Lab-8 @ - ES203

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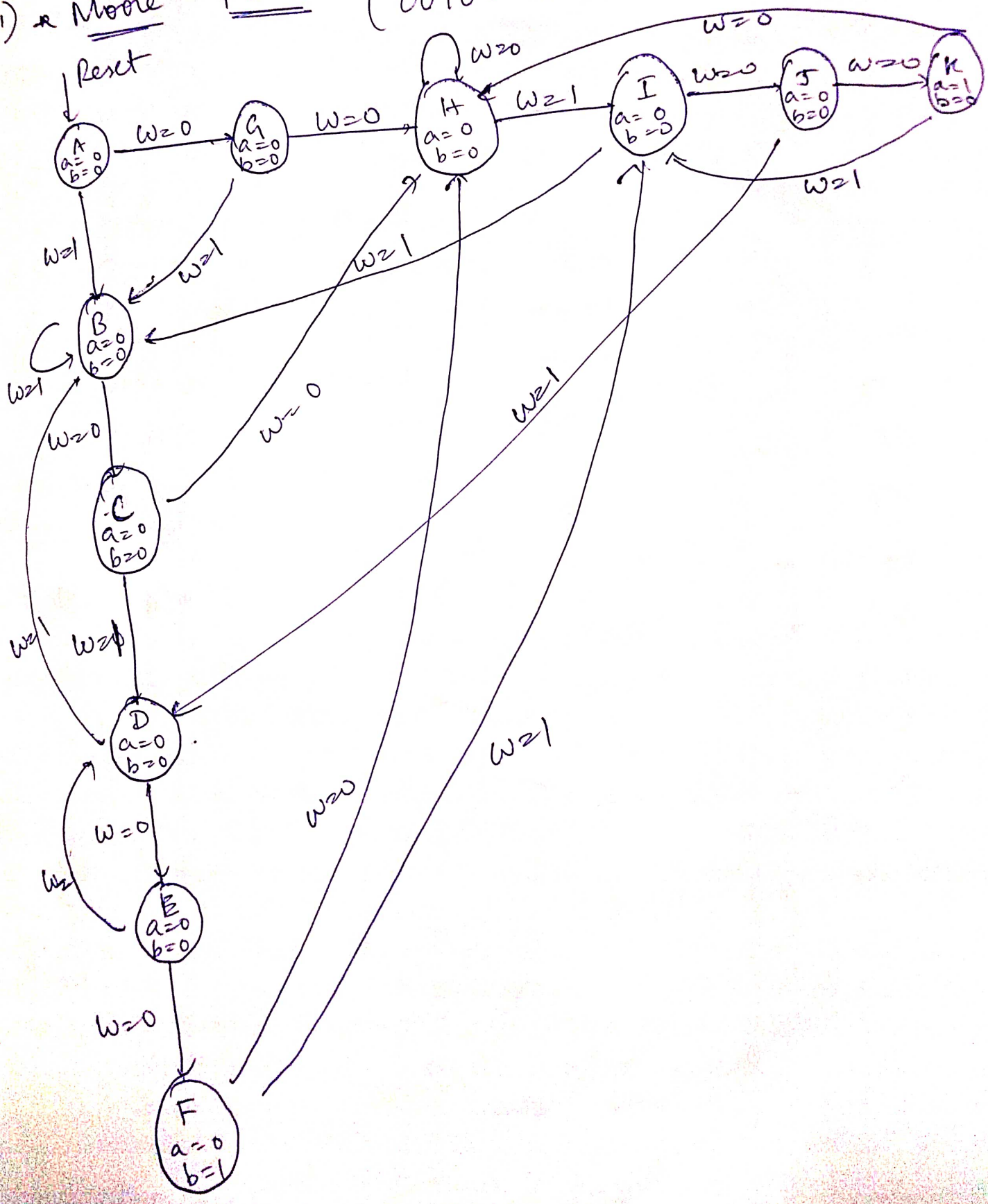
1) * Moore FSM: (00100 or 10100)



* State Assignment:

Present state		Next state		z (output)	
		w=0	w=1	a	b
	$y_3\ y_2\ y_1\ y_0$	$Y_3\ Y_2\ Y_1\ Y_0$	$Y_3\ Y_2\ Y_1\ Y_0$		
A	0 0 0 0	0 1 1 0	0 0 0 1	0	0
B	0 0 0 1	0 0 1 0	0 0 0 1	0	0
C	0 0 1 0	0 1 1 1	0 0 1 1	0	0
D	0 0 1 1	0 1 0 0	0 0 0 1	0	0
E	0 1 0 0	0 1 0 1	0 0 1 1	0	0
F	0 1 0 1	0 1 1 1	1 0 0 0	0	1
G	0 1 1 0	0 1 1 1	0 0 0 1	0	0
H	0 1 1 1	0 1 1 1	1 0 0 0	0	0
I	1 0 0 0	1 0 0 1	0 0 0 1	0	0
J	1 0 0 1	1 0 1 0	0 0 1 1	0	0
K	1 0 1 0	0 1 1 1	1 0 0 0	1	0
L	* 0 1 1	x x x x	x x x x	x	x
M	1 1 0 0	x x x x	x x x x	x	x
N	1 1 0 1	x x x x	x x x x	x	x
O	1 1 1 0	x x x x	x x x x	x	x
P	1 1 1 1	x x x x	x x x x	x	x

Since we need to consider JK flip flop, we know that.

Prev. State	Next State	J	K
0	0	0	d
0	1	1	d
1	0	d	1
1	1	d	0

∴ State Assignment Table for JK flip flop when

i) $w=0$

Present	$J_3 K_3$	$J_2 K_2$	$J_1 K_1$	$J_0 K_0$
A (0000)	0 d	1 d	1 d	0 d
B (0001)	0 d	0 d	1 d	d 1
C (0010)	0 d	1 d	d 0	1 d
D (0011)	0 d	1 d	d 1	d 1
E (0100)	0 d	d 0	0 d	1 d
F (0101)	0 d	d 0	1 d	d 0
G (0110)	0 d	d 0	d 0	1 d
H (0111)	0 d	d 0	d 0	d 0
I (1000)	d 0	0 d	0 d	1 d
J (1001)	d 0	0 d	1 d	d 1
K (1010)	d 1	1 d	d 0	1 d

d = dont cares

ii) $w=1$

Present	$J_3 K_3$	$J_2 K_2$	$J_1 K_1$	$J_0 K_0$
A	0 d	0 d	0 d	1 d
B	0 d	0 d	0 d	d 0
C	0 d	0 d	d 0	1 d
D	0 d	0 d	d 1	d 0
E	0 d	d 1	1 d	1 d
F	1 d	d 1	0 d	d 1
G	0 d	d 1	d 1	1 d
H	1 d	d 1	d 1	d 1
I	d 1	0 d	0 d	1 d
J	d 1	0 d	1 d	d 0
K	d 0	0 d	d 1	0 d

By Analysis (K-maps), we get :-

$$J_3 = w y_2 y_0 \quad , \quad K_3 = \bar{w} y_1 + w \bar{y_1}$$

$$K_3 = w \oplus y_1$$

$$J_2 = \bar{w} y_1 + \bar{w} \bar{y_3} \bar{y_0} \quad , \quad K_2 = w$$

$$J_1 = \bar{w} y_0 + y_3 y_0 + \bar{w} \bar{y_3} \bar{y_2} + w y_2 \bar{y_0} \quad , \quad K_1 = \bar{y_2} y_0 + w y_2 + w y_3$$

$$J_0 = y_2 + \bar{w} y_1 + y_3 \bar{y_1} + w \bar{y_3} \quad , \quad K_0 = \bar{w} \bar{y_2} + w y_2$$

$$a = y_3 \bar{y_2} y_1 \bar{y_0} \quad , \quad b = \bar{y_3} y_2 \bar{y_1} y_0$$

Hardware Implementation :