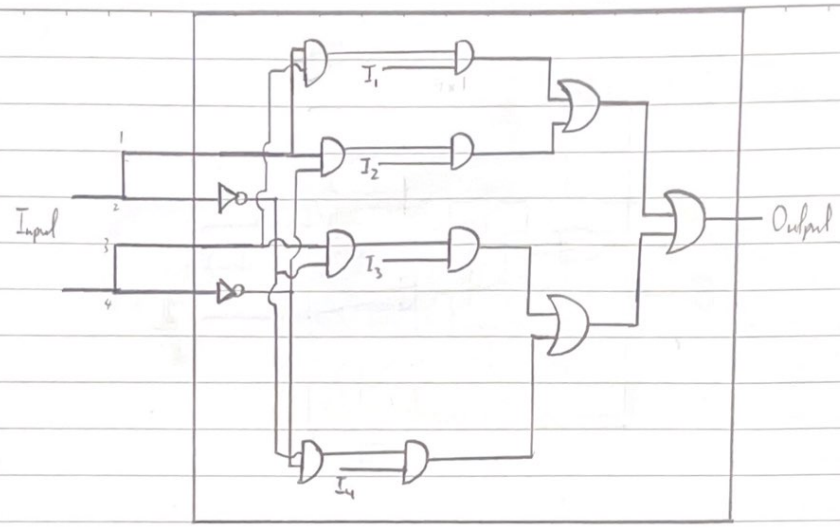
Saishma Ramesh Kumar

Date: . .

CSCI113-Lab 1

1) 4x1 multiplexer:



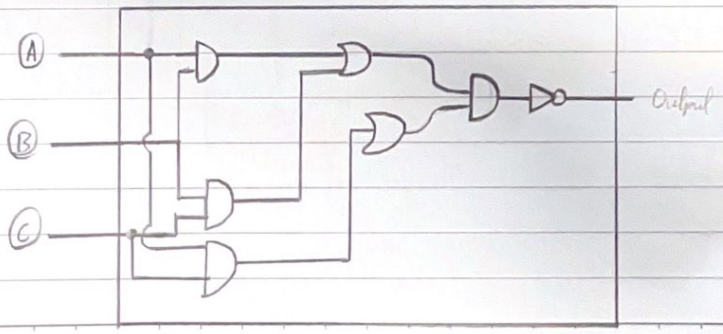
2)

x_2	x_1	x_0	F_1	F_2	F_3	F_4
0	0	0	0	0	1	0
0	0	1	0	1	1	0
0	1	0	0	1	1	0
0	1	1	1	0	1	0
1	0	0	0	1	0	1
1	0	1	1	0	0	1
1	1	0	1	0	0	1
1	1	1	0	1	0	1

111 + 001 = 001

110 + 001 = 011

3) $E = \left((A \cdot B) + (A \cdot C) + (B \cdot C)\right) \cdot \overline{(A \cdot B \cdot C)}$



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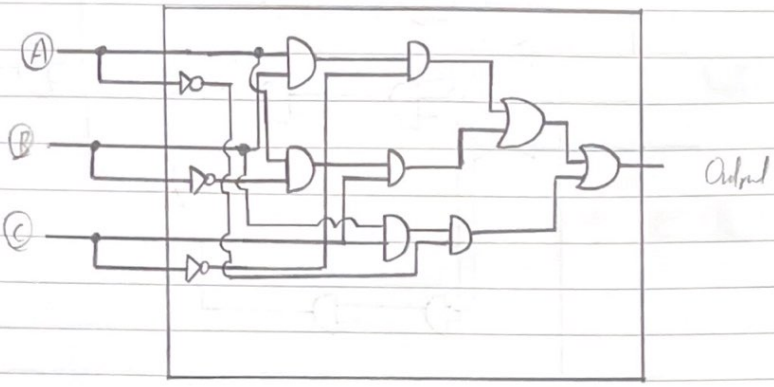
$E = (A \cdot B \cdot \bar{C}) + (A \cdot \bar{B} \cdot C) + (\bar{A} \cdot B \cdot C)$



$E = (A \cdot B \cdot \bar{C}) + (A \cdot \bar{B} \cdot C) + (\bar{A} \cdot B \cdot C)$ seems to be more efficient among the two terms.

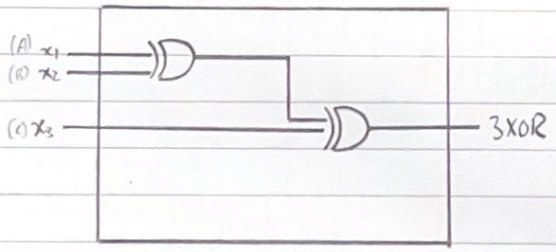
4) $E = ((A \cdot B) + (A \cdot C) + (B \cdot C)) \cdot (\overline{A \cdot B \cdot C}) = (A \cdot B) \cdot (\bar{A} + \bar{B} + \bar{C}) + (A \cdot C) \cdot (\bar{A} + \bar{B} + \bar{C}) + (B \cdot C)(\bar{A} + \bar{B} + \bar{C})$

$= (A \cdot B) \cdot (\bar{C}) + (A \cdot C) \cdot (\bar{B}) + (B \cdot C) \cdot (\bar{A}) = (A \cdot B \cdot \bar{C}) + (A \cdot \bar{B} \cdot C) + (\bar{A} \cdot B \cdot C)$ ≠

5) $XOR = (A + B) \cdot (\overline{A \cdot B}) = (A + B) \cdot (\bar{A} + \bar{B}) = ((A + B) \cdot \bar{A}) + ((A + B) \cdot \bar{B})$

$= (\bar{A} \cdot B) + (A \cdot \bar{B}) = (A \cdot \bar{B}) + (\bar{A} \cdot B)$

6)



A	B	C	A⊕B⊕C
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

$E = \bar{A} \cdot \bar{B} \cdot \bar{C} + \bar{A} \cdot \bar{B} \cdot C + \bar{A} \cdot B \cdot \bar{C} + \bar{A} \cdot B \cdot C$
$+ A \cdot \bar{B} \cdot \bar{C} + A \cdot \bar{B} \cdot C + A \cdot B \cdot \bar{C} + A \cdot B \cdot C$