

Logic Gates, Lab 8

Boolean Expression from Truth Table

A	B	C	Output
0	0	0	0
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	1

$$\bar{A}BC = 1$$

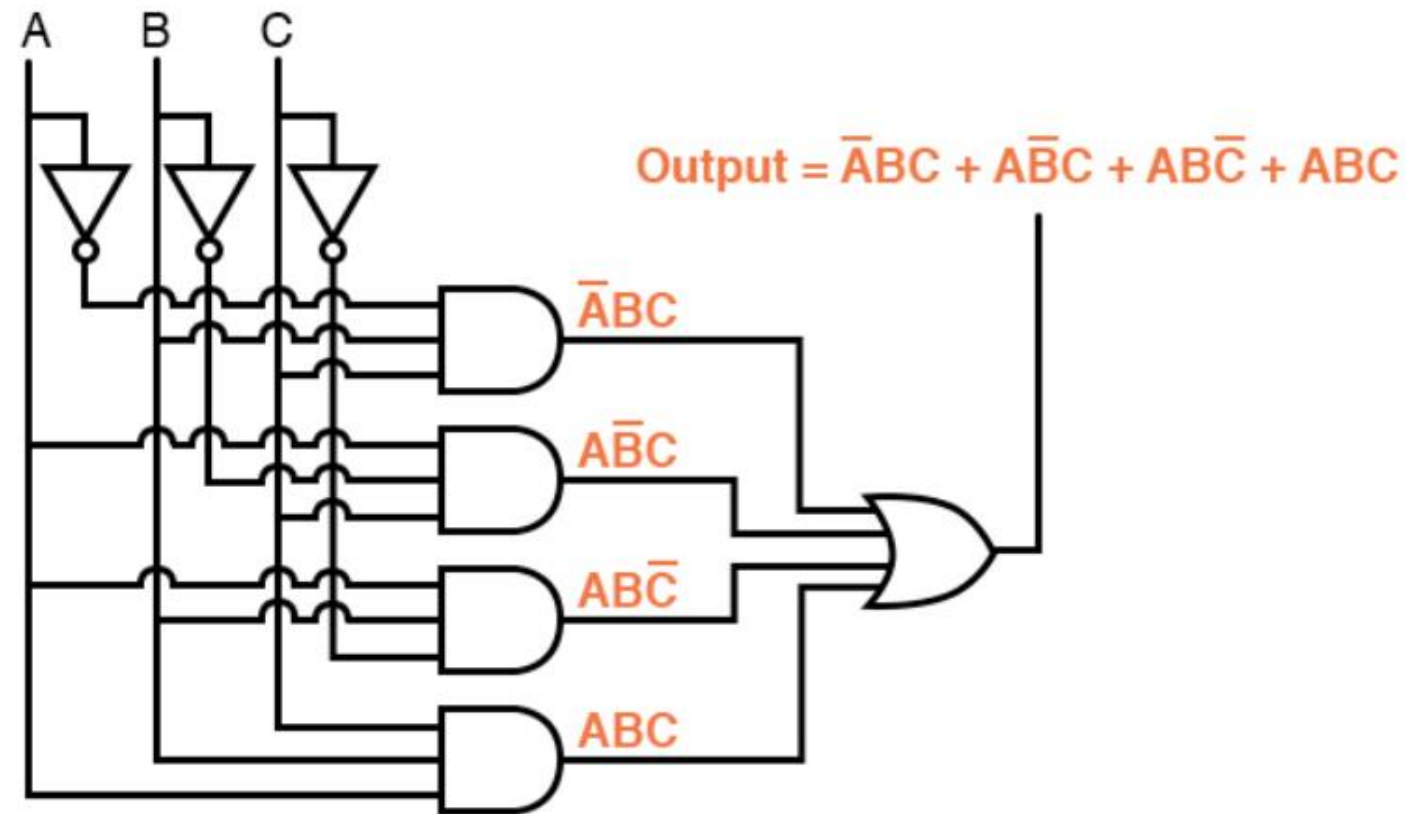
$$A\bar{B}C = 1$$

$$AB\bar{C} = 1$$

$$ABC = 1$$

$$\bar{A}BC + A\bar{B}C + AB\bar{C} + ABC$$

Logic Gate Circuit based on the Boolean Expression



Simplifying Boolean Expression

- $A + AB = A$
 - $A + AB = A(1 + B) = 1A = A$
- $A + \bar{A}B = A + B$
 - $A + \bar{A}B = A + AB + \bar{A}B$ (applying $A + AB = A$) $= A + B(A + \bar{A}) = A + B$
- $(A + B)(A + C)$
 - $AA + AC + AB + BC$
 - $A + AC + AB + BC$
 - $A + AB + BC$ (applying $A + AC = A$)
 - $A + BC$ (applying $A + AB = A$)

Example

- Simplify $ABCD + \overline{ABCD} + AB\overline{CD}$
 - $A(BCD + \overline{BCD}) + AB\overline{CD}$
 - $A1 + AB\overline{CD}$ (applying $X + \bar{X} = 1$) $= A + AB\overline{CD}$
 - $A(1 + B\overline{CD})$
 - A (applying $1 + X = 1$)

Lab 8

- Demo of drawing circuit for the expression $(A + \bar{B})(A + B)$
- Discussion of Part A, B, C