Day-3

• Logic design:-

Boolean algebra:-

'0' @ '1'

→ cost of the circuit

→ Simple realization of a circuit

"In 1854, George book developed an algebra system is called boolean algebra"

→ "Boolean algebra is a system of mathematical logic"

→ It is defined with set of elements, a set of operators, and a no. of axioms @ postulates

→ Set of elements - (0.1)

→ Two binary operators - OR and AND

'+' @ (∪) @ (v)(+) (•) @ ∩ @

→ Ugnary operator - NOT @ (invert)

• Axioms and laws of boolean algebra:-

→ Axioms @ postulates of boolean algebra are a logical expressions upon which we can build useful theorems.

"AND operation "OR operation"

"NOT operation

$\rightarrow 0.0 = 0$
$\rightarrow 0.1 = 0$
$\rightarrow 1.0 = 0$
$\rightarrow 1.1 = 1$
$\}$ AND operation

$\rightarrow 0+0 = 0$
$\rightarrow 0+1 = 1$
$\rightarrow 1+0 = 1$
$\rightarrow 1+1 = 1$
$\}$ OR operation

DATE: PAGE:

$\rightarrow \bar{0}$ or $0'$ @ A' @ $\bar{A}$ $= 1$

$\rightarrow \bar{1}$ @ $1' = 0$

- Difference b/w boolean algebra, ordinary algebra and binary number system.

$\rightarrow$ In boolean algebra

$A + A = A$ & $A A = A$

$1 + 1 = A = 1$ & $1 . 1 = 1$

$\rightarrow$ In ordinary algebra

$A + A = 2A$ $A . A = A^2$

$1 + 1 = 2$ $1 . 1 = 1$

$\rightarrow$ In binary number system.

$1 + 1 = (10)$ $1 . 1 = 1$

Axioms @ postulates

$\rightarrow x + 0 = x$ $x . 0 = 0$

$\rightarrow x + 1 = 1$ $x . 1 = x$

$\rightarrow x + x = x$ $x . x = x$

$\rightarrow x + \bar{x} = 1$ $x . \bar{x} = 0$

$\rightarrow \overline{(\bar{x})}$ @ $(x')' = x$

- Identity element

additive identity $= 0$ OR operation $\Rightarrow x + 0 = x$ AND operation $x . 1 = x = 1 . x$

multiplicative identity $= 1$

$x + 0 = x$

$0 + x = x$

- Laws of boolean algebra:-

(i) Commutative : $x+y = y+x$

$A+B = B+A$ | $x \cdot y = y \cdot x$, $A \cdot B = B \cdot A$

DATE: PAGE:

(ii) Associative Law:

$x+(y+z) = (x+y)+z$ $x\cdot(y\cdot z) = (x\cdot y)\cdot z$

$A+(B+C) = (A+B)+C$ $A\cdot(B\cdot C) = (A\cdot B)\cdot C$

(iii) distributive law.

(1) $x(y+z) = xy+xy$

$A(B+C) = AB+BC$ → $A=0$, $B=1$, $C=0$

LHS · $A(B+C) = 0(1+0) = 0$

RHS $AB+BC = 0$

(2) $x+yz = (x+y)(x+z)$

$A+BC = (A+B)(A+C)$

(i) $x+yz = (x+y)(x+z)$

$= x\cdot x + xz + xy + yz$

$= x + xz + xy + yz$

$= x(1+z+y) = yz \Rightarrow x+yz$ hence proved

- Theorems of boolean algebra:-

(1) Absorption theorem:, $x+xy = x'$, $A+AB = A$

$\rightarrow x(1+y) = x\cdot 1 = x$

(b) $x+\bar{x}y = x+y$

$(x+\bar{x})(x+y) = 1\cdot(x+y) = (x+y)$

(c) $A+BC = (A+B)(A+C)$

$= A\cdot A + A\cdot C + B\cdot A + B\cdot C$

$= A(1+C)+AB+BC \Rightarrow A+BC$ $\boxed{A+\bar{A}B = A+B}$

- Mux to logic gates:-

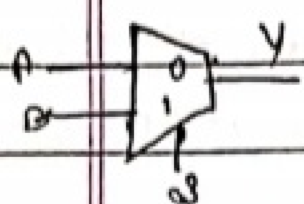
(1) NAND, NOR - universal gates

(2) "universal logic"

(3) Mux & decoder are called "universal logic"

Multiplexer :- It is a device that selects one of several analog or digital signals and it will forward to o/p line, i.e single o/p line

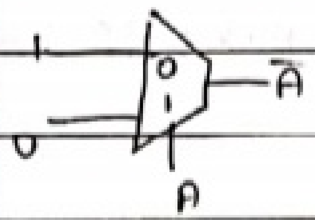
$2^n - 1 \Rightarrow 2^n \rightarrow$ inputs , $n \rightarrow$ selection lines



S	o/p(Y)
0	A
1	B

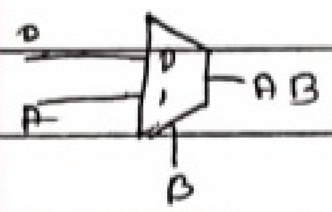
$\Rightarrow \boxed{Y = A\bar{S} + BS}$ with help of 1×m

Inverter designs help of mux.



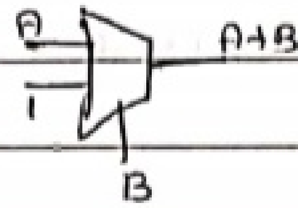
$Y = A\bar{S} + BS \Rightarrow 1\bar{A} + 0A$

$\boxed{Y = \bar{A}}$



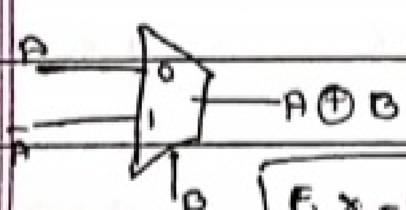
$Y = 0\bar{B} + AB$

$\boxed{Y = A.B}$

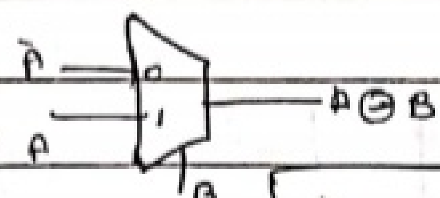


$Y = A+B$

OR gate

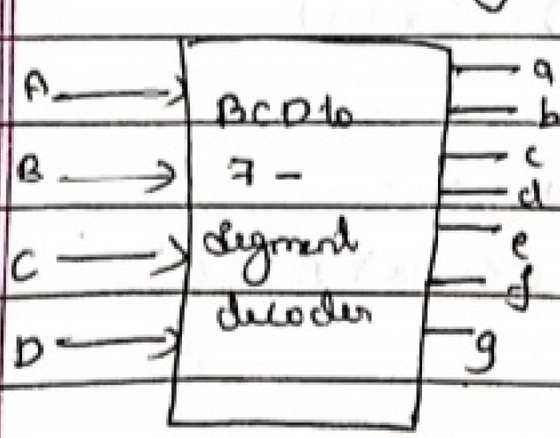


$\boxed{\text{EX-OR}}$

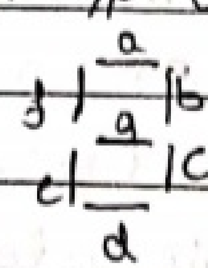


$\boxed{\text{EX-NOR}}$

BCD to 7-segment decoder :-



4 i/p lines & 7 o/p lines



light emitting diode.

Python:

Application 5:- build a desktop database application.

@ Desktop database App - How the o/p will look like.

-> How to build a program which is used store the information of books

-> user interface design.

-> build a graphical user interface.

-> frontend interface

we use grid method make things easier

1. from tkinter import.

2.

3. window TK()

~~4. window~~

5. window main loop()

l. = label (window, text ; Title')

l. = grid (row = 0, column = 0)

Copy for more row & column indicating "Title", "author", "year", "ISBN"

title - text - storing var()

e. = entry (window, text variable = title -text)

e. = grid (row = 0, column = 1)

This should be applied for authors, year, ISBN to get a row & column table.

-> Backend :- we got to know to create table (or) exist book.

-> connecting the frontend to the backend.

-> fixing the bug.

-> creating a standalone executable version of the program.