

Assignment-1

Amreen Kaur (IS21MTECH14002)

15 January 2022

1 Question

Derive a Canonical POS expression for a Boolean function FN, represented by the following truth table :

X	Y	Z	FN(X,Y,Z)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

2 Answer

The Canonical POS expression for the Boolean function FN can be represented as: $\pi M(2,3,5,6)$ and the expression is as follows:-

The Boolean Function is:

$$(X + Y' + Z).(X + Y' + Z').(X' + Y + Z').(X' + Y' + Z)$$

Now, the reduced or non-canonical form of the expression is as follows:-

The Boolean Function is:

$$(X + Y')(Y' + Z)(X' + Y + Z')$$

The reduced expression was obtained using the following k-map.

		YZ			
		00	01	11	10
X					
0		1	1	0	0
1		1	0	1	0

3 NAND INPLEMENTATION

The simplified expression for FN obtained from the given truth table is as follows-

$$FN = [(X + Y').(Y' + Z).(X' + Y + Z')]$$

Now using NAND Logic the expression becomes-

$$((((X'.Y')(Y.Z')')')(X.Y'Z')')$$

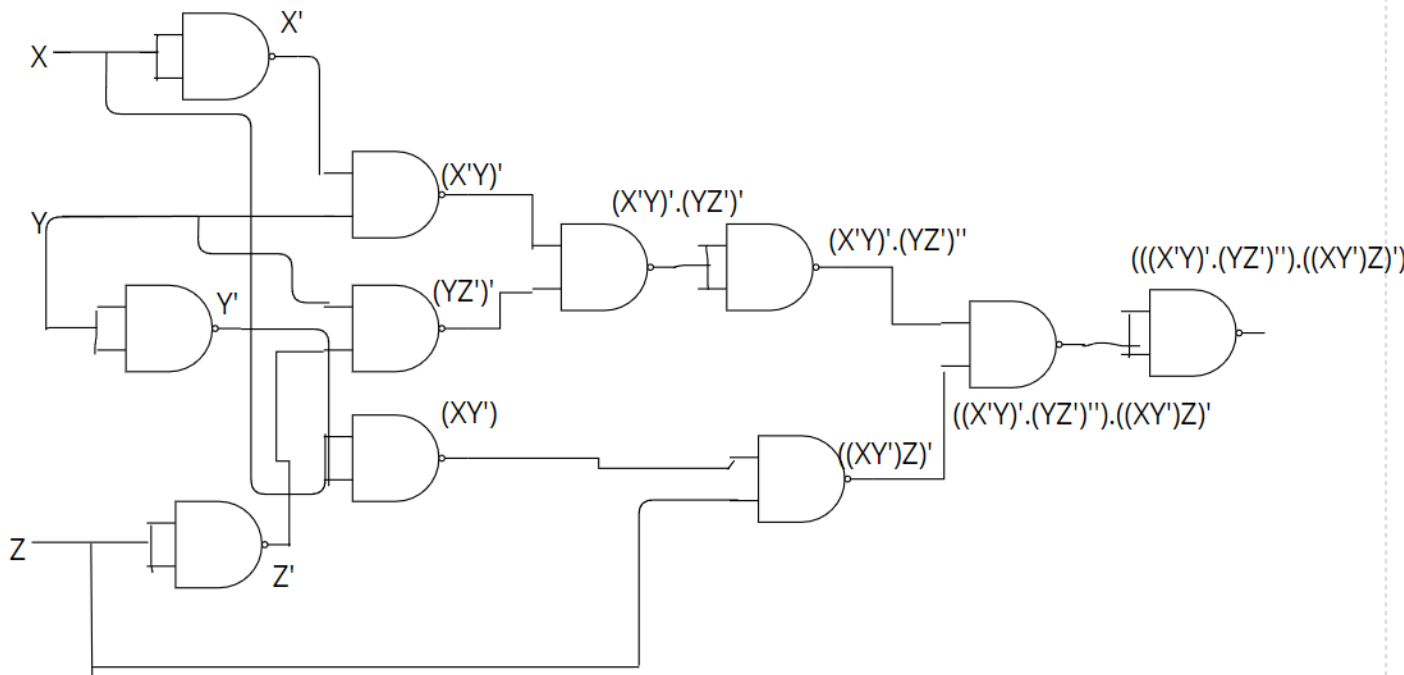


Figure 1: CIRCUIT DIAGRAM