Practice Sheet - 2 Solutions

(1) $F(w,x,y,z) = m_3, m_4, m_5, m_7, m_9, m_{13}, m_{14}, m_{15}$

yz \ wx	00	01	11	10
00	0	1 (4)	12	8
01	1	1 (5)	1 (13)	1 (9)
11	1 (3)	1 (7)	1 (15)	11
10	2	6	1 (14)	10

$= \bar{y}\bar{w}x + \bar{w}yz + wxy + \bar{y}zw$

(2) $Y = \Sigma m(0,1,5,9,13,14,15) + \Sigma d(3,4,7,10,11)$

yz \ wx	00	01	11	10
00	1 (0)	X (4)	12	8
01	1 (1)	1 (5)	1 (13)	1 (9)
11	X (3)	X (7)	1 (15)	X (11)
10	2	6	1 (14)	X (10)

$= z + \bar{w}\bar{y} + yw$

(3)

(1) $F(x,y,z) = \Pi M(0,5)$

z \ xy	00	01	11	10
0	0 (0)	2	6	4
1	1	3	7	0 (5)

$F = (x+y+z)(\bar{x}+y+\bar{z})$
$= x\bar{z} + \bar{x}z + y$

(2) $F(x,y,z) = \Sigma m(1,2,3,4,6,7)$

z \ xy	00	01	11	10
0	0	1 (2)	1 (6)	1 (4)
1	1 (1)	1 (3)	1 (7)	5

$F = y + \bar{x}z + x\bar{z}$

Note :- (1) == (2)

(4)

$F(a,b,c,d,e) =$

$ab'cd + a'b'cde + ab'c'de + a'bcde$

$= ab'cd(e+e') + a'b'cde + ab'c'de + a'bcde$

$= a.(\underbrace{b'cde + b'cde' + b'c'de}_{I}) + a'(\underbrace{b'cde + bcde}_{II})$

I

de \ bc	00	01	11	10
00				
01				
11	1	1		
10		1		

$= deb' + \bar{b}cd$

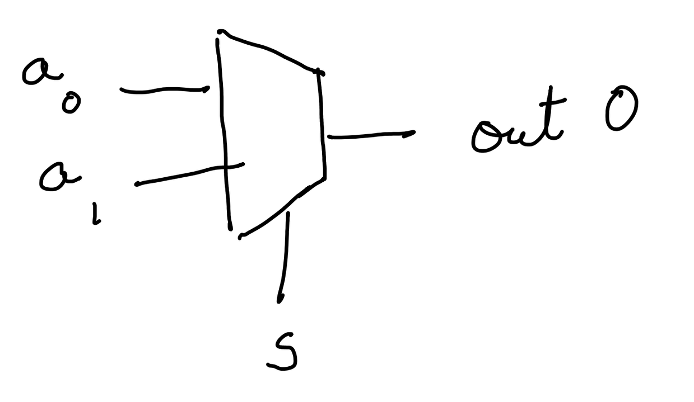
II

de \ bc	00	01	11	10
00				
01				
11		1	1	
10				

$= dec$

$F = a(deb' + b'cd) + a'(dec)$

(5)



$O = \bar{S}a_0 + Sa_1$ - (1)

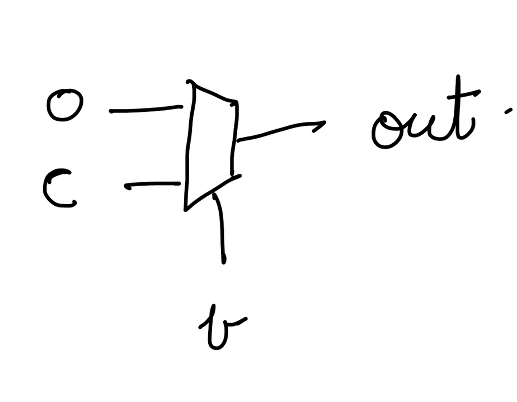
(1) AND gate inputs be b, c.

$O = b \cdot c$ - (2)

Try to make (1) as (2) so:-

$S = b, a_1 = c, a_0 = 0$

=>



(2) XOR gate. inputs be b, c

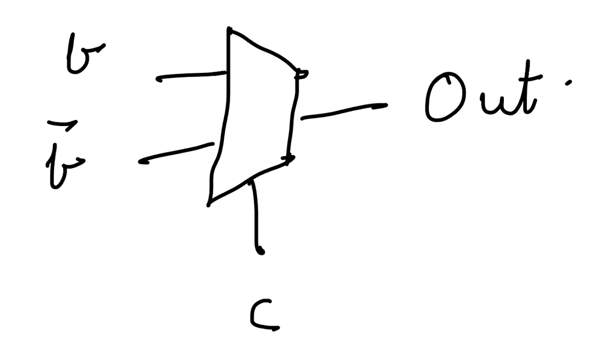
$O = b\bar{c} + \bar{b}c$ - (3)

Try to convert

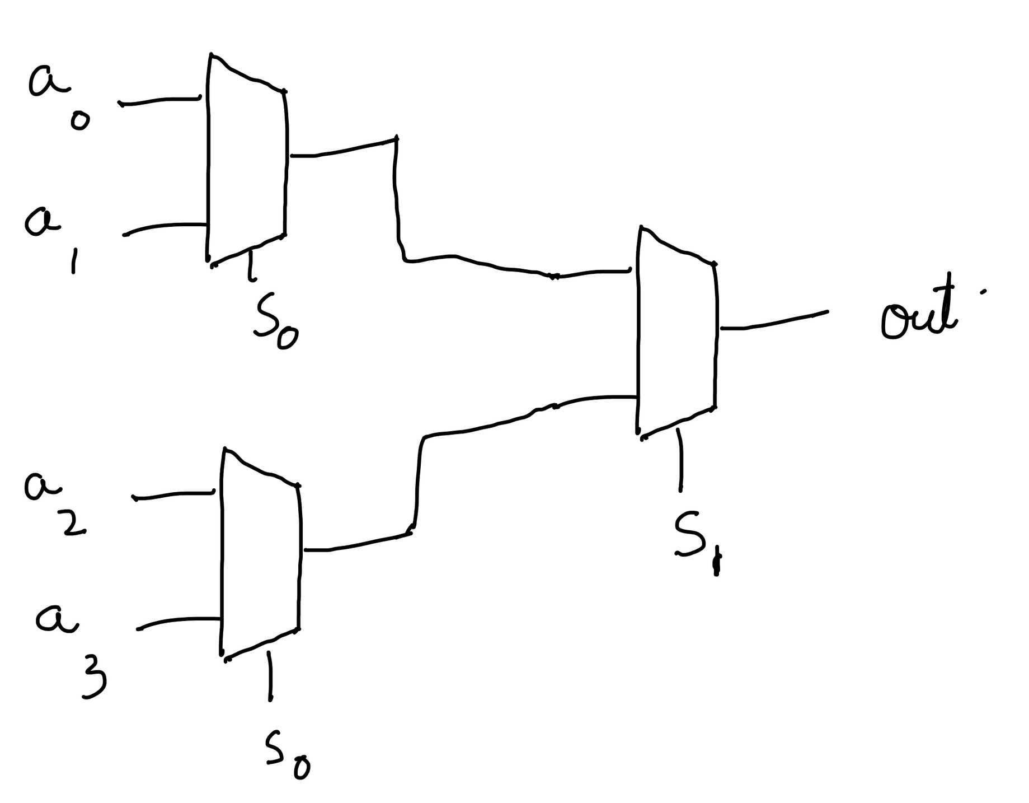
$O = a_0\bar{S} + a_1S$ as (3)

so $a_0 = b, a_1 = \bar{b}$.

$S = c$



(6)



We need 2 MUX for 2 inputs each & 1 MUX for selecting outputs of mux.