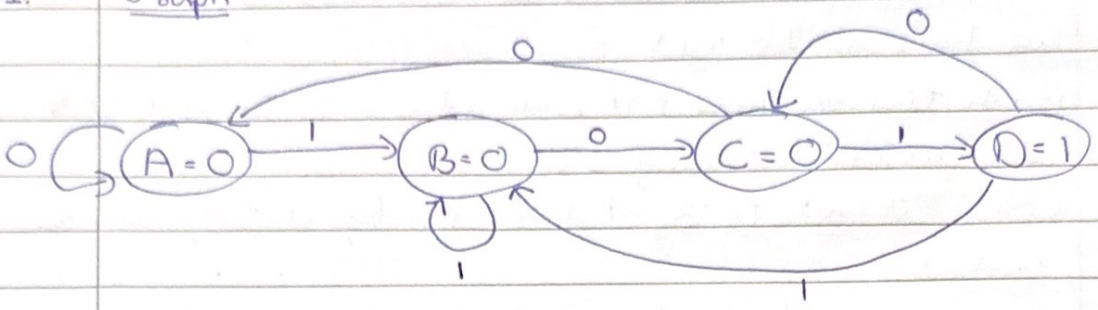
Aryan Rao
ID: 2649547482
Section: 11

HOMEWORK 11

P1. Graph



Starting state is output zero, only if we get an input of '1' after that, we proceed. It then advances only if the sequence is maintained.
If not, it resets accordingly. All states output '0' except final state that returns '1' (TRUE) if sequence is found.

State Table

Present State	Next State $W_0=0$	Next State $W_0=1$	Output Z_0
A	A	B	0
B	C	B	0
C	A	D	0
D	C	B	1

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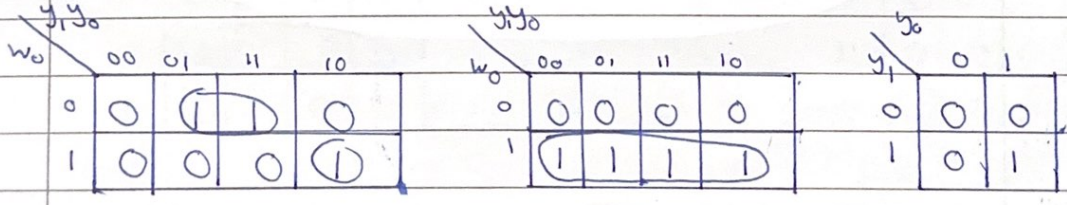
State Assigned Table

Present State		Next State		Output
y_1	y_0	$w_0=0$	$w_0=1$	z_0
0	0	00	01	0
0	1	10	01	0
1	0	00	11	0
1	1	10	10	1

Truth Table

W	y_1	y_0	Y_1	Y_0	Z
0	0	0	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	1	1	1	0	1
1	0	0	0	1	0
1	0	1	0	1	0
1	1	0	1	1	0
1	1	1	0	1	1

K-Maps



$Y_1 = \bar{w}_0 y_0 + w_0 y_1 \bar{y}_0$ $\quad Y_0 = w_0$ $\quad z_0 = y_1 y_0$

(maybe MUX, y_0 - select)

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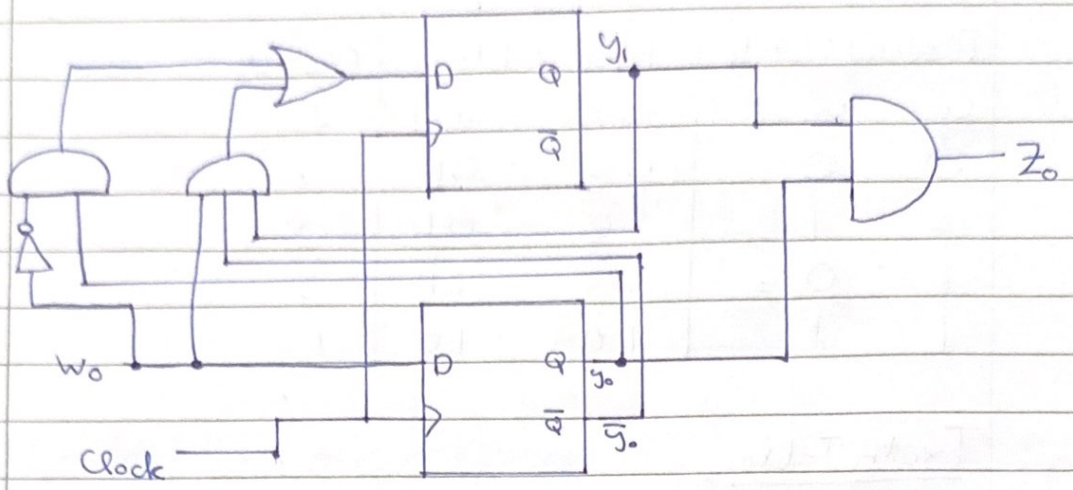
Circuit



P2. A. It is a MEALY MACHINE

B.

Present State		Next State ($Y_2 Y_1$)					Output				
y_2	y_1	$(x_1 x_0)$	00	01	10	11	00	01	(Z) 10	11	
0	0		00	00	01	10	1	1	0	0	
0	1		01	11	00	10	1	0	1	1	
1	0		10	01	00	11	1	0	0	1	
1	1		11	11	01	10	1	1	0	0	

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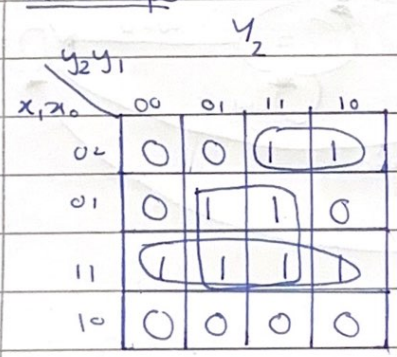
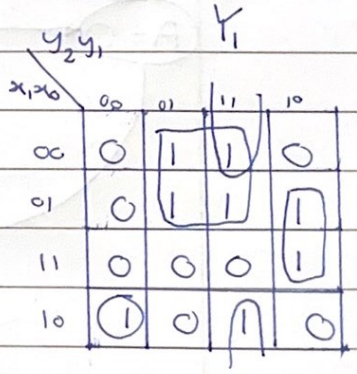
c.

y_2	y_1	x_1	x_0	Y_2	Y_1
0	0	0	0	0	0
0	0	0	1	0	0
0	0	1	0	0	1
0	0	1	1	1	0
0	1	0	0	0	1
0	1	0	1	1	1
0	1	1	0	0	0
0	1	1	1	1	0
1	0	0	0	1	0
1	0	0	1	0	1
1	0	1	0	0	0
1	0	1	1	1	1
1	1	0	0	1	1
1	1	0	1	1	1
1	1	1	0	0	1
1	1	1	1	1	0

K-Maps





$Y_2 = y_1x_0 + x_1x_0 + \bar{x}_1\bar{x}_0y_2$

$Y_1 = \bar{x}_1y_1 + x_0y_2\bar{y}_1 + \bar{x}_0y_2y_1 + x_1\bar{x}_0\bar{y}_2\bar{y}_1$

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P3. A. Logic Expression:

$Z = y_0 + y_1$

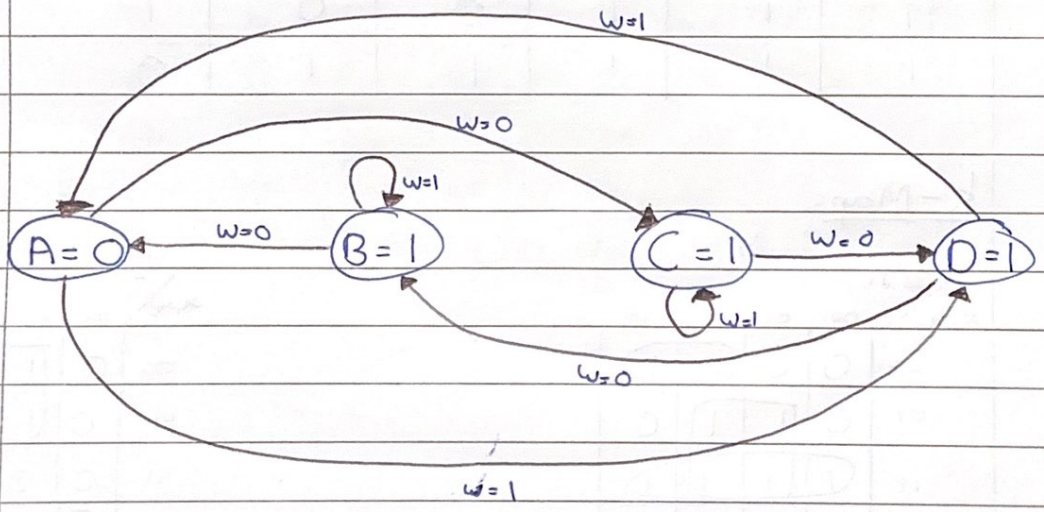
$Y_1 = \bar{y}_0$

$Y_0 = w \oplus y_1$ → 1: if different; → 0: if same

B.

	Present State		Next State		Output
	y_1	y_0	$w=0$	$w=1$	Z
A	0	0	C 1 0	D 1 1	0
B	0	1	A 0 0	B 0 1	1
C	1	0	D 1 1	C 1 0	1
D	1	1	B 0 1	A 0 0	1

C.



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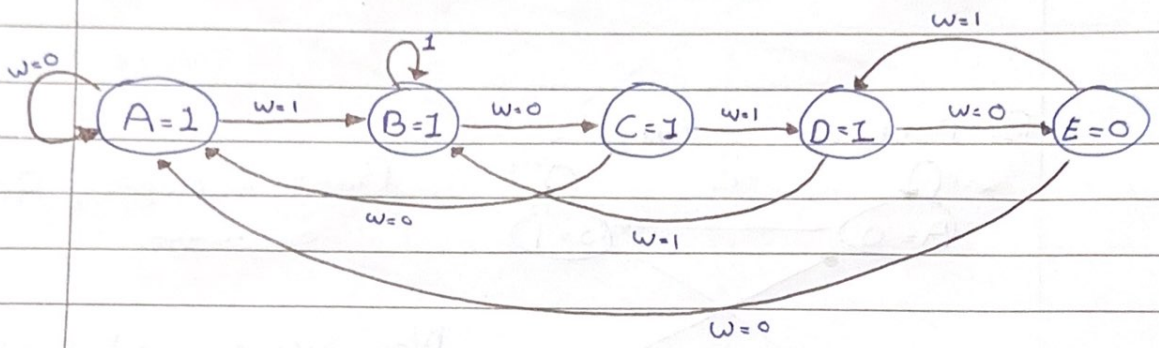
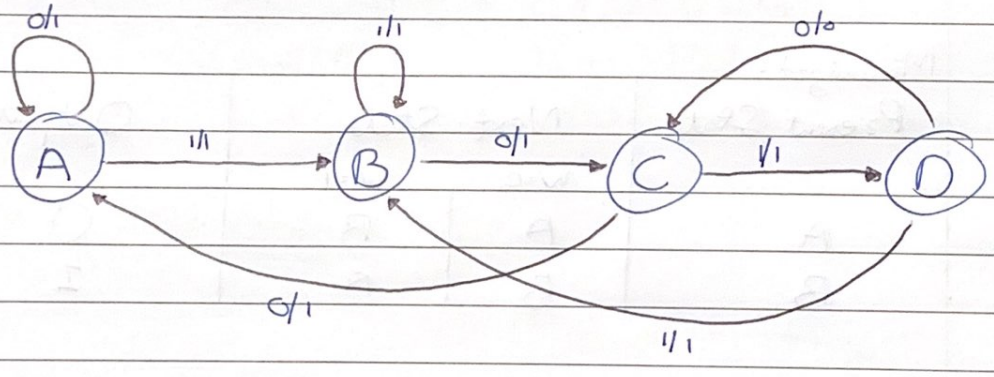
P4. OUTPUT : 0 → '1010'
1 → Otherwise

A. Moore Machine



B. Mealy Machine



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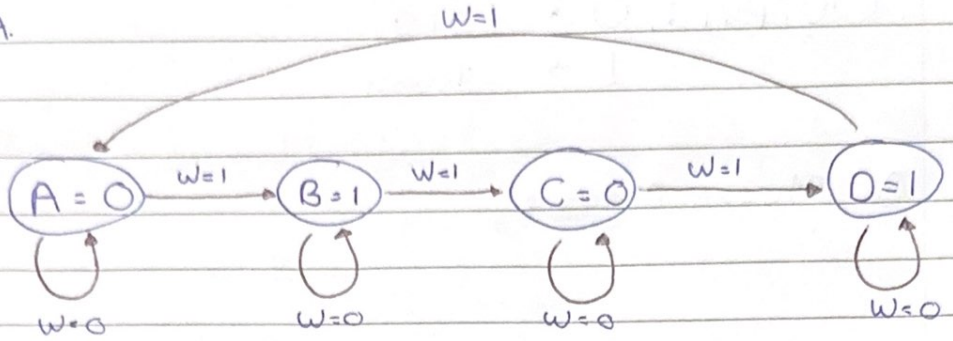
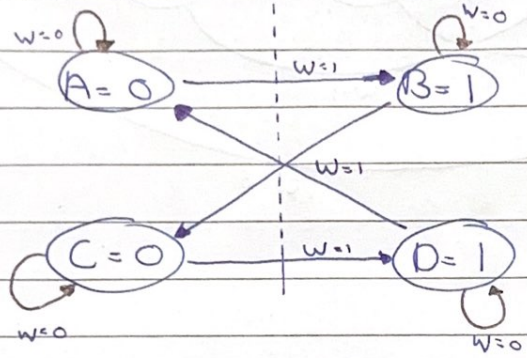
P5. A.



B. Partition 1 | Partition 2



Based on outputs & '0, 1' successors.

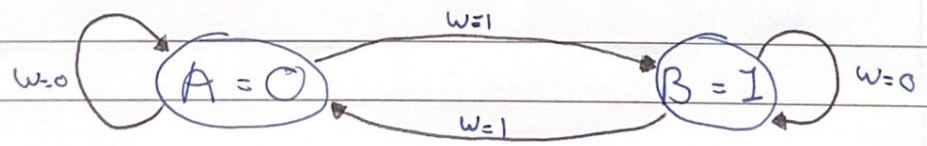
Now, because we get same partition on (1, 2) twice, we have reached the limit.

So, A ≡ C & B ≡ D

Minimized:

Present State	Next State		Output
	W=0	W=1	
A	A	B	0
B	B	A	1

C.



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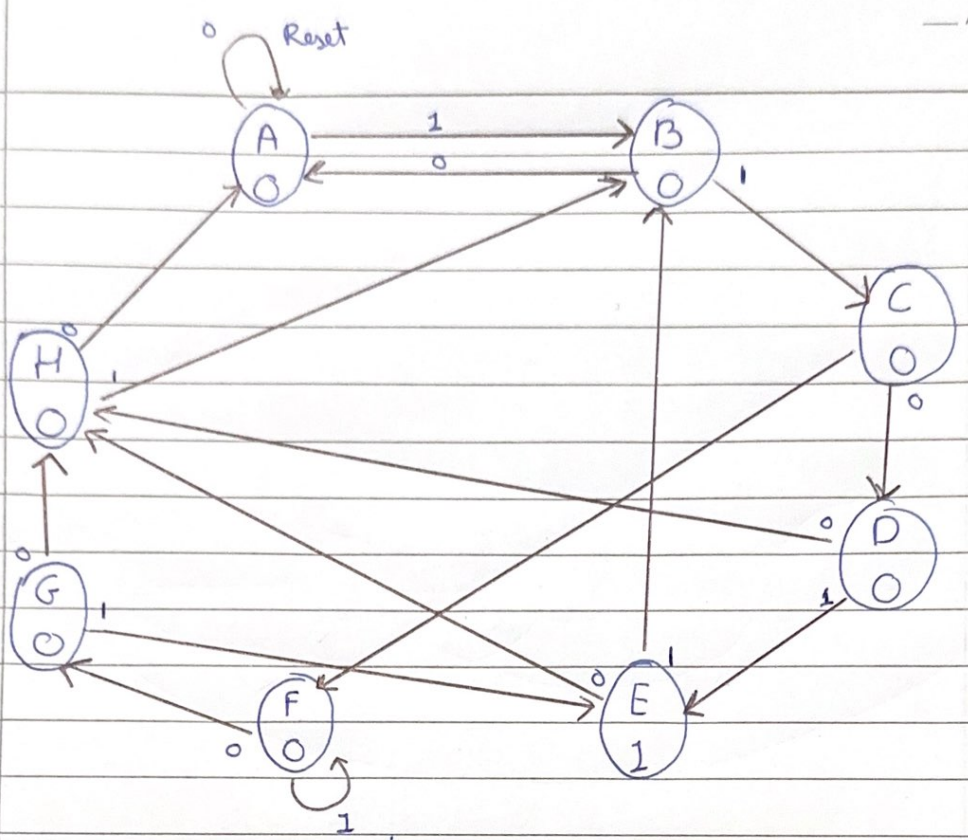
P6.



Partition 1 : Output based	Partition 2 : Where (W=1) Points
(ABCDFGH)(E)	(ABCFH)(DG)(E) → Same behaviours

Partition 3 : Where (W=0) Points	Partition 4
(ABH)(CF)(DG)(E)	(AH)(B)(CF)(DG)(E) : 5 Partitions Only have to plot underlined ones.

Minimized Diagram