DACD ASSIGNMEN-2

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① Inputs: x, y, z, w

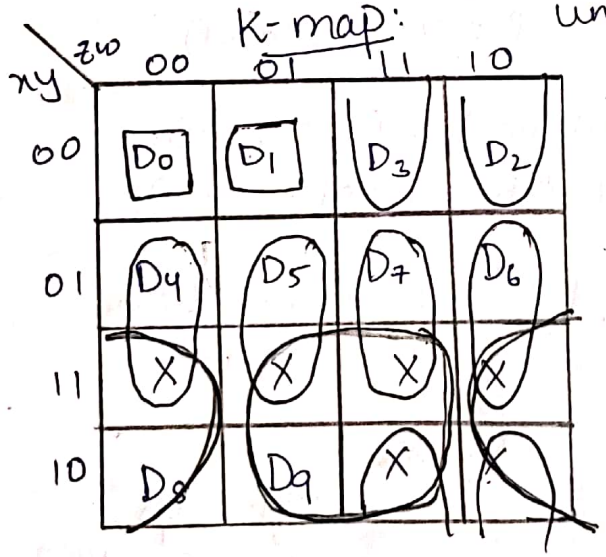
Outputs: $D_0, D_1, D_2, D_3, D_4, D_5, D_6, D_7, D_8, D_9$

x	y	z	w	D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9
0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	1	0	1	0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0	0	0	0	0	0	0
0	0	1	1	0	0	0	1	0	0	0	0	0	0
0	1	0	0	0	0	0	0	1	0	0	0	0	0
0	1	0	1	0	0	0	0	0	1	0	0	0	0
0	1	1	0	0	0	0	0	0	0	1	0	0	0
0	1	1	1	0	0	0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1	0
1	0	0	1	0	0	0	0	0	0	0	0	0	1

For other all values, they are considered as DONTCARE values

unused ⇒ $D_{10} - D_{15}$

K-map:



$D_0 = x'y'z'w'$

$D_1 = x'y'z'w$

$D_2 = y'zw'$

$D_3 = y'zw$

$D_4 = yz'w'$

$D_5 = yz'w$

$D_6 = yzw'$

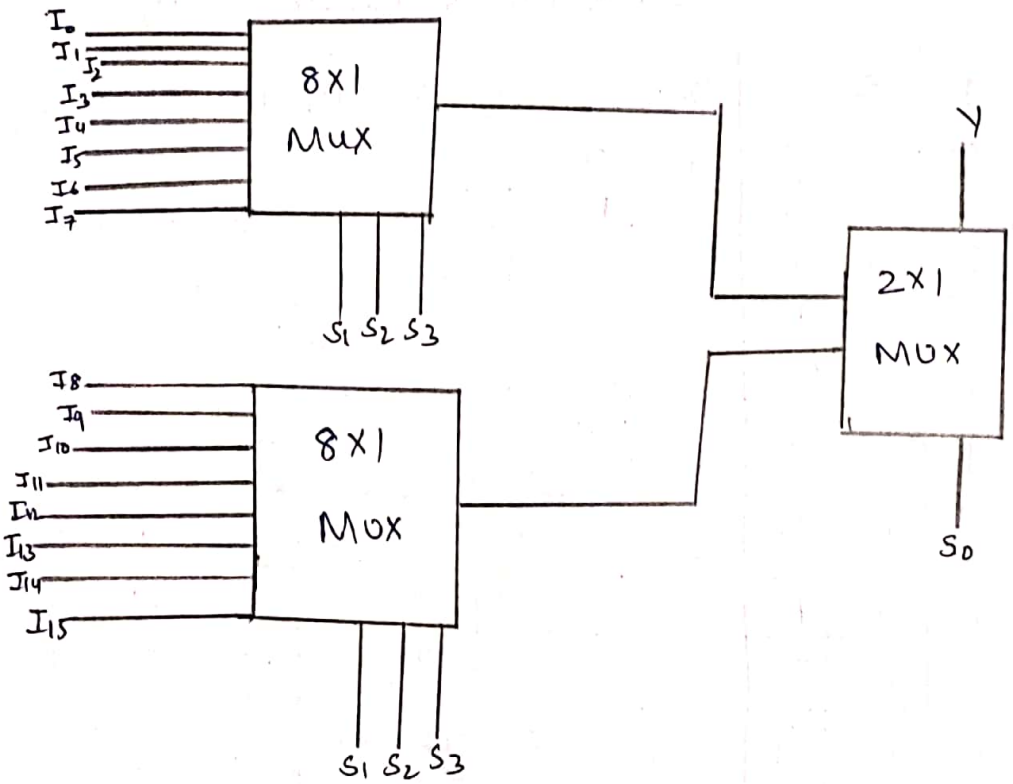
$D_7 = yzw$

$D_8 = xw'$

$D_9 = xw$

(2) Inputs- $I_0, I_1, I_2 \cdots I_{15}$

select lines :- S_0, S_1, S_2, S_3



(3) A/Q A is augend ⇒ $A = 137_{10}$

$B = 72_{10}$ (addend)

$(A_7 A_6 A_5 A_4 A_3 A_2 A_1 A_0)_2 = (10001001)_2$

$(B_7 B_6 B_5 B_4 B_3 B_2 B_1 B_0)_2 = (01001000)_2$

$A_7 = 1$	$B_7 = 0$
$A_6 = 0$	$B_6 = 1$
$A_5 = 0$	$B_5 = 0$
$A_4 = 0$	$B_4 = 0$
$A_3 = 1$	$B_3 = 1$
$A_2 = 0$	$B_2 = 0$
$A_1 = 0$	$B_1 = 0$
$A_0 = 1$	$B_0 = 0$

During addition

$C_0 = 0$

high-order		low order
1000	← carry	1001
0100		1000
1101		0001

$\therefore \Sigma_0 = 1 \quad \Sigma_4 = 1$

$\Sigma_1 = 0 \quad \Sigma_5 = 0$

$\Sigma_2 = 0 \quad \Sigma_6 = 1$

$\Sigma_3 = 0 \quad \Sigma_7 = 1$

$\Sigma_8 = 0$

1 1 1 1

4 (a) A = 0111

B = 0110

M = 0 ⇒ A + B

```
  0 1 1 1
  0 1 1 0
  -------
  1 1 0 1
```

Sum = 1101

$S_0 = 1$, $S_1 = 0$, $S_2 = 1$, $S_3 = 1$

$C = C_4 = 0$

$V = C_4 \oplus C_3$

$= 0 \oplus 1$

V = 1

(b) A = 1000

B = 1001

M = 0 ⇒ A + B

```
   1000
   1001
  -----
  10001
```

C_4

$C = C_4 = 1$

Sum = 0001

$S_0 = 1$, $S_1 = 0$, $S_2 = 0$, $S_3 = 0$

$V = 1 \oplus 0$

V = 1

(c) A = 1100

B = 1000

M = 1 ⇒ A − B

```
    1 1 0 0  (1S)   1 1 0 0   1 → C
(−) 1 0 0 0   ⇒  +  0 1 1 1
                 ---------
                 1 0 1 0 0
```

C_4

C = 1

$S_0 = 0$, $S_1 = 0$, $S_2 = 1$, $S_3 = 0$

$V = 1 \oplus 1$

V = 0

(d) A = 0101

B = 1010

M = 1 ⇒ A − B

1s of B = 0101

```
      0 1 0 1   1 → C
  ⇒   0 1 0 1
      -------
      1 0 1 1
```

C = 0

$S_0 = 1$, $S_1 = 1$, $S_2 = 0$, $S_3 = 1$

$V = 0 \oplus 0 = 0$

(e) A = 0000

B = 0001

M = 1 ⇒ A − B

1s of B = 1110

```
  0 0 0 0   1 → Carry
  1 1 1 0
  -------
  1 1 1 1
```

$S_0 = 1$, $S_1 = 1$, $S_2 = 1$, $S_3 = 1$

C = 0

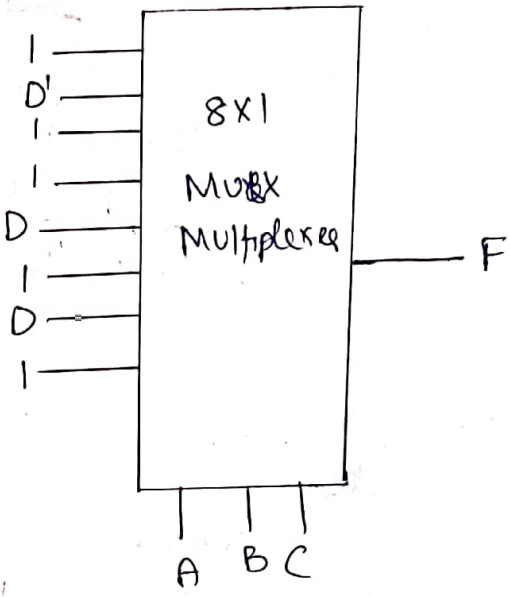
$V = 0 \oplus 0$

V = 0

(5) $F(A,B,C,D) = \pi(3,8,12)$

$= \Sigma(0,1,2,4,5,6,7,9,10,11,13,14,15)$

A	B	C	D	F	
0	0	0	0	1	F=1
0	0	0	1	1	
0	0	1	0	1	F=D'
0	0	1	1	0	
0	1	0	0	1	F=1
0	1	0	1	1	
0	1	1	0	1	F=1
0	1	1	1	1	
1	0	0	0	0	F=D
1	0	0	1	1	
1	0	1	0	1	F=1
1	0	1	1	1	
1	1	0	0	0	F=D
1	1	0	1	1	
1	1	1	0	1	F=1
1	1	1	1	1	



(6) $F = (X_3X_2X_1X_0 + Y_3Y_2Y_1Y_0) - Z_3Z_2Z_1Z_0$