Introduction to degital design

Introduction to Digital Design: **Digital Logic Gates**, *Introduction,* **The Map Method**, **Four-Variable Map**, **Don't-Care Conditions**, **NAND and NOR Implementation**, **QM method (tabular)**, *Other Hardware Description Language – Verilog/vhdl Model of a simple circuit*
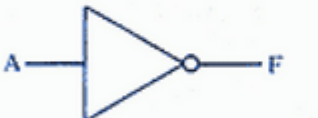
Text Book chapters: 1.9 ; 2.4 , 2.5 , 2.8 ; 3

VerlilogTextbook

Definition of binary logic

name	Logic	Symbol	Example
AND	Multiplicator	(.)or empty	1 . 1 = 1 or 1 . 0 = 0
OR	Addition	(+)	1 + 0 = 1 or 0 + 0 = 0
NOT	Complement	(`)or overbar	1~ = 0 or 0~ = 1

Logic Gates Diagrams

Name	Graphic Symbol	Algebraic Function	Truth Table
AND		$F = A \cdot B$ or $F = AB$	A B $\mid$ F 0 0 $\mid$ 0 0 1 $\mid$ 0 1 0 $\mid$ 0 1 1 $\mid$ 1
OR		$F = A + B$	A B $\mid$ F 0 0 $\mid$ 0 0 1 $\mid$ 1 1 0 $\mid$ 1 1 1 $\mid$ 1
NOT		$F = \overline{A}$ or $F = A'$	A $\mid$ F 0 $\mid$ 1 1 $\mid$ 0
NAND		$F = (\overline{AB})$	A B $\mid$ F 0 0 $\mid$ 1 0 1 $\mid$ 1 1 0 $\mid$ 1 1 1 $\mid$ 0
NOR		$F = (\overline{A + B})$	A B $\mid$ F 0 0 $\mid$ 1 0 1 $\mid$ 0 1 0 $\mid$ 0 1 1 $\mid$ 0

Boolean Algebra And Logic Gates

Duality

One part may be obtained from the other if the binary operators and the identity elements are interchanged.

> This important property of Boolean algebra is called the duality principle and states that every algebraic expression deducible from the postulates of Boolean algebra remains valid if the operators and identity elements are interchanged

If the dual of an algebraic expression is desired, we simply interchange OR and AND operators and replace 1's by 0's and 0's by 1's