lecture# 5

complement of a function

steps

(1) Take dual of the function then complement each literal

(1) $F = \bar{x}y\bar{z} + x\bar{y}\bar{z} \rightarrow (x+\bar{y}+z)(\bar{x}+\bar{y}+z)$

(2) $G = (\bar{a} + bc)\bar{d} + e \rightarrow (a \cdot (\bar{b}+\bar{c})) + d \cdot \bar{e}$

→ $F(x, y)$ then literals are $x, \bar{x}, y, \bar{y}$

→ $A\bar{B} + BC + C\bar{A}$ = 5 literals $A, \bar{A}, B, \bar{B}, C$

Bolean function

The representation of logic gate by interconnecting then is called bolean function.

(1) The output of one's logic gate is ~~the~~ input of other's logic gate

These logic gates ~~gat~~ are called building blocks of combinational circuit

Combinational logic circuits CLC

Memoryless digital logic circuits whose output at any instant in time depends upon only on combination of it's input.

-> No feedback.
-> Imediate effect of input on output.

Representation of C.L.C.

① Bolean Algebra
② Truth table
③ Logic Diagram.

Expression Simplification.

$$AB + \bar{A}CD + \bar{A}BD + \bar{A}C\bar{D} + ABCD$$

$$= AB + ABCD + \bar{A}C(D + \bar{D}) + \bar{A}BD$$

$$= AB + ABCD + \bar{A}\bar{B}D + \bar{A}C$$

-> Absorption Theorem

$$= AB(1 + CD) + \bar{A}\bar{B}D + \bar{A}C$$

$$= AB[(1+C)(1+D)] + \bar{A}\bar{B}D + \bar{A}C$$

$$= AB + \bar{A}BD + \bar{A}C$$

$$= B(A + \bar{A}D) + \bar{A}C$$

$$= B\underbrace{\cancel{(A + \bar{A})}}_{1}(A + D) + \bar{A}C$$

$$= AB + BD + \bar{A}C$$

5 Literals

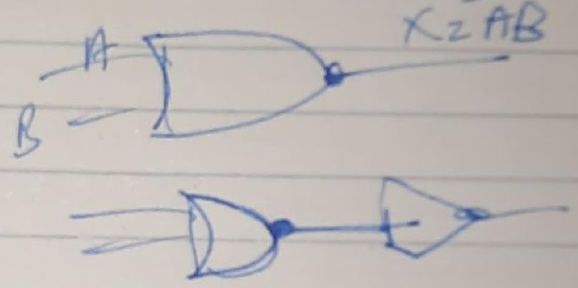
$$Z = \overline{(\bar{A}+C)\cdot(B+\bar{D})}$$

Dual

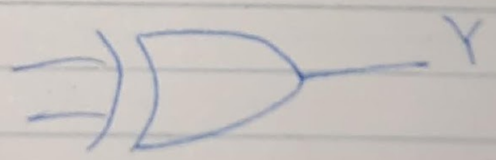
$$Z = (\bar{\bar{A}}\cdot\bar{C}) + \overline{(B\cdot\bar{D})}$$

$$= A\cdot\bar{C} + \bar{B}\bar{\bar{D}} = A\cdot\bar{C} + \bar{B}D$$

NOR Gate



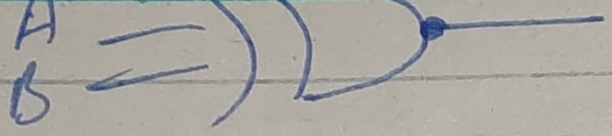
XOR



It's one if one ~~[illegible]~~ input is one.

X	Y	Y
0	0	0
1	1	0
0	1	1
1	0	1

XNOR



The inversion of XOR

Nand or Nor are universal gates