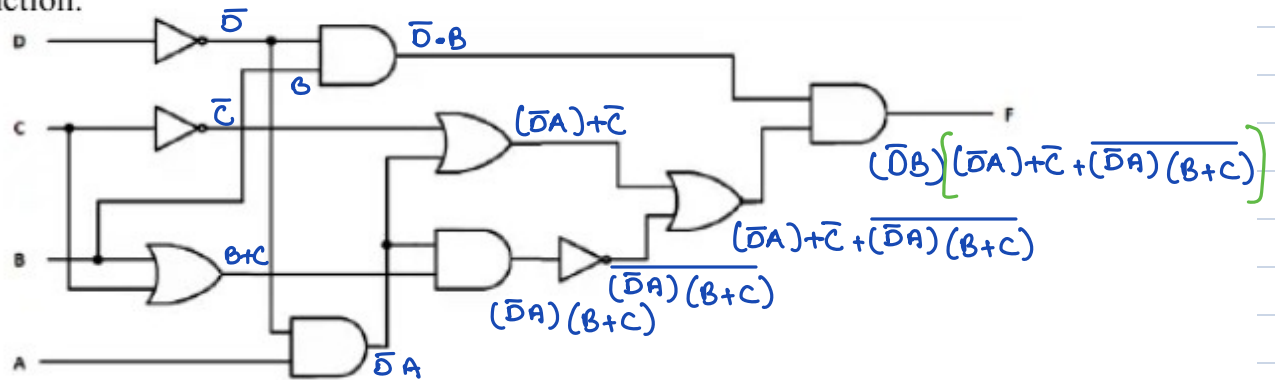


Q1.

Write down the boolean equation for the circuit diagram given below and obtain its truth table. Use boolean algebra to simplify the function to a minimum number of literals and redraw the logic diagram for simplified function.



$$(\overline{D}B)[(\overline{D}A) + \overline{C} + \overline{(\overline{D}A)(B+C)}]$$

$$\overline{D}B\overline{D}A + \overline{D}B\overline{C} + \overline{D}B\overline{(\overline{D}A)(B+C)}$$

$$AB\overline{D} + B\overline{C}\overline{D} + \overline{D}B[(D+\overline{A}) + (\overline{B}\overline{C})]$$

$$+ \overline{D}B(D+\overline{A}) + \overline{D}B\overline{B}\overline{C}$$

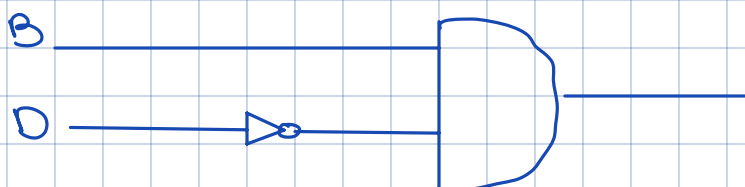
$$+ \overline{D}BD + \overline{D}B\overline{A}$$

$$AB\overline{D} + B\overline{C}\overline{D} + \overline{A}B\overline{D}$$

A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

AB \ CD	00	01	11	10
00	0	0	0	0
01	1	0	0	1
11	1	0	0	1
10	0	0	0	0

$$m1 = B\overline{D}$$



Q2.

$$F = \overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}B\overline{C}\overline{D} + A\overline{B}\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}$$

$$\overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}B\overline{C}\overline{D} + A\overline{B}\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}(0+\overline{D})$$

$$\overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}\overline{C}D + \overline{A}B\overline{C}\overline{D} + A\overline{B}\overline{C}\overline{D} + \overline{A}B\overline{C}D + \overline{A}B\overline{C}\overline{D} + \overline{A}B\overline{C}\overline{D}$$

1 0 1 0      1 0 0 1      0 1 1 0      1 1 0 0      0 1 1 1      0 1 0 1      0 1 0 0

A	B	C	D	X	
0	0	0	0	X	
0	0	0	1	0	$A+B+C+\overline{D}$
0	0	1	0	0	$A+B+\overline{C}+D$
0	0	1	1	0	$A+B+\overline{C}+\overline{D}$
0	1	0	0	1	
0	1	0	1	1	
0	1	1	0	1	
0	1	1	1	1	
1	0	0	0	X	
1	0	0	1	1	
1	0	1	0	1	
1	0	1	1	0	$\overline{A}+B+\overline{C}+\overline{D}$
1	1	0	0	1	
1	1	0	1	0	$\overline{A}+\overline{B}+C+\overline{D}$
1	1	1	0	0	$\overline{A}+\overline{B}+\overline{C}+D$
1	1	1	1	0	$\overline{A}+\overline{B}+\overline{C}+\overline{D}$

$$d = \overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}\overline{C}D$$

1 0 0 0      0 0 0 0

$$(A+B+C+\overline{D})(A+B+\overline{C}+D)(A+B+\overline{C}+\overline{D})(\overline{A}+B+\overline{C}+\overline{D})(\overline{A}+\overline{B}+C+\overline{D})$$

$$(\overline{A}+\overline{B}+\overline{C}+D)(\overline{A}+\overline{B}+\overline{C}+\overline{D})$$

AB \ CD	00	01	11	10
00	X	0	0	0
01	1	1	1	1
11	1	0	0	0
10	X	1	0	1

$h1 = \overline{A}B$

$h2 = \overline{C}D$

$h3 = A\overline{B}\overline{C}$

$h4 = A\overline{B}\overline{D}$

$$X = \overline{A}B + \overline{C}D + A\overline{B}\overline{C} + A\overline{B}\overline{D}$$

# Assignment: 01

Q1.

$$\begin{array}{r|l} 8 & 153 \\ 8 & 19 \\ & 2 \end{array} \quad \begin{array}{l} 1 \\ 3 \end{array}$$

$$(231)_8$$

Q2.

$$\begin{array}{r} 001010111 \\ \hline 1 \quad 2 \quad 7 \end{array}$$

Q5.

$$\begin{array}{r} 10111 \\ - 2^4 \quad 2^3 \quad 2^2 \quad 2^1 \quad 2^0 \\ \hline -16 + 4 + 2 + 1 \\ \hline -9 \end{array}$$

Q4.

$$\begin{array}{r} 11011.010 \\ \hline 3 \quad 3 \quad . \quad 2 \end{array}$$

$$Q8. (A+B+C)(\overline{D+E}) + (A+B+C)(D+E)$$

$$(A+B+C) [(\overline{D+E}) + (D+E)]$$

$$A+B+C$$

Q9.

$$AB + ABC + ABCD + ABCDE + ABCDEF$$

$$AB$$

$$Q12. AB + A(\overline{BC})$$

$$AB + A(\overline{B} + \overline{C})$$

$$AB + A\overline{B} + A\overline{C}$$

$$A(B + \overline{B}) + A\overline{C}$$

$$A + A\overline{C}$$

$$A(1 + \overline{C})$$

$$A$$

Q10.

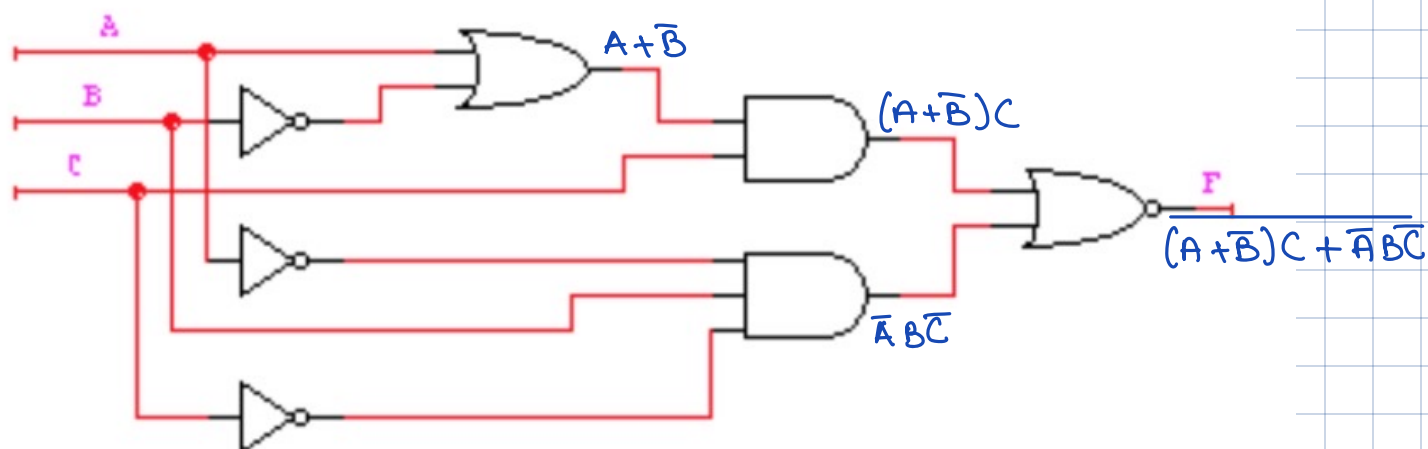
$$F = \overline{A\overline{B} + \overline{C} + \overline{D} + \overline{E}}$$

$$\overline{F} = (\overline{A\overline{B}})(\overline{\overline{C}})(\overline{\overline{D}})(\overline{\overline{E}})$$

$$= (A+B)CDE$$

# Assignment: 02

Q1.



A	B	C	$X = (A+\bar{B})C + \bar{A}B\bar{C}$
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

AB \ C	0	1
00	1	0
01	0	1
11	1	0
10	1	0

$$K1 = A\bar{C}$$

$$K2 = \bar{B}\bar{C}$$

$$K3 = \bar{A}BC$$

$$X = A\bar{C} + \bar{B}\bar{C} + \bar{A}BC$$

Q2.

X	Y	Z	A
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0

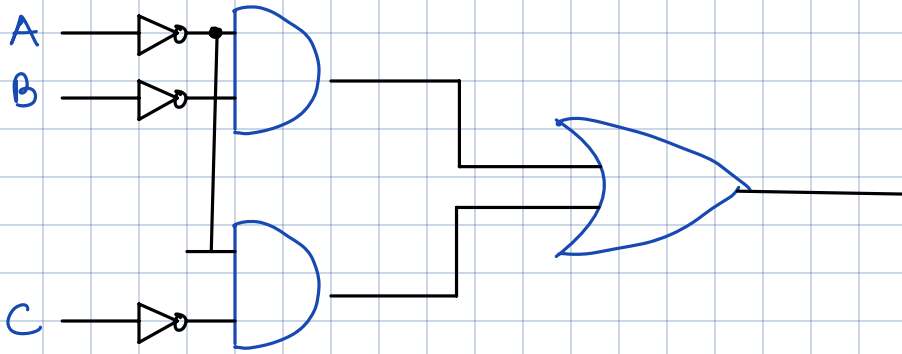
AB \ C	0	1
00	1	1
01	1	0
11	0	0
10	0	0

$$K1 = \bar{A}\bar{B}$$

$$K2 = \bar{A}\bar{C}$$

$$X = \bar{A}\bar{B} + \bar{A}\bar{C}$$

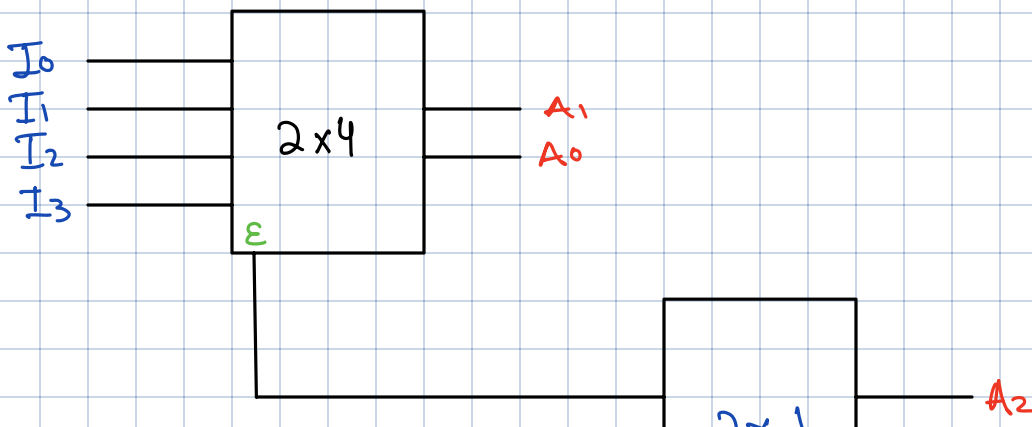
1	1	0	0
1	1	1	0

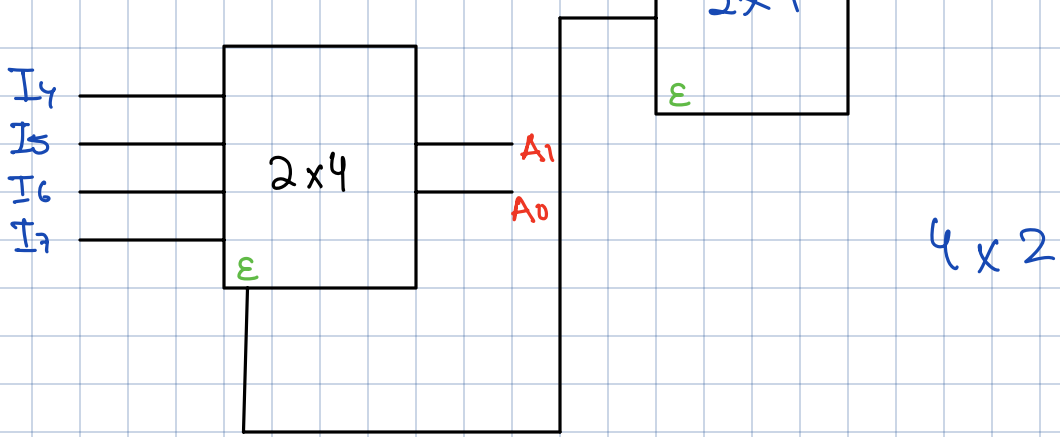


Q4.

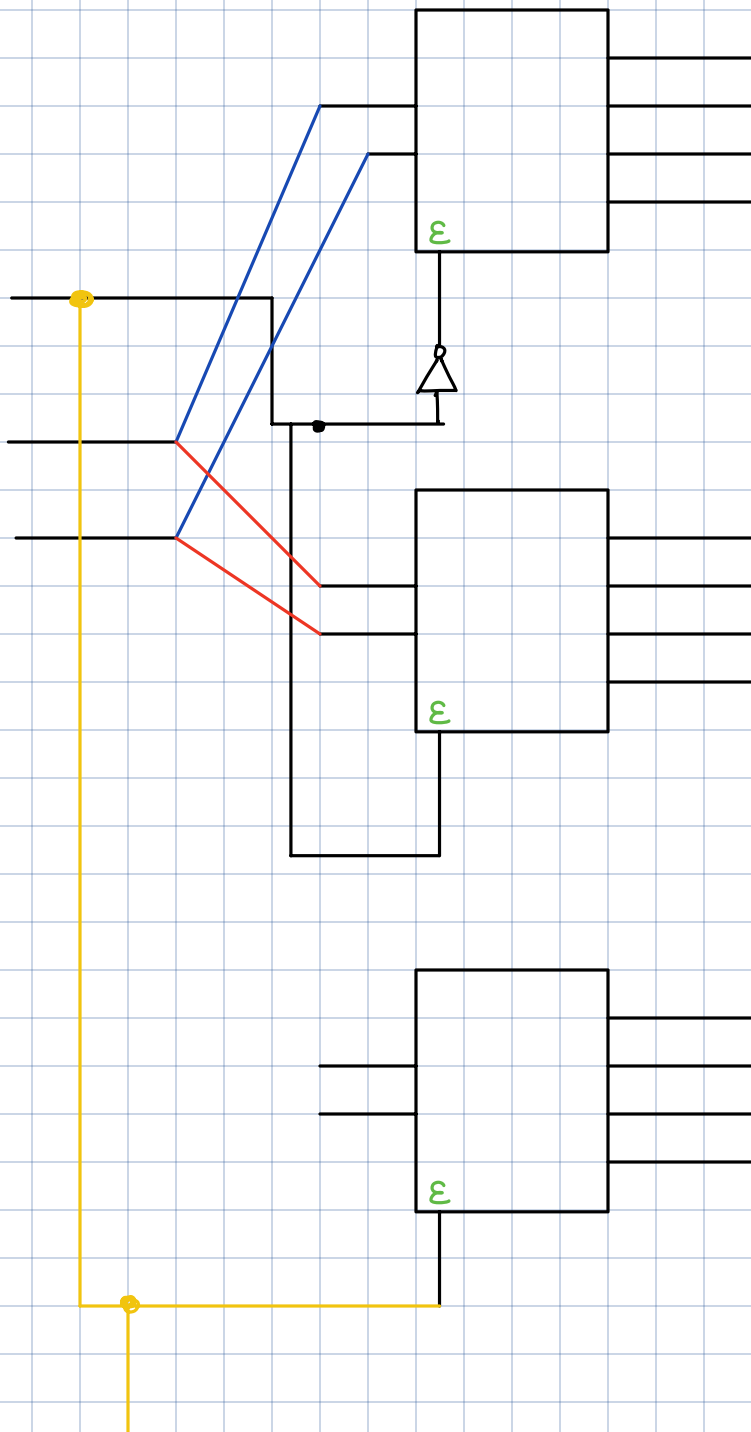
$A_1$	$A_0$	$B_1$	$B_0$	$C_3$	$C_2$	$C_1$	$C_0$
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0
0	0	1	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	0	0	0	0	0
0	1	0	1	0	0	0	1
0	1	1	0	0	0	1	0
0	1	1	1	0	0	1	1
1	0	0	0	0	0	0	0
1	0	0	1	0	0	1	0
1	0	1	0	0	1	0	0
1	0	1	1	0	1	1	0
1	1	0	0	0	0	0	0
1	1	0	1	0	0	1	1
1	1	1	0	0	1	1	0
1	1	1	1	1	0	0	1

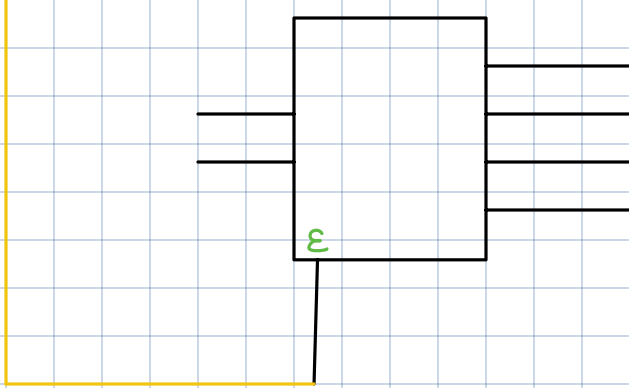
GPT paper:





Q2.





Q3.

$$F = \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}C + A\overline{B}\overline{C}D + \overline{A}B\overline{C}\overline{D}$$

$$= \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}C\overline{D} + \overline{A}\overline{B}\overline{C}\overline{D} + A\overline{B}\overline{C}D + \overline{A}B\overline{C}\overline{D}$$

0 1 0 1    1 0 1 1    1 0 1 0    1 1 0 1    0 1 1 0

A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	<u>0</u>
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	<u>0</u>
1	0	0	0	0
1	0	0	1	0
1	0	1	0	1
1	0	1	1	<u>1</u>
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

AB \ CD	00	01	11	10
00	0	0	0	0
01	0	1	0	1
11	0	1	0	0
10	0	0	1	1

$$G1 = B\overline{C}D$$

$$G2 = A\overline{B}C$$

$$G3 = \overline{A}B\overline{C}\overline{D}$$