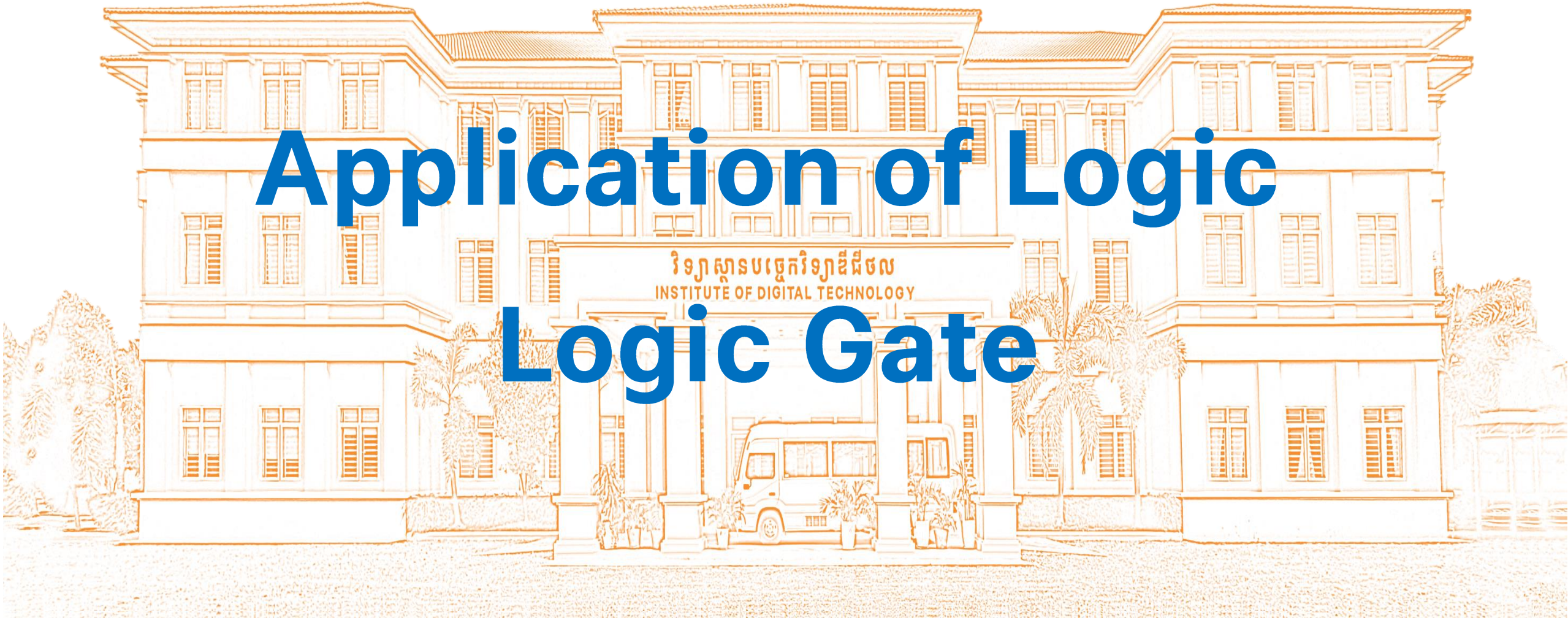
CADT

IDT វិទ្យាស្ថានបច្ចេកវិទ្យាឌីជីថល
Institute of Digital Technology

Department of Foundation Year



Application of Logic Gate

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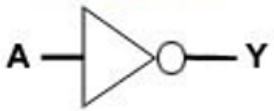
Logic (Application of Logic)

Symbolic

Not gate

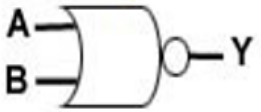


If A = 0 then Y = 1
If A = 1 then Y = 0

Or gate

If A = 0 and B = 0 then Y = 0
If A = 1 and B = 0 then Y = 1
If A = 0 and B = 1 then Y = 1
If A = 1 and B = 1 then Y = 1

Nor gate

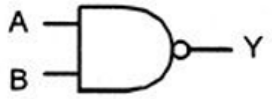


If A = 0 and B = 0 then Y = 1
If A = 0 and B = 1 then Y = 0
If A = 1 and B = 0 then Y = 0
If A = 1 and B = 1 then Y = 0

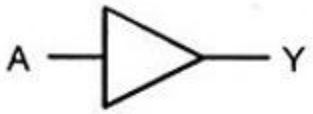
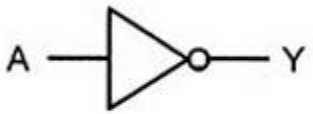
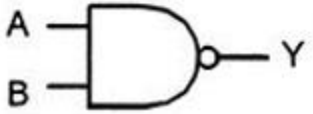
And gate

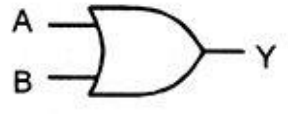
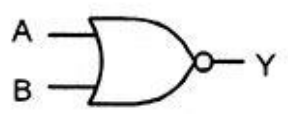
If A = 0 and B = 0 then Y = 0
If A = 0 and B = 1 then Y = 0
If A = 1 and B = 0 then Y = 0
If A = 1 and B = 1 then Y = 1

Nand gate

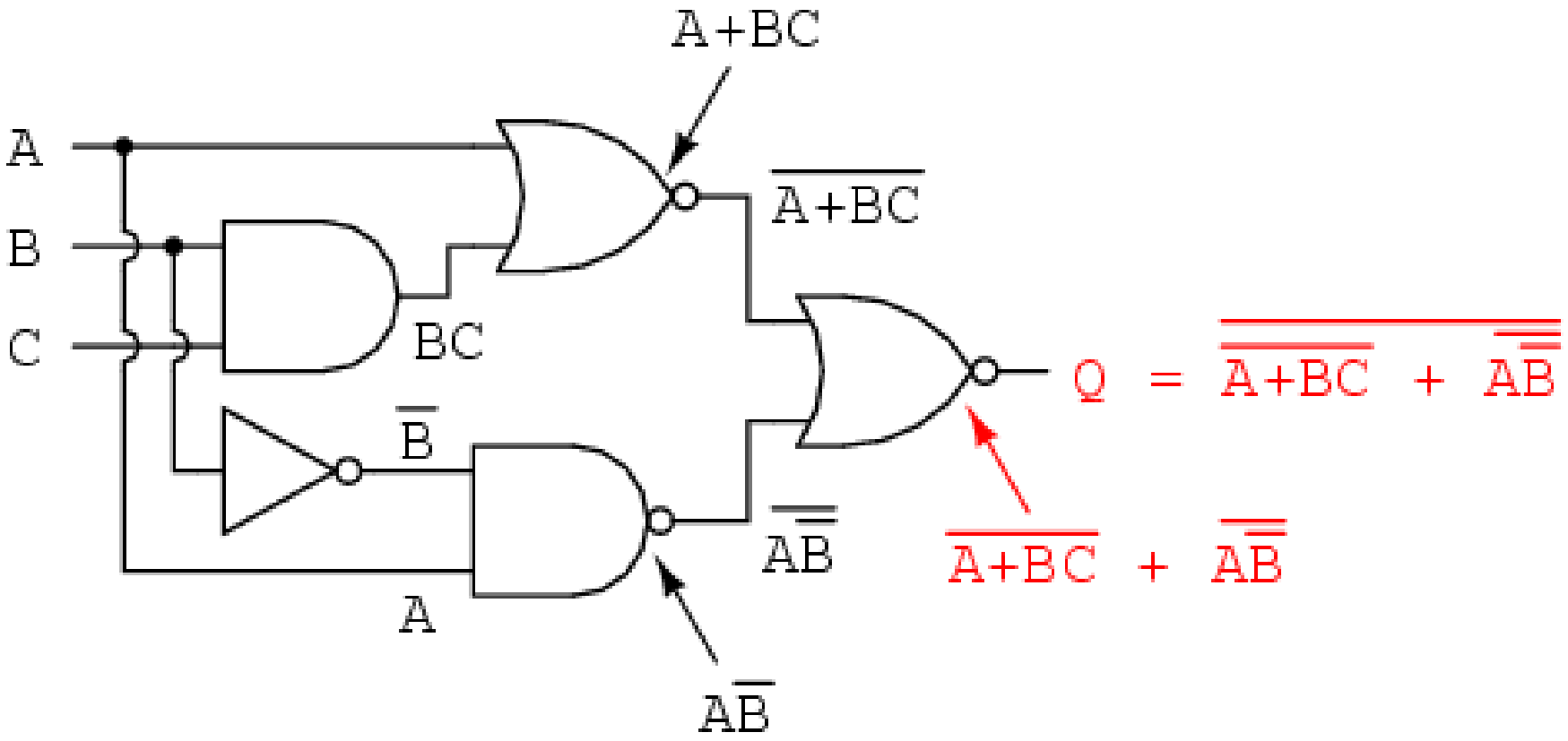


If A = 0 and B = 0 then Y = 1
If A = 0 and B = 1 then Y = 1
If A = 1 and B = 0 then Y = 1
If A = 1 and B = 1 then Y = 0

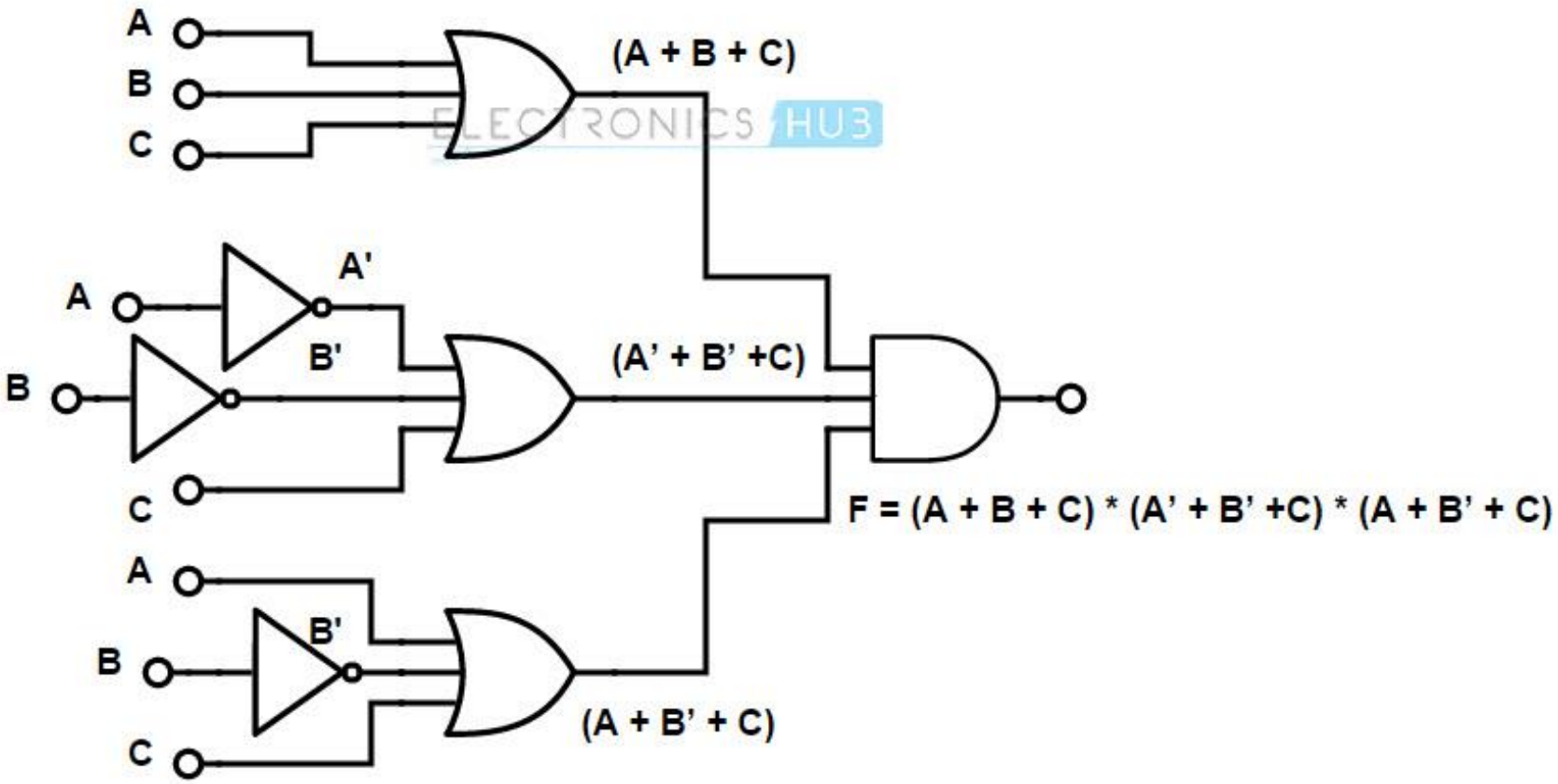
Logic function	Logic symbol	Truth table	Boolean expression
Buffer		A | Y 0 | 0 1 | 1	$Y = A$
Inverter (NOT gate)		A | Y 0 | 1 1 | 0	$Y = \overline{A}$
2-input AND gate		A B | Y 0 0 | 0 0 1 | 0 1 0 | 0 1 1 | 1	$Y = A \bullet B$
2-input NAND gate		A B | Y 0 0 | 1 0 1 | 1 1 0 | 1 1 1 | 0	$Y = \overline{A \bullet B}$

Logic function	Logic symbol	Truth table	Boolean expression
2-input OR gate		A B | Y 0 0 | 0 0 1 | 1 1 0 | 1 1 1 | 1	$Y = A + B$
2-input NOR gate		A B | Y 0 0 | 1 0 1 | 0 1 0 | 0 1 1 | 0	$Y = \overline{A + B}$
2-input EX-OR gate		A B | Y 0 0 | 0 0 1 | 1 1 0 | 1 1 1 | 0	$Y = A \oplus B$
2-input EX-NOR gate		A B | Y 0 0 | 1 0 1 | 0 1 0 | 0 1 1 | 1	$Y = \overline{A \oplus B}$

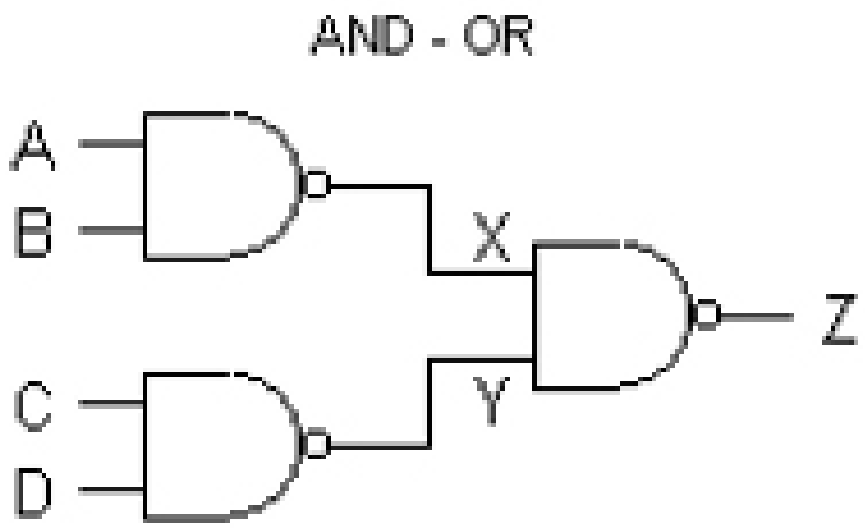
Notice point and the way to write statements in logic gate



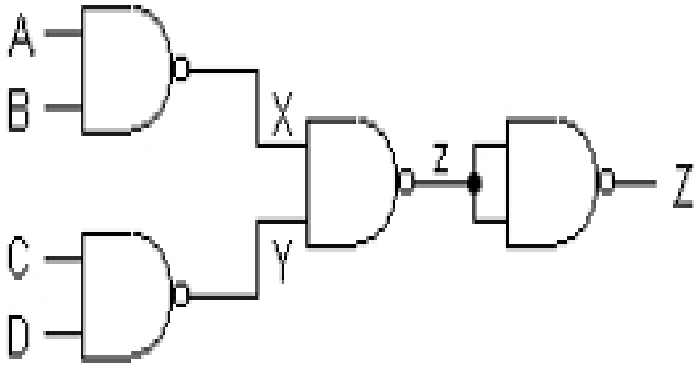
Notice point and the way to write statements in logic gate



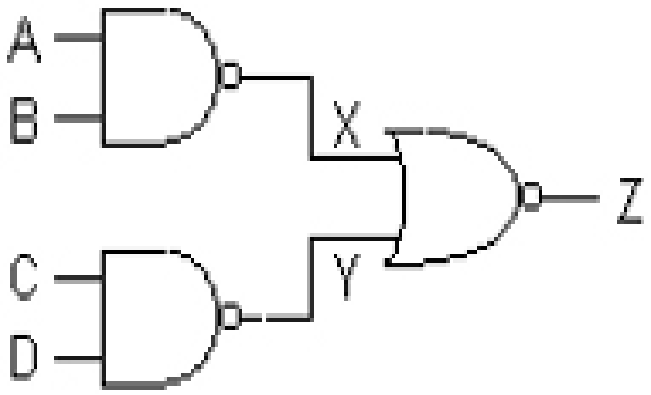
Draw the truth table of gate below



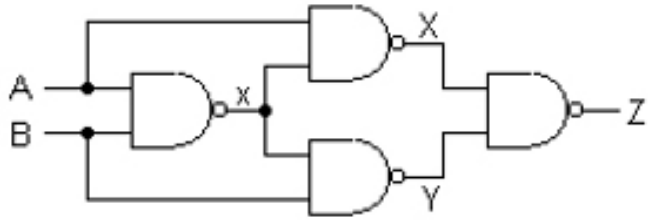
Draw the truth table of gate below



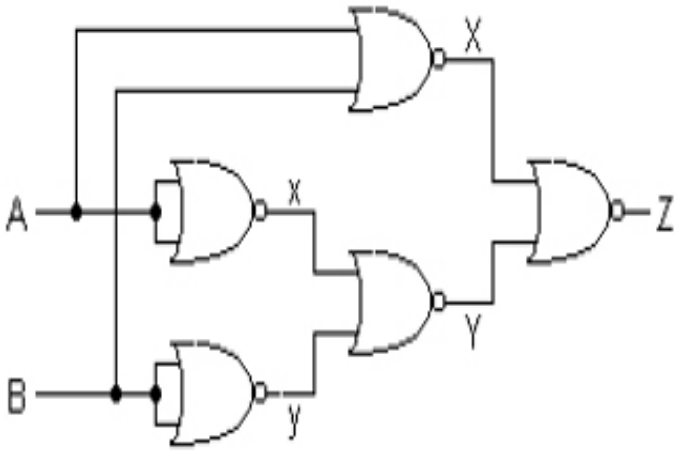
Draw the truth table of gate below



Draw the truth table of gate below

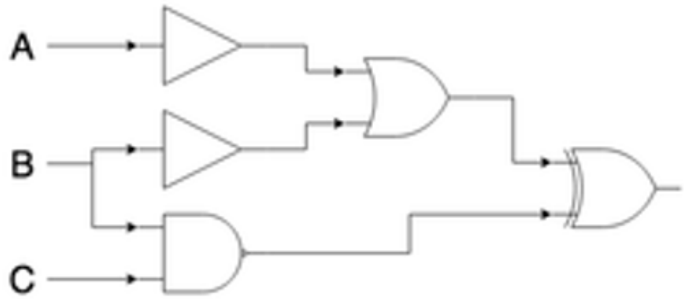


Draw the truth table of gate below

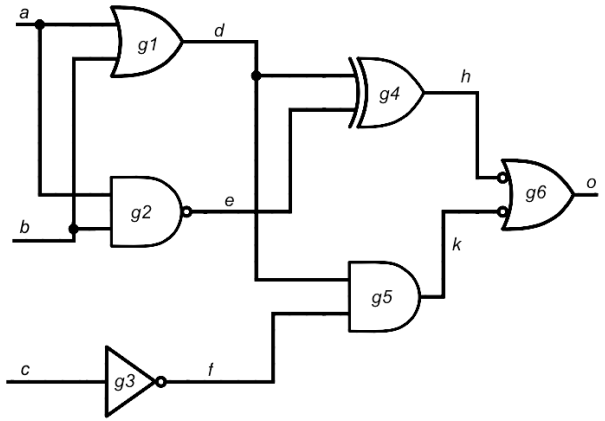


Logic Gate

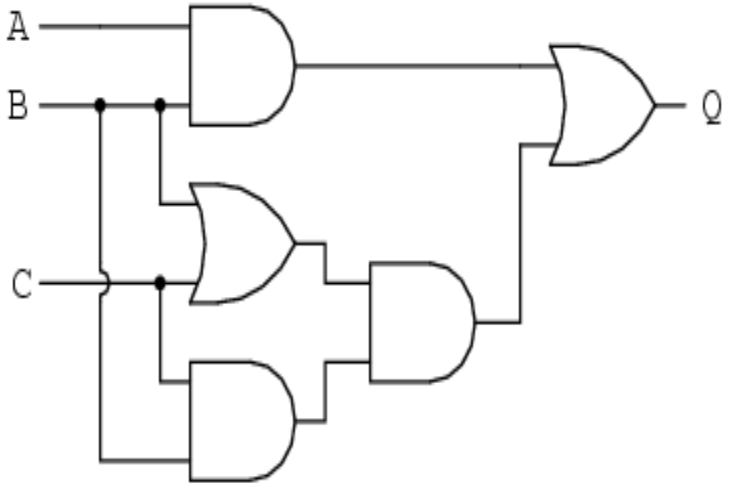
Draw the truth table of gate below



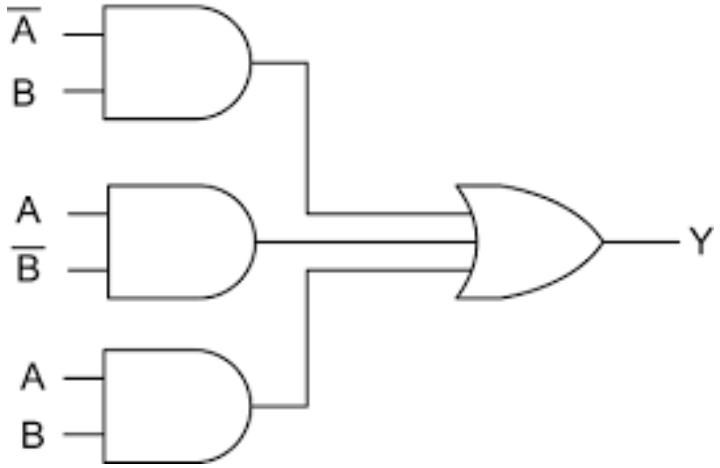
Draw the truth table of gate below



Draw the truth table of gate below



Draw the truth table of gate below



Draw the truth table of statements below

1. $p \vee q \Leftrightarrow q \vee p$

   $p \wedge q \Leftrightarrow q \wedge p$ *Commutative*

2. $p \vee (q \vee r) \Leftrightarrow (p \vee q) \vee r$

   $p \wedge (q \wedge r) \Leftrightarrow (p \wedge q) \wedge r$ *Associative*

   $p \wedge (q \vee r) \Leftrightarrow (p \wedge q) \vee (p \wedge r)$

   $p \vee (q \wedge r) \Leftrightarrow (p \vee q) \wedge (p \vee r)$ *Distributive*

3. $\left(\overline{p \vee q}\right) \Leftrightarrow \bar{p} \wedge \bar{q}$

   $\left(\overline{p \wedge q}\right) \Leftrightarrow \bar{p} \vee \bar{q}$ *De Morgan*

4. $p \Rightarrow q \Leftrightarrow \bar{q} \Rightarrow \bar{p}$ *Contrapositive*

5. $p \Rightarrow q \Leftrightarrow \bar{p} \vee q$ *Implicative*