

# DIGITAL LOGIC DESIGN



## Lab Manual – 02

### Topic:

1. Basic Boolean Identities
2. Digital logic circuits analysis
3. Converting Boolean expressions to digital circuits

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## 1) Some Basic Boolean Identities:

1.	$B \cdot 1 = B \mid B \cdot 0 = 0 \mid B \cdot B' = 0$	$B + 0 = B \mid B + 1 = 1 \mid B + B' = 1$
2.	$B \cdot C = C \cdot B$	$B + C = C + B$
3.	$(B \cdot C) \cdot D = B \cdot (C \cdot D)$	$(B + C) + D = B + (C + D)$
4.	$(B \cdot C) + (B \cdot D) = B \cdot (C + D)$	$(B + C) \cdot (B + D) = B + (C \cdot D)$
5.	$B \cdot (B + C) = B$	$B + (B \cdot C) = B$
6.	$(B \cdot C) + (B \cdot C') = B$	$(B + C) \cdot (B + C') = B$
7.	$(B \cdot C) + (B' \cdot D) + (C \cdot D) = B \cdot C + B' \cdot D$	$(B + C) \cdot (B' + D) \cdot (C + D) = (B + C) \cdot (B' + D)$

## 2) Converting Boolean expressions to digital circuits:

Lab Task:

- Convert the following Boolean expressions into circuits:

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

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

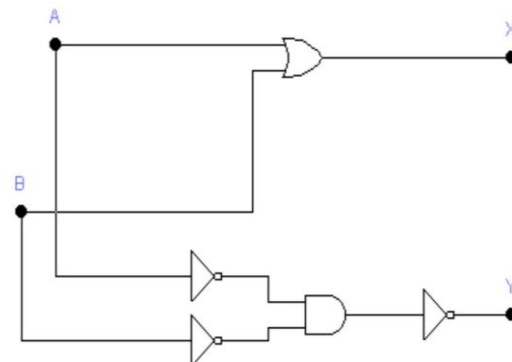
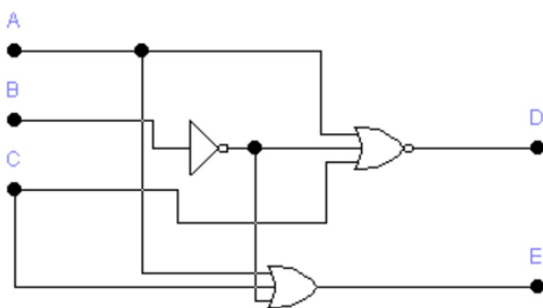
$$X = AB'C(BD + CDE) + AC'$$

- ➔ Draw circuit diagram of the function and show its truth table along with implementation

## 3) Digital Logic Circuit Analysis:

Home Task:

- Find the Boolean expressions of the following circuits and show the truth tables:



Note: Write Functions for D and E, and X and Y separately.

Instructions:

- **Show your work:** Make sure you have shown your work to respective TA in the lab before leaving it.
- **Clean Up Workspace:** Ensure your workstation is clean and organized. Clear away any papers, or materials used during the lab session.
- **Turn Off Equipment:** Power down all equipment.
- **Secure Components:** Place all physical components such as wires, ICs at their designated places. Do not leave components lying around on the workbench.
- **Return Borrowed Equipment:** Return the ICs and other equipment taken from server room.
- **Save Work:** Follow the instruction given in the lab regarding saving your work.
- **Dispose of Waste:** Dispose of any non-recyclable items, in the designated waste bins. Recycle any recyclable materials according to lab guidelines.
- Follow any additional instructions provided by the lab instructor or TAs regarding lab cleanup and departure procedure.
- Do the home task on sheets, make a and submit it in the Google Classroom. The name of your file must be YourRollNumber\_HTLab03.pdf
  - (i.e. BCSF23M5XX\_HTLab03.pdf/ BSDSF23XXXX\_HTLab03.pdf).