AKTU

GATEWAY CLASSES

Digital System Design

B.Tech. 3rd Sem

EC & Allied



Exam/Result Oriented Content

- ✓ Recorded Video Lectures
- ✓ Pdf Notes
- ✓ PYQs

DIGITAL SYSTEM DESIGN

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UNIT 1 : LOGIC SIMPLIFICATION AND COMBINATIONAL LOGIC DESIGN

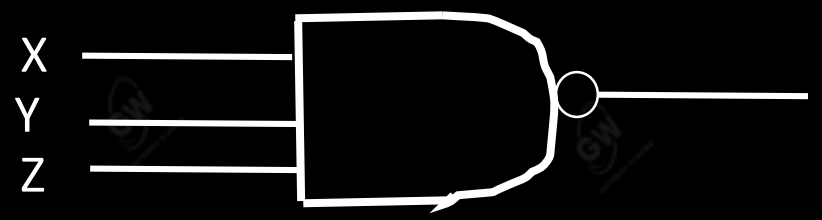
Today's Target

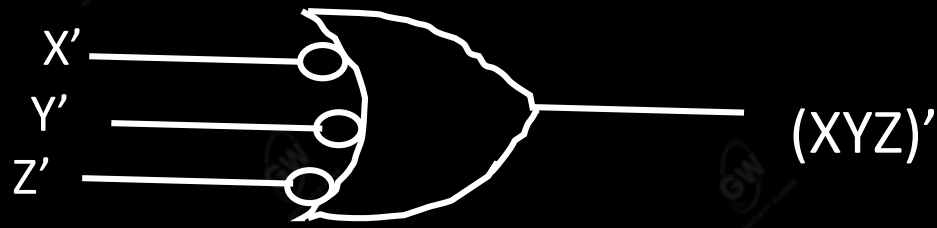
- NAND GATE IMPLEMENTATION
- Numerical Practice
- DPP
- University Questions

NAND GATE IMPLEMENTATION OF CIRCUIT

- NAND gate is a universal gate
- Function should be in SOP form
- Obtain simplified Boolean function in terms of Boolean operators and then convert the function to NAND logic.
- Implement the function with AND & OR gates.
- Replace AND with NAND gate.
- Replace OR gate by invert OR (NAND) gate.
- Two bubbles on same line denote double complement & both can be removed.

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Example: F = AB + CD Implement using NAND gates only.

- Step 1: Implement using Basic gates.
- Step 2: Convert AND to NAND and OR to invert OR.
- Step 3: Replace invert OR by NAND gate.

Example: F = (A+B) (A+C) Implement using NAND gates only.

Example: F = Σm(1,3,5,8,9,11,15) +d(2,13)

Implement using NAND gates only.

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Example: f(A,B,C,D) = πM(1,2,3,8,9,10,11,14) . d(7,15)

Implement using NAND gates only.

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DPP

Implement using NAND gates only:

a) $Y = \Sigma m(0,1,3,7,11,15) + d(8,9,13)$

b) $F = AB + AC' + BC$

c) $F = \pi M(6,9,11,13,14,17,20,25,28,29,30)$

UNIVERSITY QUESTIONS

YEAR	QUESTION	MARKS	ANSWER
22-23	Give the general procedure for converting a multilevel AND-OR diagram into an all NAND diagram. Implement the following Boolean function with NAND gates only. $F(x, y, z) = \Sigma m(1,2,3,4,5,7)$	10 marks	F= z+x'y + xy'
17-18	Implement the Expression Y = ABC' + BD + E using Nand gate only.	2 marks	

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Thank You