Q 4. FSM minimization

Note:- $x=0$ distinguishes (C, D, H) from the rest

(C, D, H) → o/p = 0

the rest → o/p = 1.

So.

$P_0 = (ABCDEFGH)$

$P_1 = (CDH)(ABEFG)$

$P_2 =$ look @ $A \xrightarrow{0} B$, $E \xrightarrow{0} D$ — different partitions

So, A & E are distinguishable

But A B are not

$P_2 = (CDH)(AB)(EFG)$

A & F can be distinguished,

B & F " " "

But E & F cannot be distinguished as their successor (D, C) are in the same partition.

F & G → (C, D) → can't distinguish

P_3 → now C & H are distinguishable as E & A are distinguishable.

$P_3 = (CD)(H)(AB)(EFG)$

$P_4 = (CD)(H)(A)(B)(EFG)$

$P_5 = (CD)(H)(A)(B)(EFG)$ ←

Q5. The circuit can be designed using both Mealy & Moore-type machines.

Since we are comparing inputs w_1 & w_2 for equality

let $K = w_1 \oplus w_2$.

whenever $K=1$, $w_1 \neq w_2$ & the sequence is broken.

We need to read $K=0$ for 4-consecutive cycles → & produce o/p = 1

" o/p = 0, otherwise.

or

Mealy machine.

P.S.	N.S., z: K=0	N.S., z: K=1
A	B, 0	A, 0
B	C, 0	A, 0
C	D, 0	A, 0
D	D, 1	A, 0

If I use the state assignment

A = 00
B = 01
C = 10
D = 11

$Y_1\ Y_2$.

then $\cancel{Y_1 = \bar{K} y_1 + \bar{K}\ldots}$

Y_1:

K \ y_1y_2	00	01	11	10
0		1	1	1
1				

PS	NS: K=0	NS: K=1
00	01, 0	00, 0
01	10, 0	00, 0
10	11, 0	00, 0
11	11, 1	00, 0

$$Y_1 = \bar{K}(y_1 + y_2)$$

$$Y_2 = \bar{K}(\bar{y}_1\bar{y}_2 + y_1\bar{y}_2 + y_1y_2)$$
$$= \bar{K}(y_1 + \bar{y}_1\bar{y}_2)$$
$$= \bar{K}(y_1 + \bar{y}_2)$$

$$z = \bar{K} \cdot y_1y_2$$

Moore m/c.

Add an extra state into the mealy m/c to account for :-

A ⟶ broken seq.

B ⟶ K=0 for 1-cycle.

C ⟶ " " 2-cycles.

D ⟶ " " 3- "

E ⟶ " " 4-cycles.