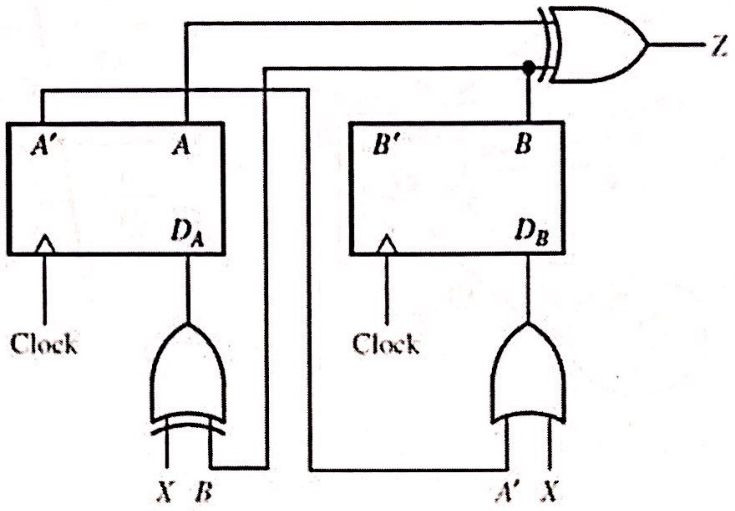
Homework 12-13

First Name:
Last Name:
Red ID#:

12.1

Derive the equations of next state A^+B^+ and output Z as a function of A, B, X for the following circuit:



$A^+ = D_A = X \oplus B$

$B^+ = D_B = A' + X$

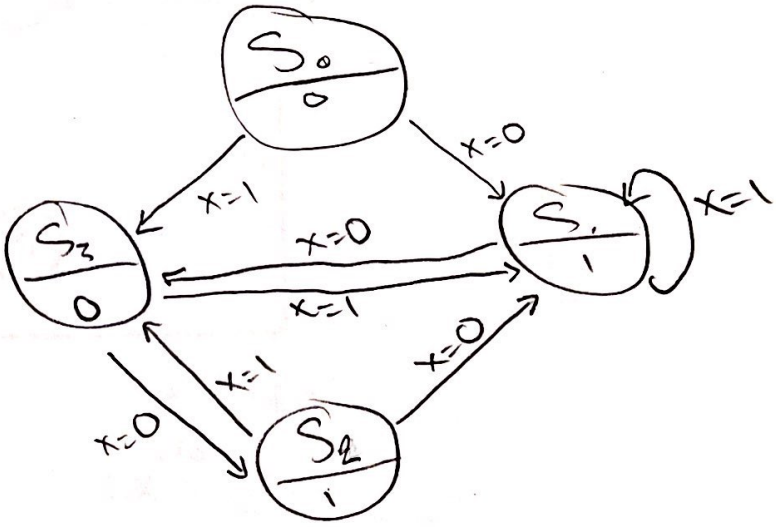
$Z = B \oplus A$

12.2

Fill up the next state table (truth table) and draw the state graph of the sequential circuit in 12.1. Is it a Moore circuit or Mealy circuit? Justify your answer.

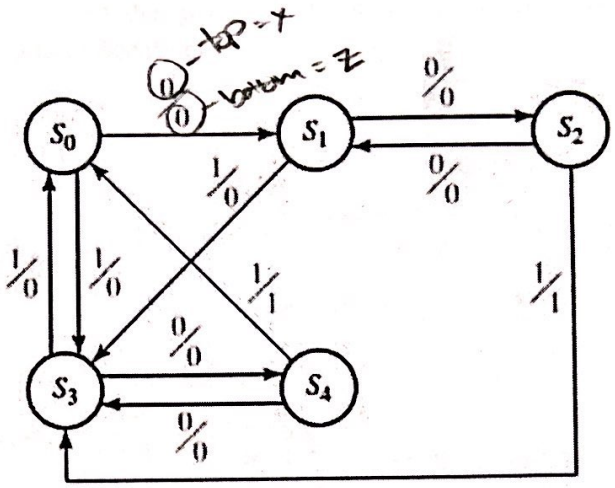
STATE TABLE

Present State	Next State x=0	Next State x=1	Z
AB			
00 (S_0)	01 S_1	11 S_3	0
01 (S_1)	11 S_3	01 S_1	1
10 (S_2)	00 S_0	11 S_3	1
11 (S_3)	10 S_2	01 S_1	0



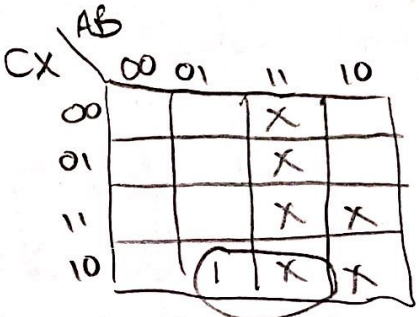
12.3

Fill up the next state table and derive the next state equations for the following state graph:



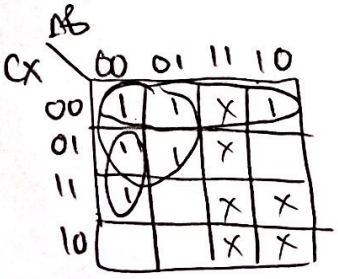
Present State ABC	Next State $A^+B^+C^+$ x=0	Next State $A^+B^+C^+$ x=1	Z x=0	Z x=1
S_0 (000)	S_1 (001)	S_3 (011)	0	0
S_1 (001)	S_2 (010)	S_3 (011)	0	0
S_2 (010)	S_1 (001)	S_3 (011)	0	1
S_3 (011)	S_4 (100)	S_0 (000)	0	0
S_4 (100)	S_3 (011)	S_0 (000)	0	1
101	xxx	xxx	x	x
110	xxx	xxx	x	x
111	xxx	xxx	x	x

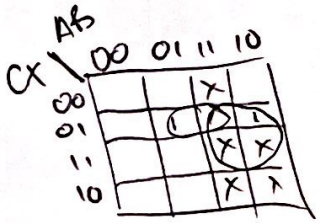
$A^+ = BCx'$



$B^+ = Ax' + A'C'x + B'C$

$C^+ = C'x' + A'C' + A'B'x$



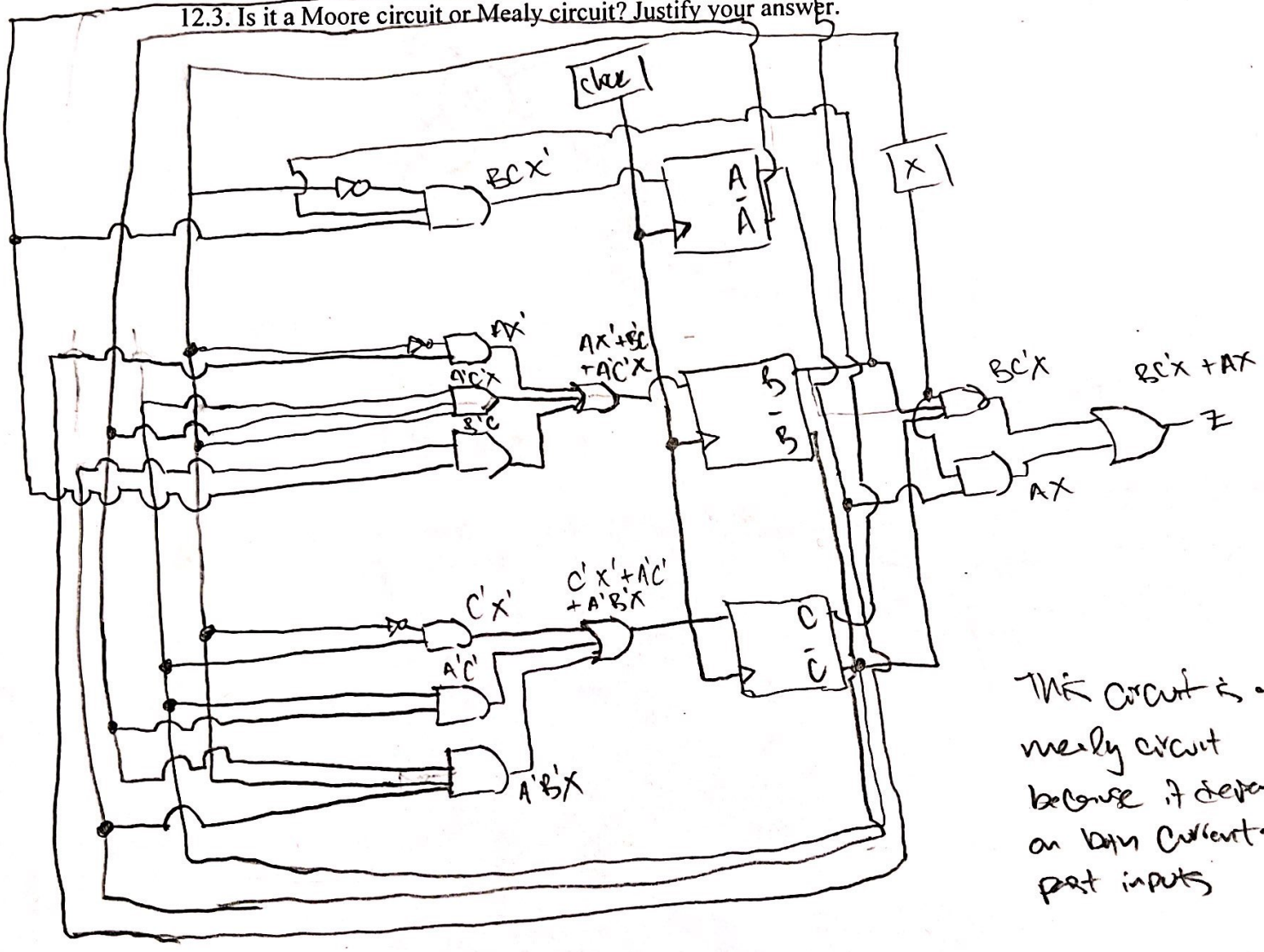


$Z = BC'x + Ax$

*remember to plug in the x

12.4

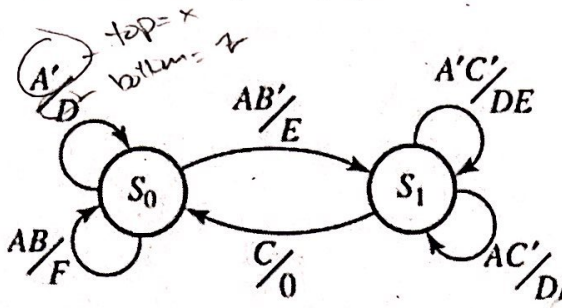
Realize the sequential circuit that performs the function specified in the state graph of 12.3. Is it a Moore circuit or Mealy circuit? Justify your answer.



This circuit is a mealy circuit because it depends on both current & past inputs

13.1

Construct the state table for the following state graph:



	Next State (ABC)								Output (DEF)							
	000	001	010	011	100	101	110	111	000	001	010	011	100	101	110	
S_0	S_0	S_0	S_0	S_0	S_1	S_1	S_0	S_0	100	100	100	100	010	000	001	
S_1	S_1	S_0	S_1	S_0	S_1	S_0	S_1	S_0	110	000	110	000	101	000	100	