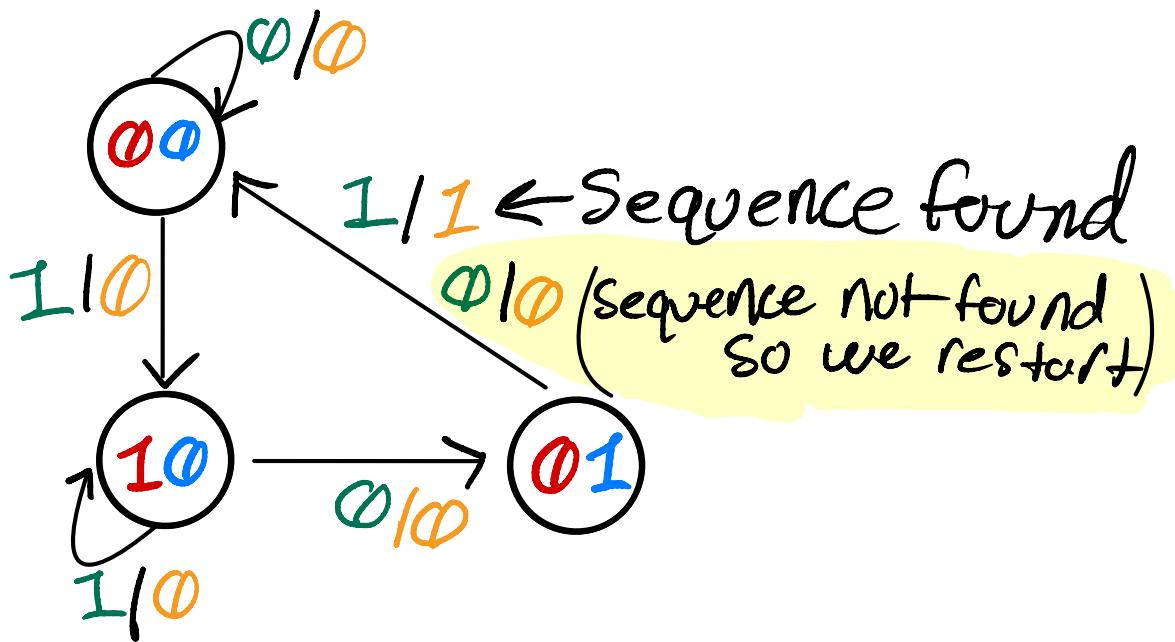
Representation:

$S_0 \rightarrow 00$ (Initial State)

$S_1 \rightarrow 10$

$S_2 \rightarrow 01$

Replaced labeled states w/binary



State Table:

Current State A B	Input X	Next State		Output Z
		A ⁺	B ⁺	
0 0	0	0	0	0
0 0	1	1	0	0
0 1	0	0	0	0
0 1	1	0	0	1
1 0	0	0	1	0
1 0	1	0	0	0
1 1	X	X	X	X
1 1	X	X	X	X

K-maps:

A^+

	Bx	00	01	11	10
A	0	1			
	1	1	X	X	

$$\begin{aligned} A^+ &= \underline{\underline{001}} + \underline{\underline{101}} \\ &= B\bar{X} \end{aligned}$$

B^+

	Bx	00	01	11	10
A	0				
	1	1		X	X

$$\begin{aligned} B^+ &= \underline{\underline{100}} + \underline{\underline{110}} \\ &= X \end{aligned}$$

Z

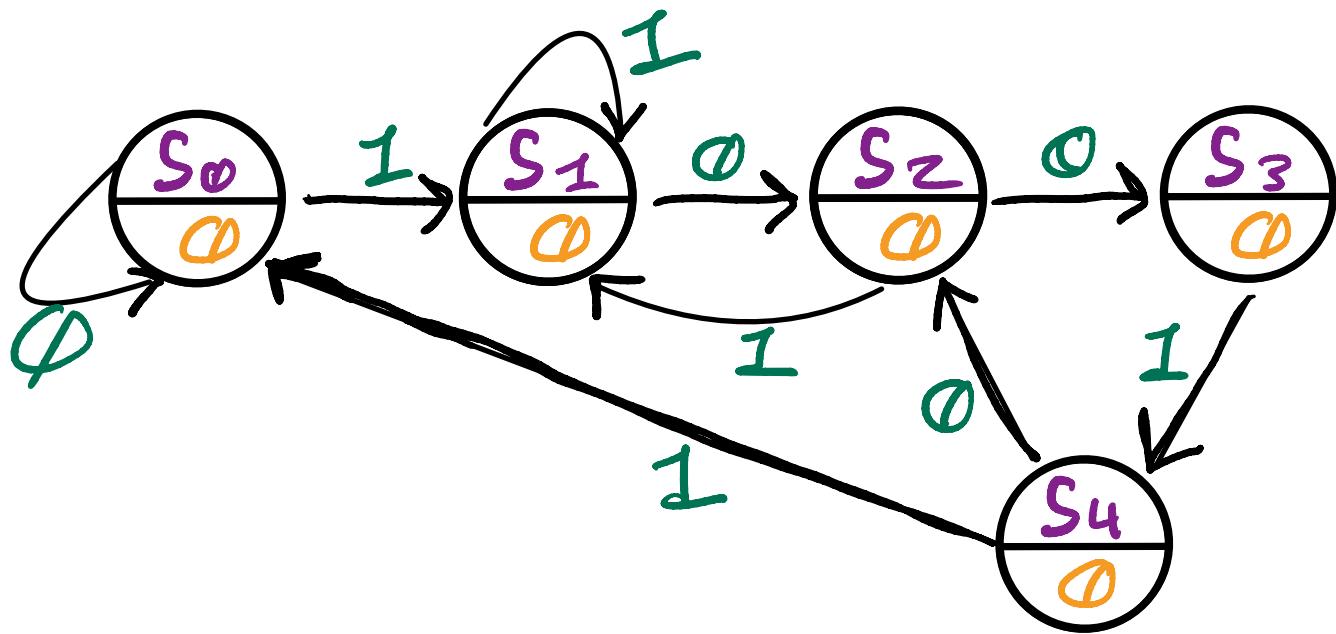
	Bx	00	01	11	10
A	0			X	
	1	1	X		

$$\begin{array}{l} A \quad Bx \\ \times \quad YZ \end{array}$$

$$\begin{aligned} Z &= \underline{\underline{101}} + \underline{\underline{111}} \\ &= A\bar{X} \end{aligned}$$

Circuit Schematic:

5.10. Design a Moore sequence recognizer that detects the overlapping sequence "1001." Use binary encoded state labels. . (Step 1. FSD only) (4 pts)



5.11. Design a Mealy sequence recognizer that detects the overlapping sequence "1001." Use binary encoded state labels. .(Step 1. FSD only) (4 pts)

