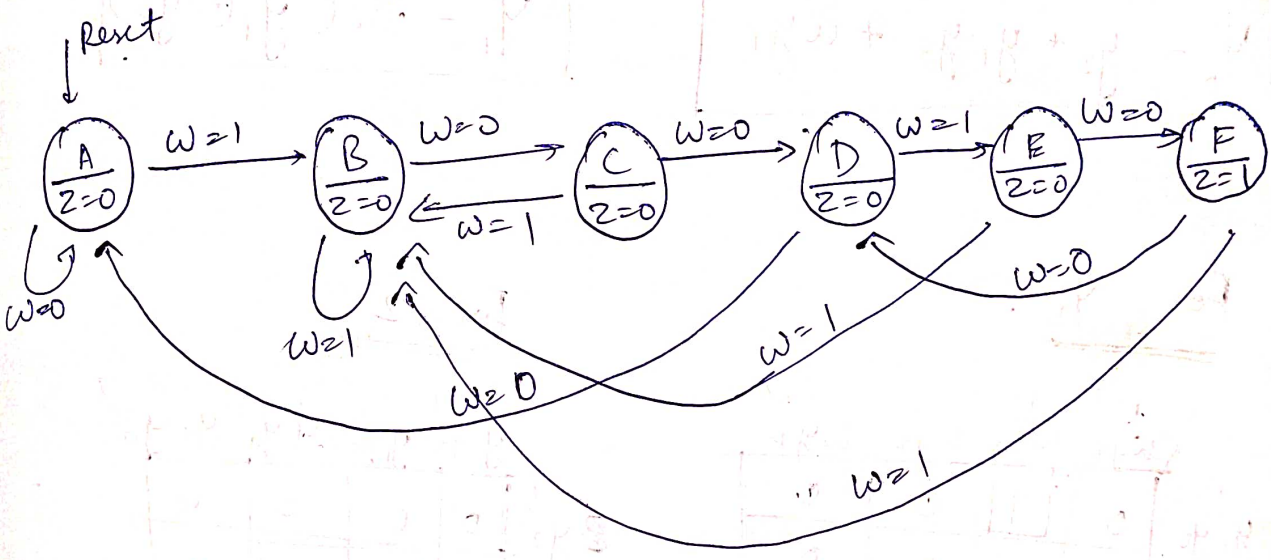
ES203 - Digital Systems

Name : Daniel Cliffson E.

Roll No: 20110051

1. i) Moore FSM : (Overlapping 10010)

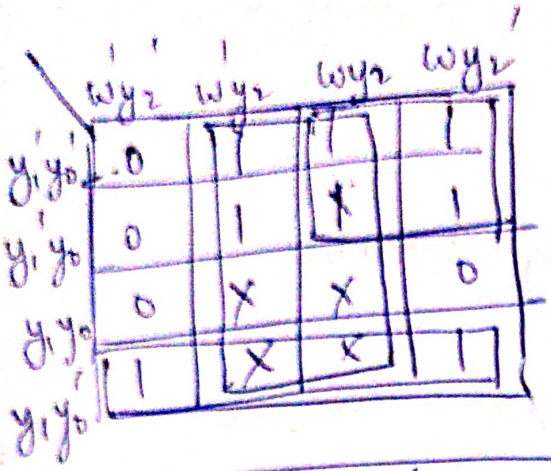
* State diagram :



* State Assignment Table :

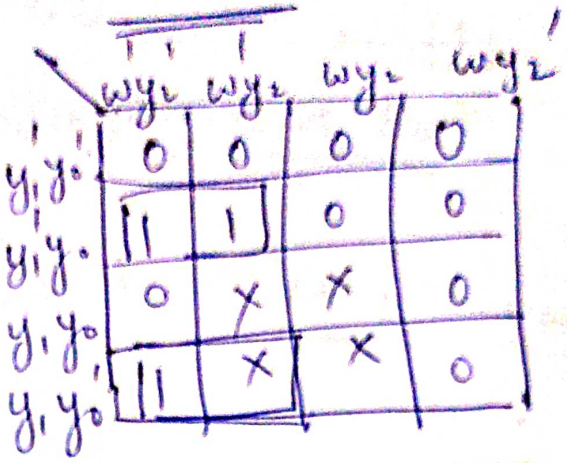
	Current State	Next State		Z
		w=0	w=1	
	$y_2\ y_1\ y_0$	$Y_2\ Y_1\ Y_0$	$Y_2\ Y_1\ Y_0$	
A	0 0 0	000 (A)	001 (B)	0
B	0 0 1	010 (C)	001 (B)	0
C	0 1 0	011 (D)	001 (B)	0
D	0 1 1	000 (A)	100 (E)	0
E	1 0 0	101 (F)	001 (B)	0
F	1 0 1	011 (D)	001 (B)	1
G	1 1 0	X X X	X X X	X
H	1 1 1	X X X	X X X	X

For Y_0 :



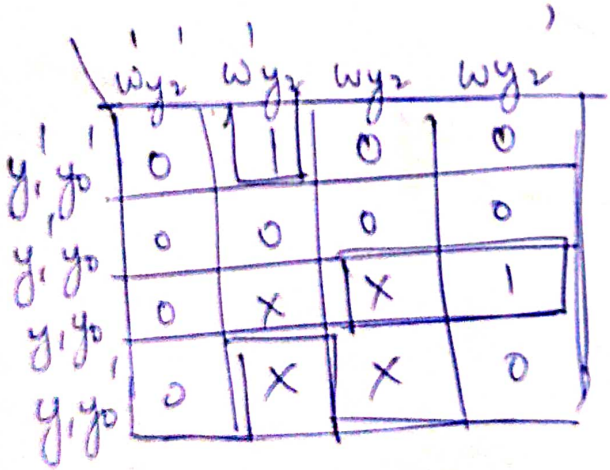
$$Y_0 = y_2 + y_1'y_0' + wy_1'$$

For Y_1 :



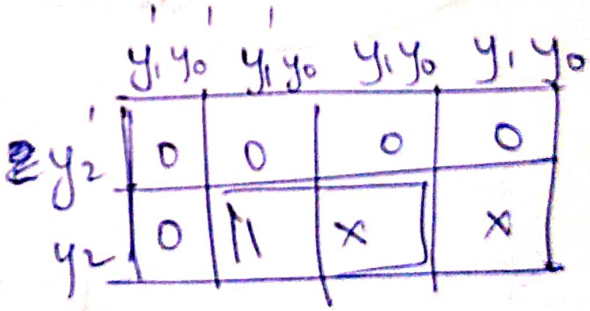
$$Y_1 = w'.(y_1 \oplus y_0)$$

For Y_2 :



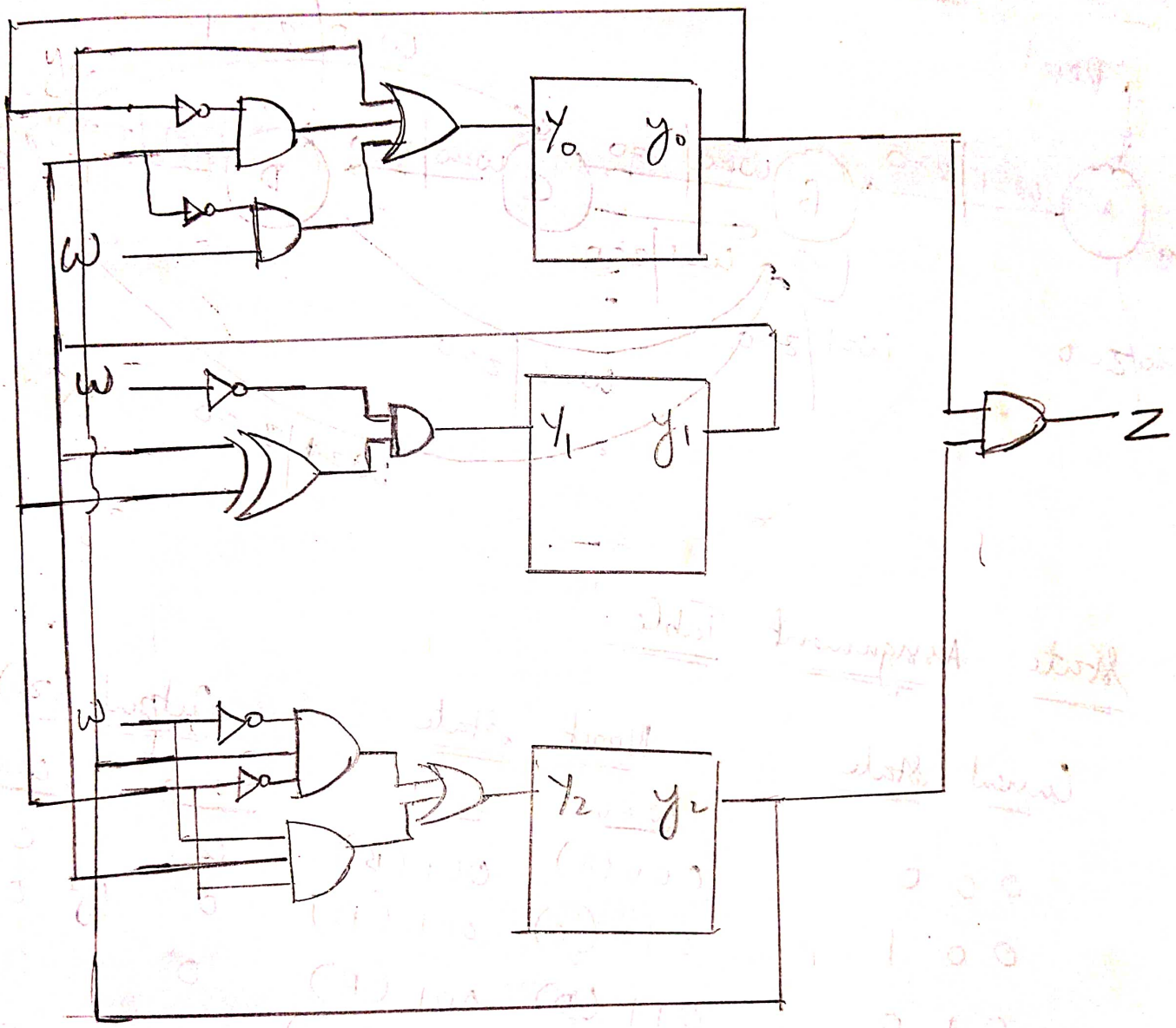
$$Y_2 = w'y_2y_0' + wy_1y_0$$

For z:



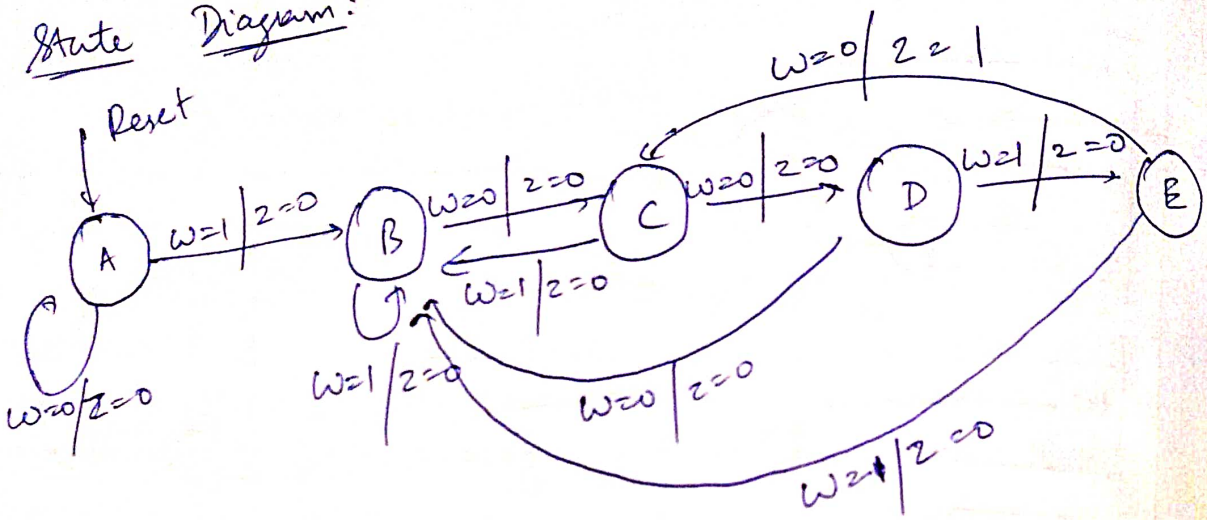
$$z = y_2 \cdot y_0$$

Hardware Implementation:



ii) Mealy FSM: (Overlapping 10010)

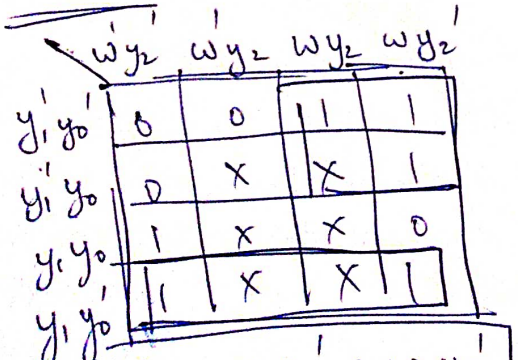
* State Diagram:



* State Assignment Table:

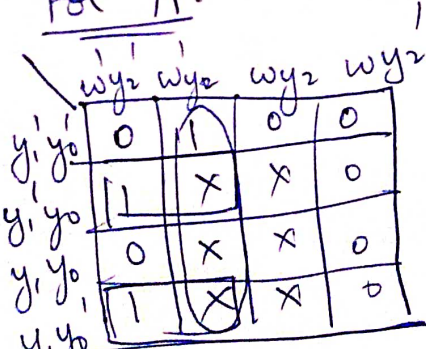
	Current State	Next State w=0	Next State w=1	Output (z) w=0	Output (z) w=1
A	0 0 0	000 (A)	001 (B)	0	0
B	0 0 1	010 (C)	001 (B)	0	0
C	0 1 0	011 (D)	001 (B)	0	0
D	0 1 1	001 (B)	100 (E)	0	0
E	1 0 0	010 (C)	001 (B)	1	0
F	1 0 1	x x x	x x x	x	x
G	1 1 0	x x x	x x x	x	x
H	1 1 1	x x x	x x x	x	x

For Y_0:



$Y_0 = y_1 y_0' + w \cdot y_1'$

For Y_1:



$Y_1 = w' \cdot (y_2 + (y_1 \oplus y_0))$

For Y_2 :

$y_1 y_0$ \ $w y_2$	$w' y_2'$	$w' y_2$	$w y_2$	$w y_2'$
$y_1' y_0'$	0	0	0	0
$y_1' y_0$	0	X	X	0
$y_1 y_0$	0	X	X	1
$y_1 y_0'$	0	X	X	0

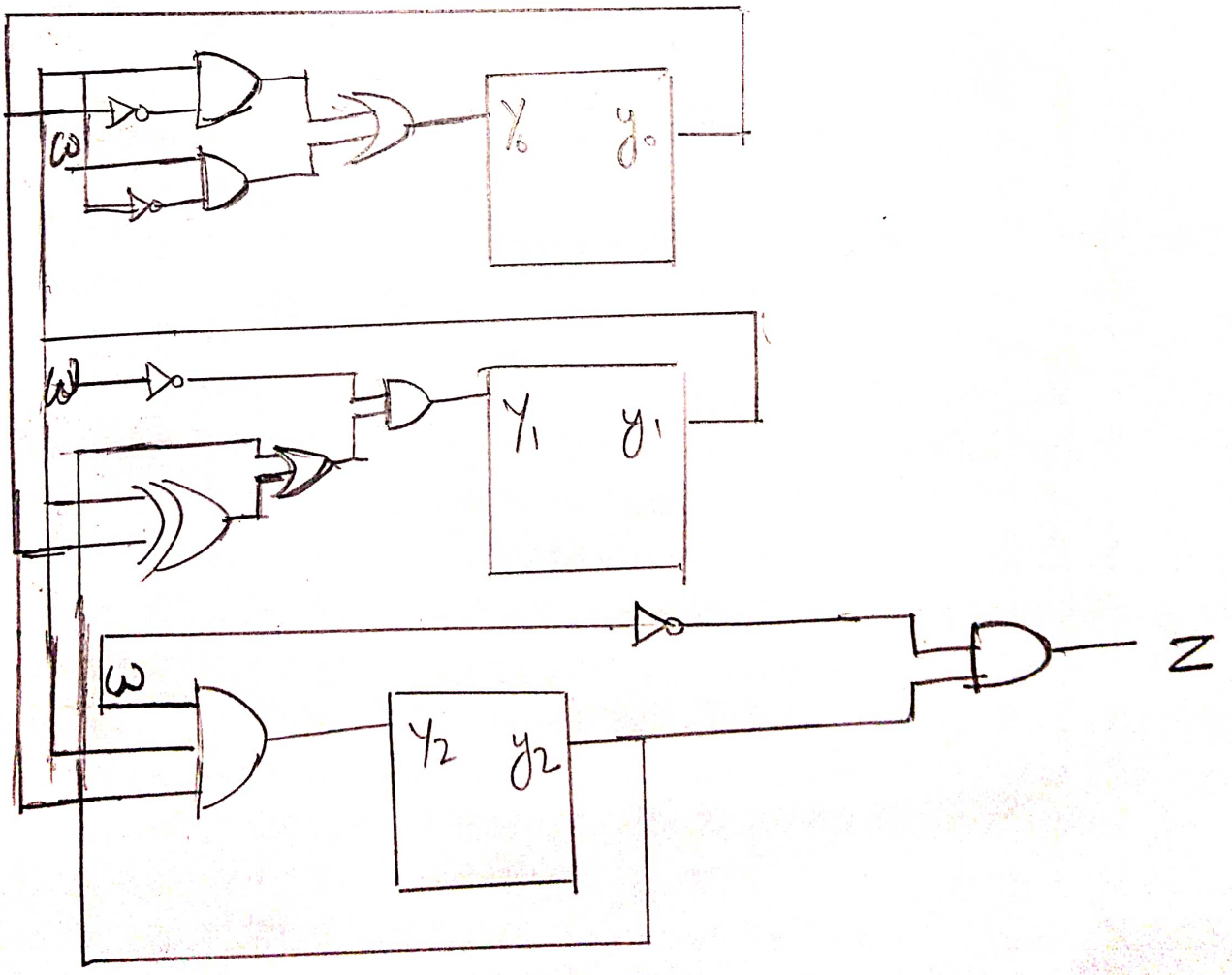
$$Y_2 = w y_1 y_0$$

For Z :

$y_1 y_0$ \ $w y_2$	$w y_2'$	$w y_2$	$w y_2$	$w y_2'$
$y_1' y_0'$	0	1	0	0
$y_1' y_0$	0	X	X	0
$y_1 y_0$	0	X	X	0
$y_1 y_0'$	0	X	X	0

$$Z = w' y_2$$

* Hardware Implementation :



2. Mealy FSM: State Diagram

↳ (overlapping ['11, 00, 11].