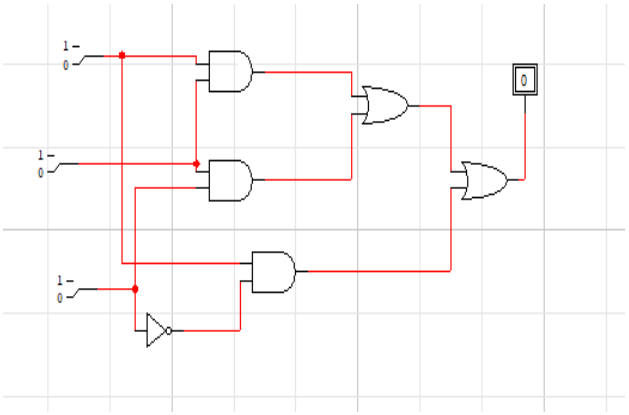
Roll no: 20k-0409

Name: MUKAND KRISHNA

EXAMPLE

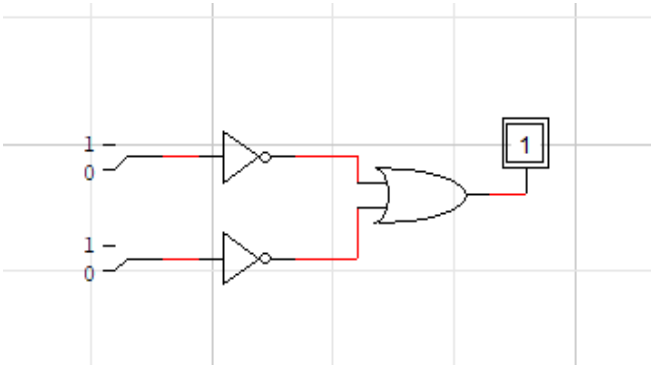
A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	1
0	1`	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1



CIRCUIT# 1

A	B	Z
0	0	1
0	1	1
1	0	1
1	1	0

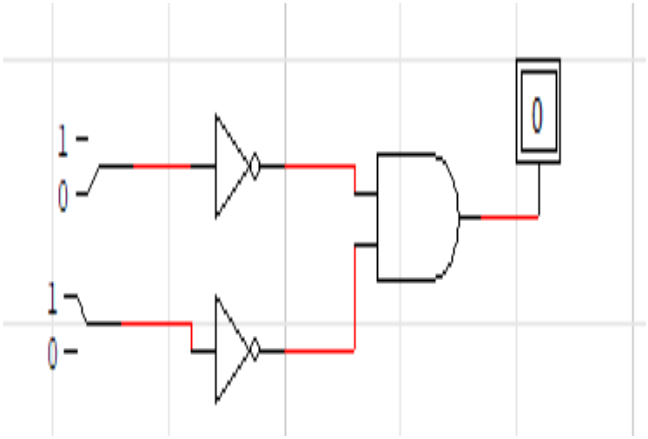
$Z = A`+B`$



CIRCUIT# 2

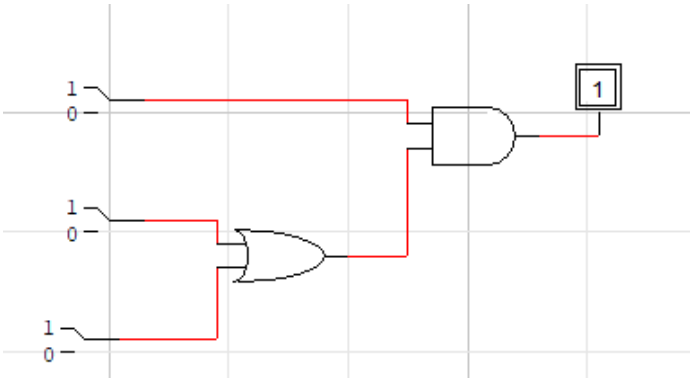
A	B	Z
0	0	1
0	1	0
1	0	0
1	1	0

$Z = A`.B`$



CIRCUIT#3

Boolean Expression: Z= A.(B+C)



CIRCUIT# 4

BOOLEAN EXPRESSION: Z = A+(B.C)

CIRCUIT# 5

EXPRESSION: Z = (A.B) + (A.C)

CIRCUIT# 6

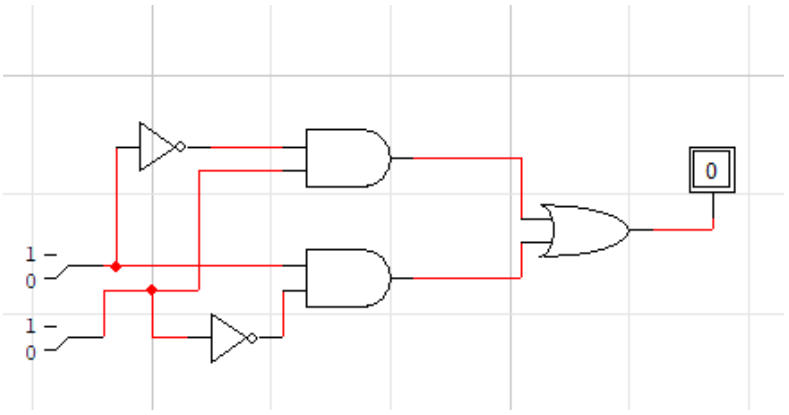
EXPRESSION: Z = (A.B).B`

CIRCUIT# 7

EXPRESSION: Z = (A.B) + (C.D)

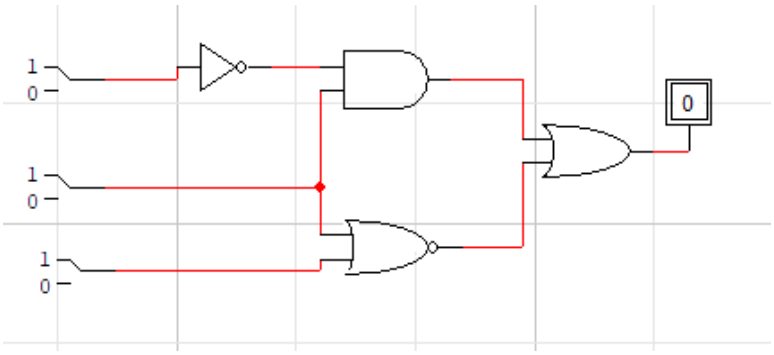
CIRCUIT# 8 --------->>>>

EXPRESSION: Z = (A.B`) + (A`.B)



LOGIC CIRCUIT DIAGRAM

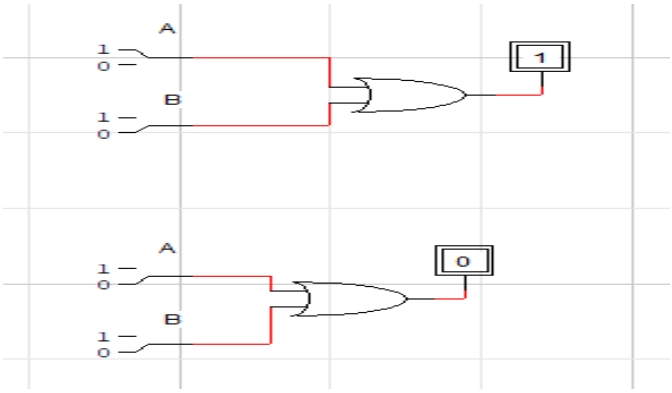
EXPRESSION: Z = (A~. B) + (B+C) ~



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

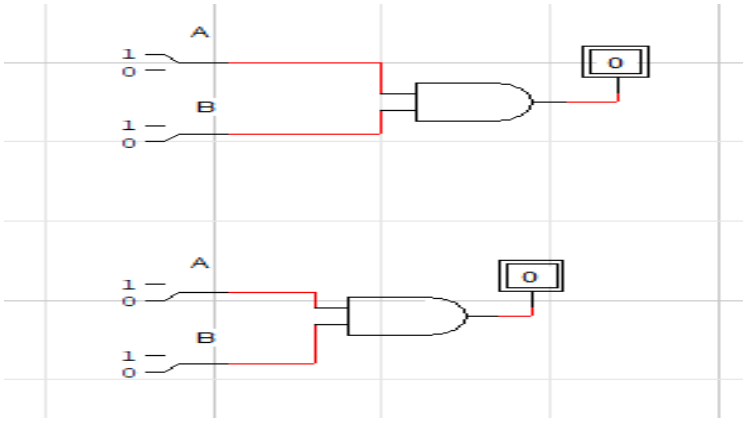
COMMUTATIVE LAW

ADDITION: a + b = b+a



A	B	A+B	A	B	B+A
0	0	0	0	0	0
0	1	1	0	1	1
1	0	1	1	0	1
1	1	1	1	1	1

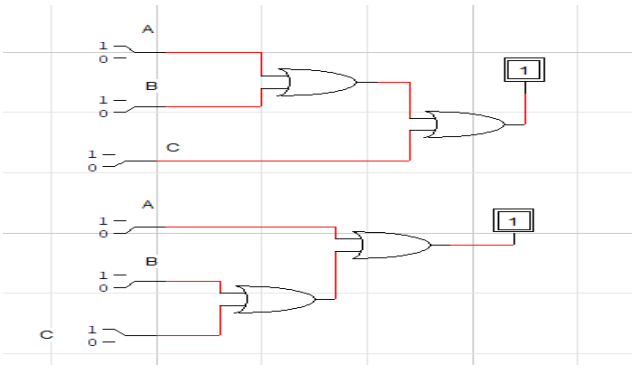
MULTIPLICATION: ab = b.a



A	B	A.B	A	B	A.B
0	0	0	0	0	0
0	1	0	0	1	0
1	0	0	1	0	0
1	1	1	1	1	1

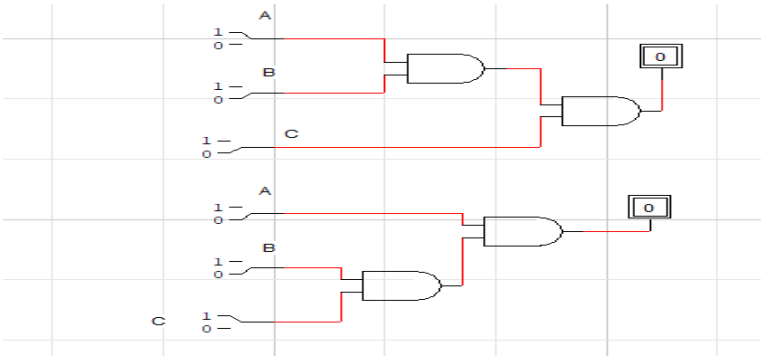
Associative law

ADDITION: a + (b + c) = (a + b) + c



A	B	C	(a+b)+c	A	B	C	a+(b+c)
0	0	0	0	0	0	0	0
0	0	1	1	0	0	1	1
0	1	0	1	0	1	0	1
0	1	1	1	0	1	1	1
1	0	0	1	1	0	0	1
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

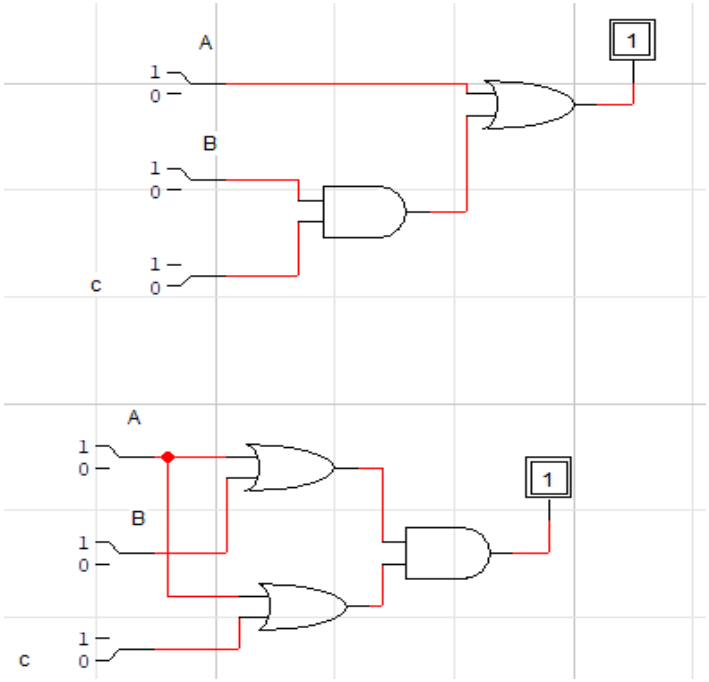
MULTIPLICATION: a(bc) = (a.b)c



A	B	C	(a.b).c	A	B	C	(a.b)c
0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0
0	1	0	0	0	1	0	0
0	1	1	0	0	1	1	0
1	0	0	0	1	0	0	0
1	0	1	0	1	0	1	0
1	1	0	0	1	1	0	0
1	1	1	1	1	1	1	1

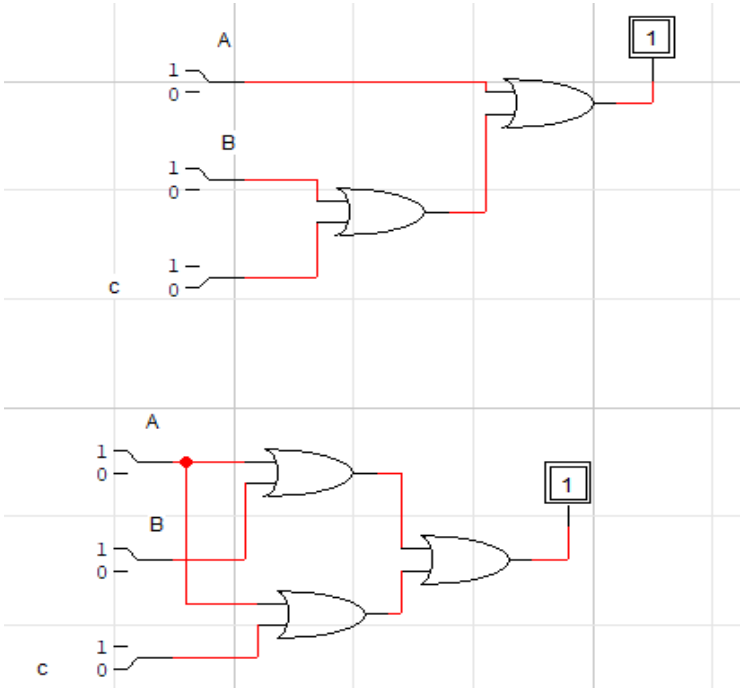
Distributive Law

Addition: A+(B+C) = (A+B)+(A+C)



A	B	C	A+(B+C)	A	B	C	(A+B)+(A+C)
0	0	0	0	0	0	0	0
0	0	1	1	0	0	1	1
0	1	0	1	0	1	0	1
0	1	1	1	0	1	1	1
1	0	0	1	1	0	0	1
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

Multiplication: A+(B.C)=(A+B).(A+C)



A	B	C	A+(B.C)	A	B	C	(A+B).(A+C)
0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0
0	1	0	0	0	1	0	0
0	1	1	1	0	1	1	1
1	0	0	1	1	0	0	1
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

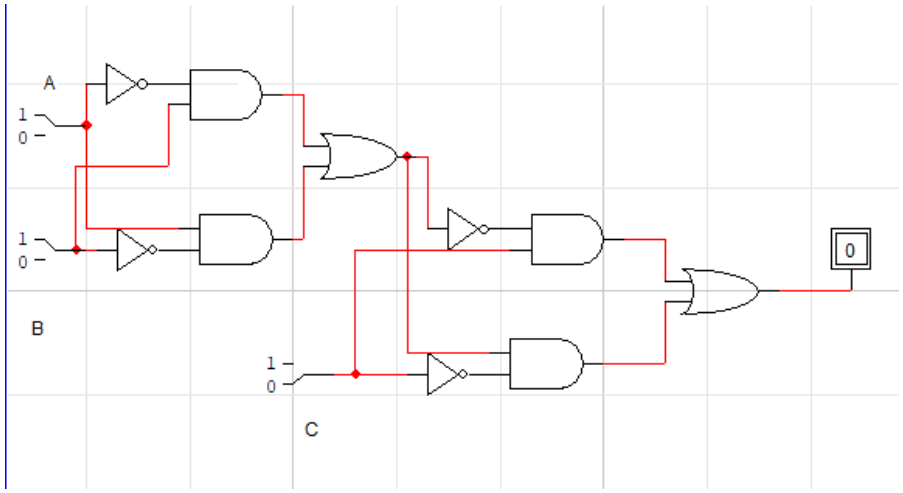
Lab# 3 tasks

1. Design 3 input XOR and XNOR gate. Truth table, draw the circuit diagram.

Truth Table

A	B	C	X
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

Circuit diagram of XOR gate using **and, or gate**



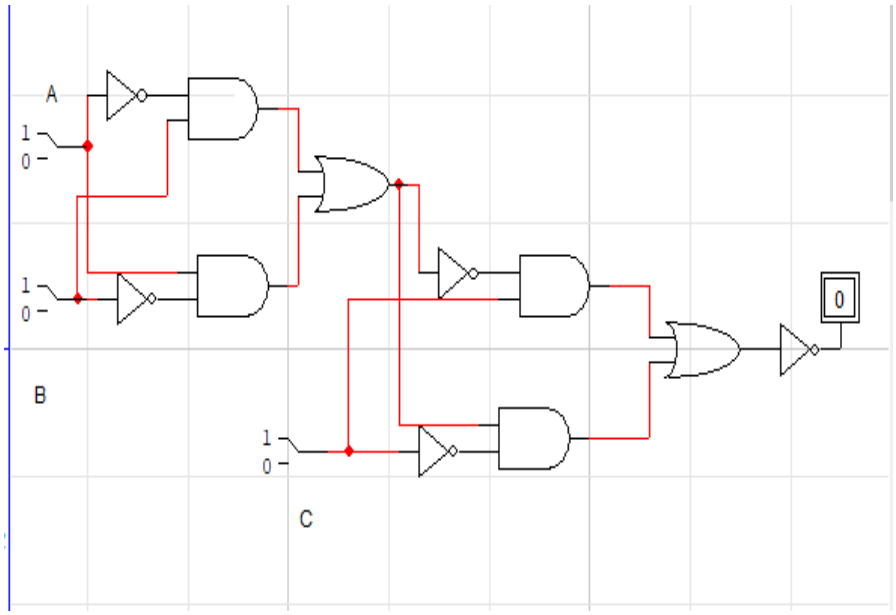
Boolean Expression: X = ABC + A`B`C + AB`C` + A`BC`

Truth Table

using **and, or gate**

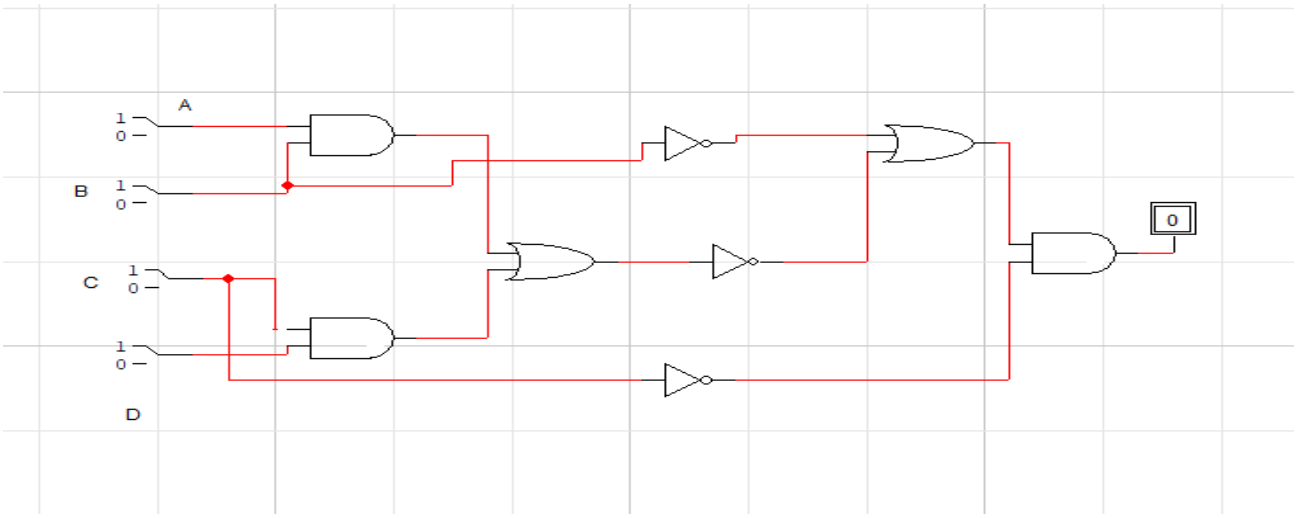
A	B	C	X
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

Circuit diagram of XNOR gate



Boolean Expression: X = (ABC + A`B`C + AB`C` + A`BC`)~

2. Implement the following logic circuit on logic trainer, and write Boolean Expression.



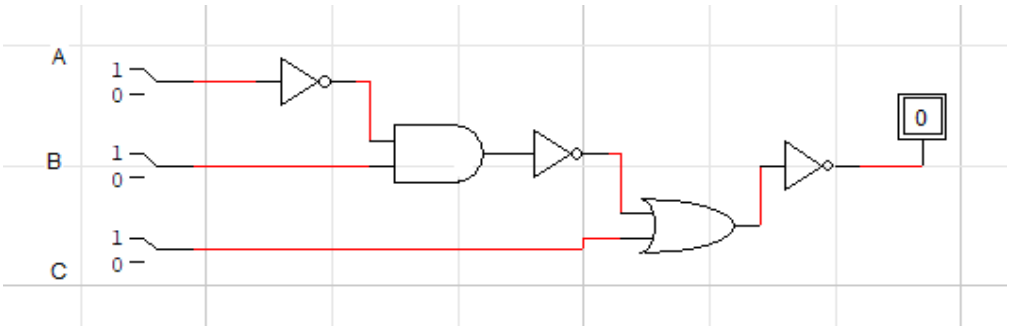
Boolean Expression: X = (A.B)+(C.D)~+B~).C~

3. Write the Boolean expression and draw Truth tables

Truth Table

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

Circuit Diagram



Boolean Expression: ((A~.B)~+C)~

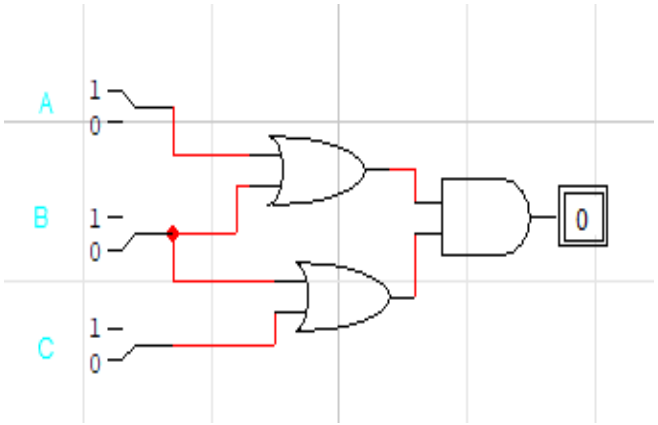
4. Draw a circuit diagram corresponding to the following Boolean expression and implement it.

Circuit # 1: Boolean Expression: (A + B) . (B + C)

Truth table

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

Circuit Diagram

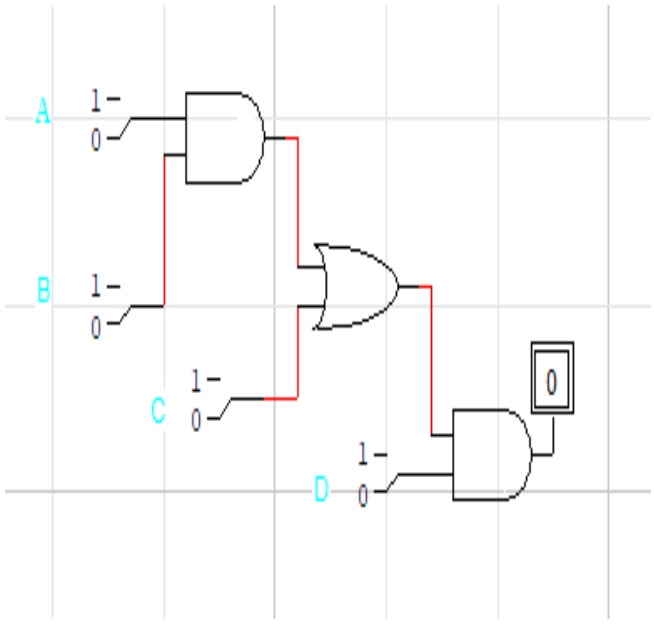


Circuit # 2: Boolean Expression: (AB + C)D

Truth table

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

Circuit Diagram

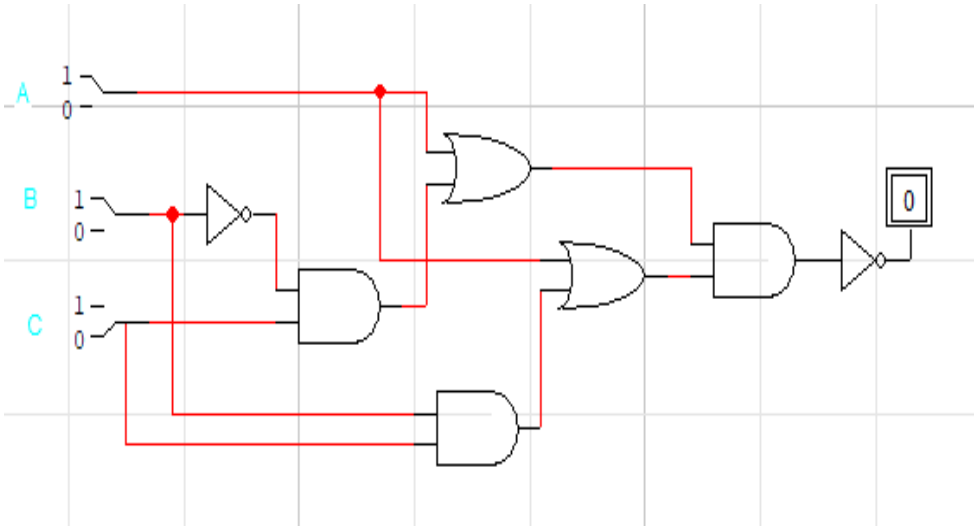


Circuit # 3: Boolean Expression: ((A + B~C)(A + BC))~

Truth table

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

Circuit Diagram

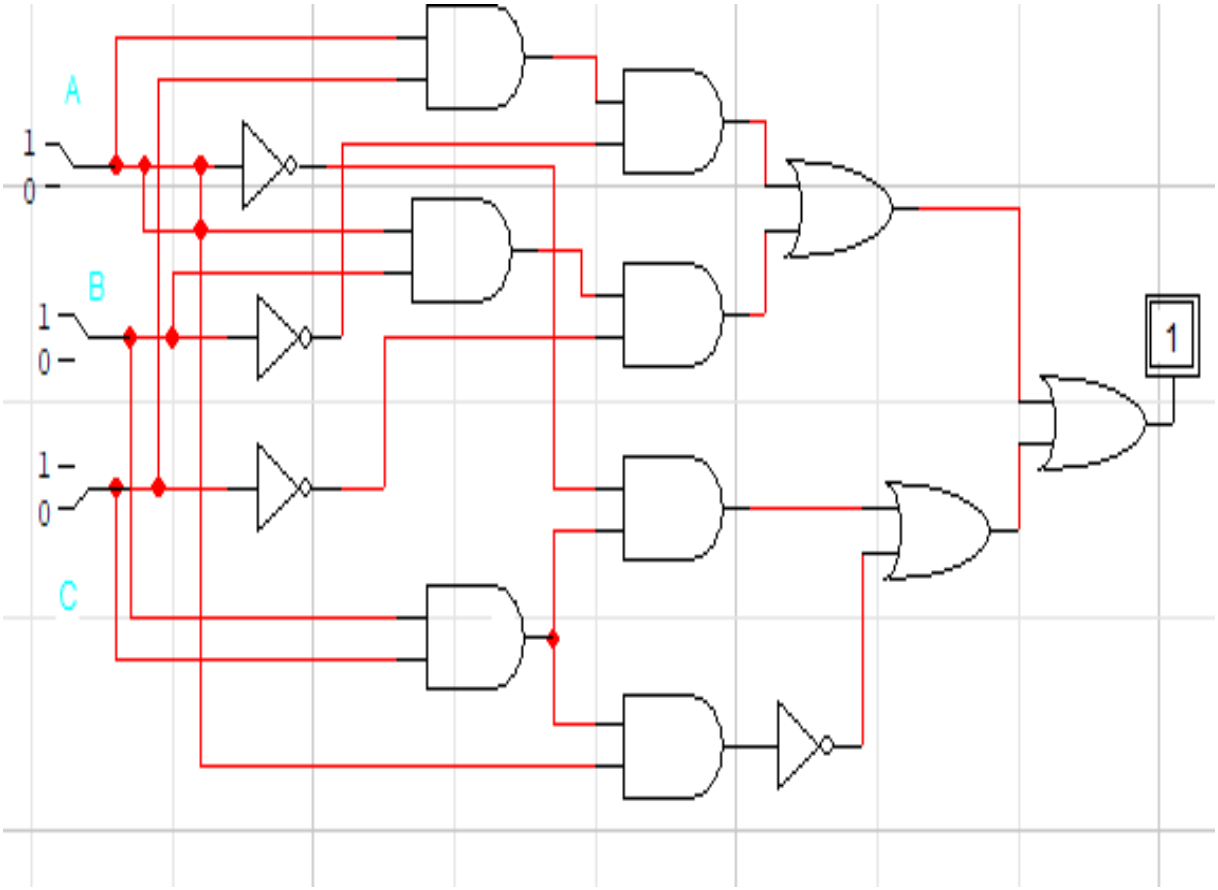


Circuit # 4: Boolean Expression: A'BC + AB'C + ABC' + (ABC)'

Truth table

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	1
1	1	0	1
1	1	1	0

Circuit Diagram

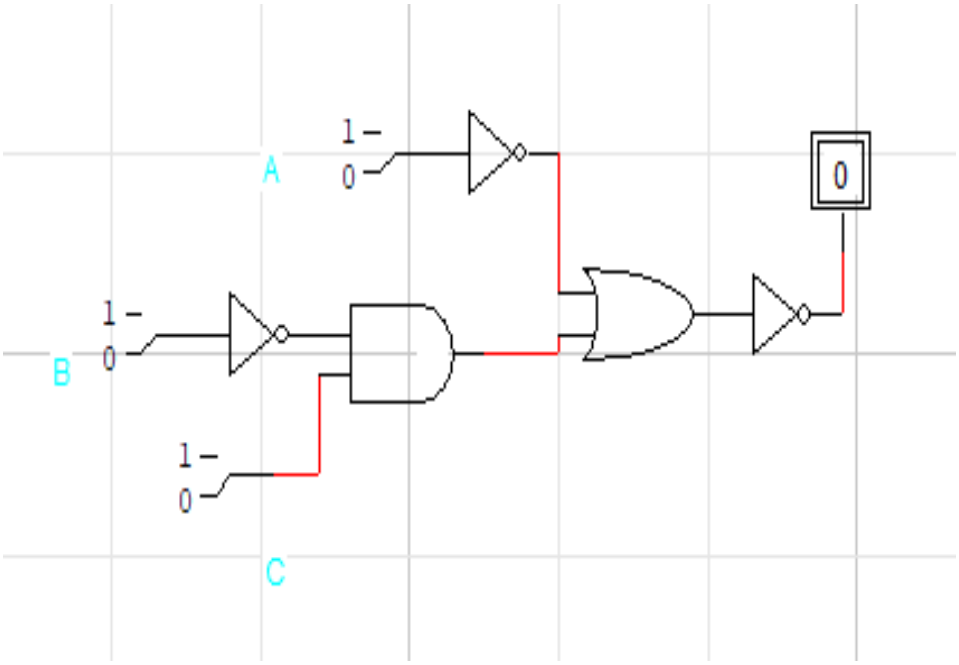


Circuit # 5: Boolean Expression: (A~ + BC)~

Truth table

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

Circuit Diagram



5. Transform the given diagram circuit to new logic diagram using NAND /NOR gates. Implement the transformed logic circuit.

Circuit Diagram