19/03/2022 Khalid Muzaffar ID:269553

Exercise 2

Truth Table:

Truth Table obtained from the logical formula f(a,b,c)= Σ(0,1,2,3,4) with a,b,c being the input values and 0,1,2,3,4 being the Miniterms. f(a, b, c) = a' + b'c'.

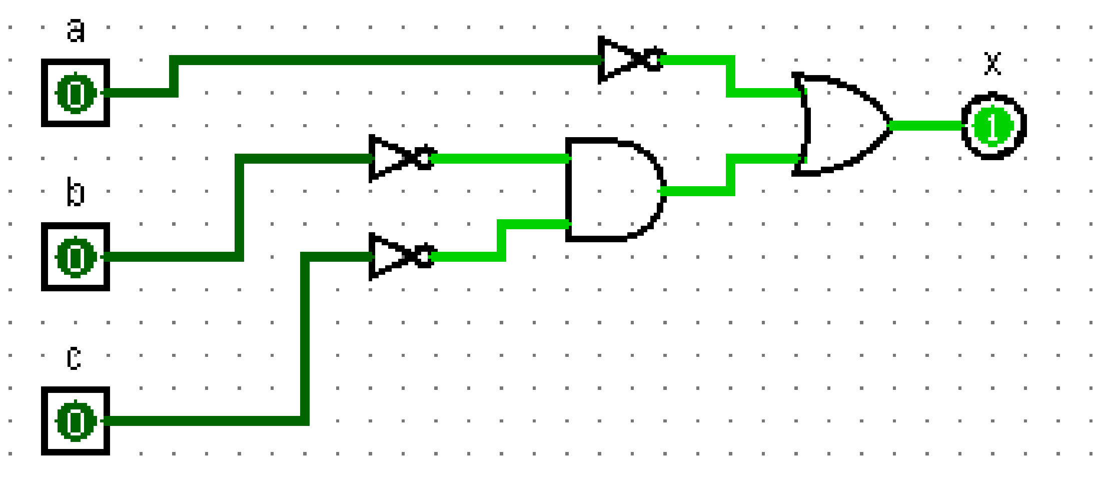
A	B	C	X
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

Karnaugh Map:

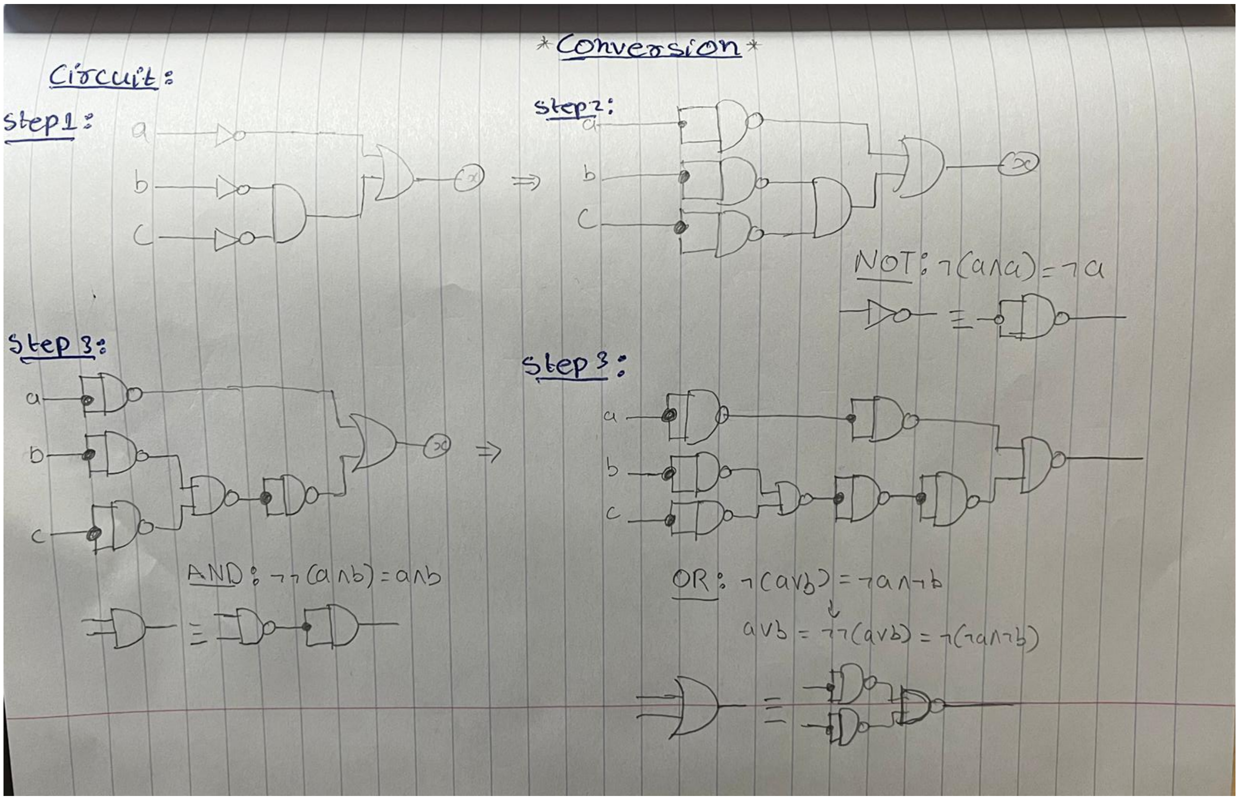
The number of cells in 3 variable K-map is eight, since the number of variables is three. The following figure shows **3 variable K-Map**.

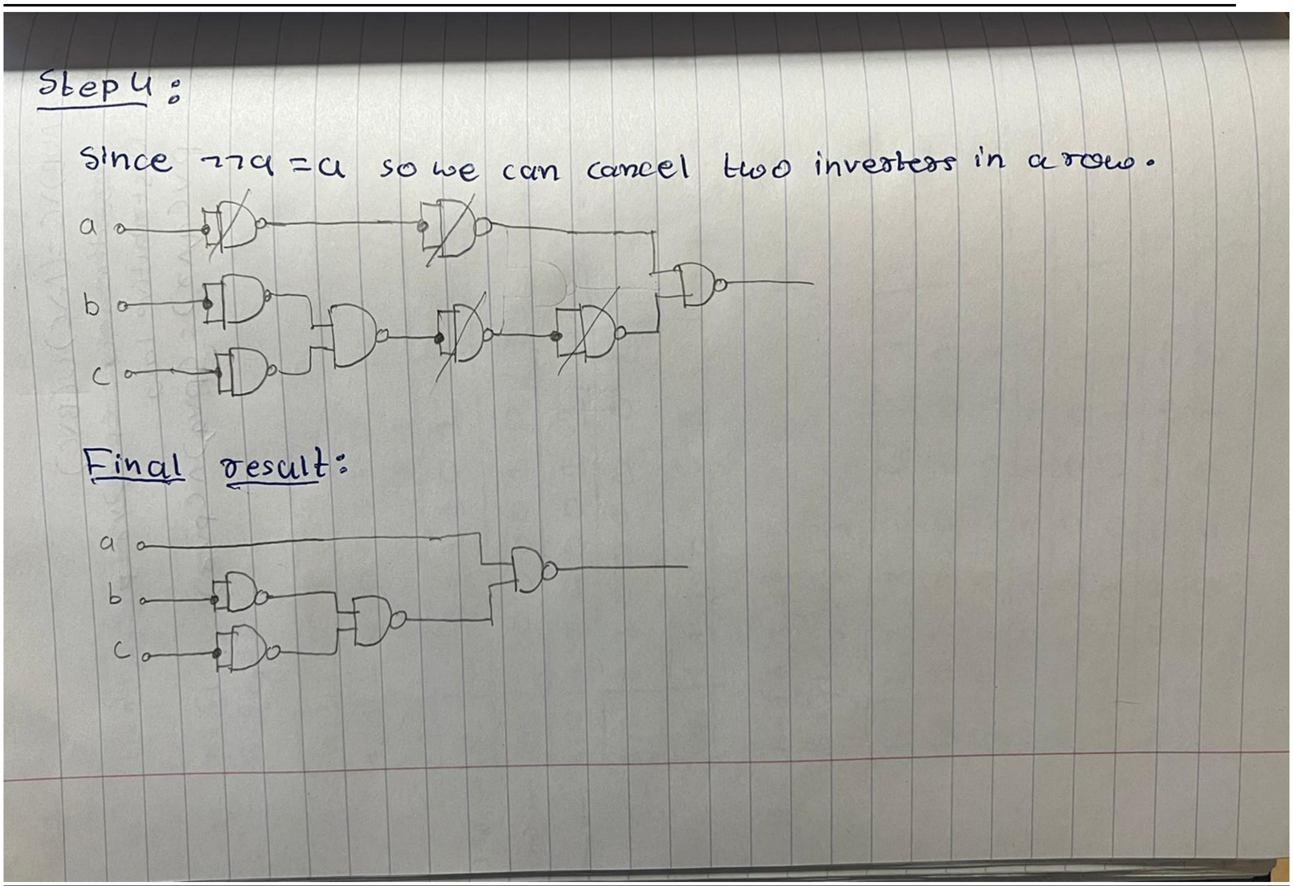
BC					
		00	***01***	***11***	***10***
A	***0***	1	1	1	1
	1	1	0	0	0

Circuit (OR, AND, NOT):



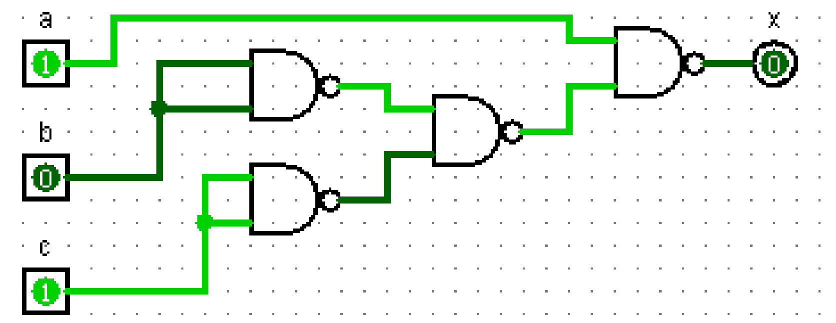
Conversion of Circuit:





Circuit (NAND):

- **How did we get from normal GATES to NAND?**
  -Our main goal is to get ~(A(B+C)) as an output and OR gate gives Y= A+B considering this we would convert it to having two NAND gates beforehand which will give us ~B and ~C that will be inputs for upcoming NAND will be ~C and ~B which will result in ~(~C+~B) = (~~C + ~~B) =(C + B) this will the input for the upcoming NAND where it will do the job of AND gate(Y=A.B) with A coming directly from the inputs with (C + B) THE FINAL result will be ~(A(B+C)) which confirms our outputs in all possible ways.



Conclusion:

The truth table was obtained from the logical formula f(a,b,c)= Σ(0,1,2,3,4) by using the Generic formula

f(a, b, c) = a' + b'c' then from truth table Karnaugh map(K-map) was produced then by using the combination and grouping technique we were able to produce the circuits where it was proven that the values obtained were accurate, for example 1,0,1 will give us 0.