



**BITS Pilani**

Hyderabad Campus

Department of Electrical Engineering



# Digital Design

## First Semester 2020-21

### Tutorial : 05

# Combinational Circuit Design

# Digital Design Tutorial : 05

1.

A committee of three individuals decide issues for an organization. Each individual votes either yes or no for each proposal that arises. A proposal is passed if it receives at least two yes votes. Design a circuit that determines whether a proposal passes.

# Digital Design Tutorial : 05

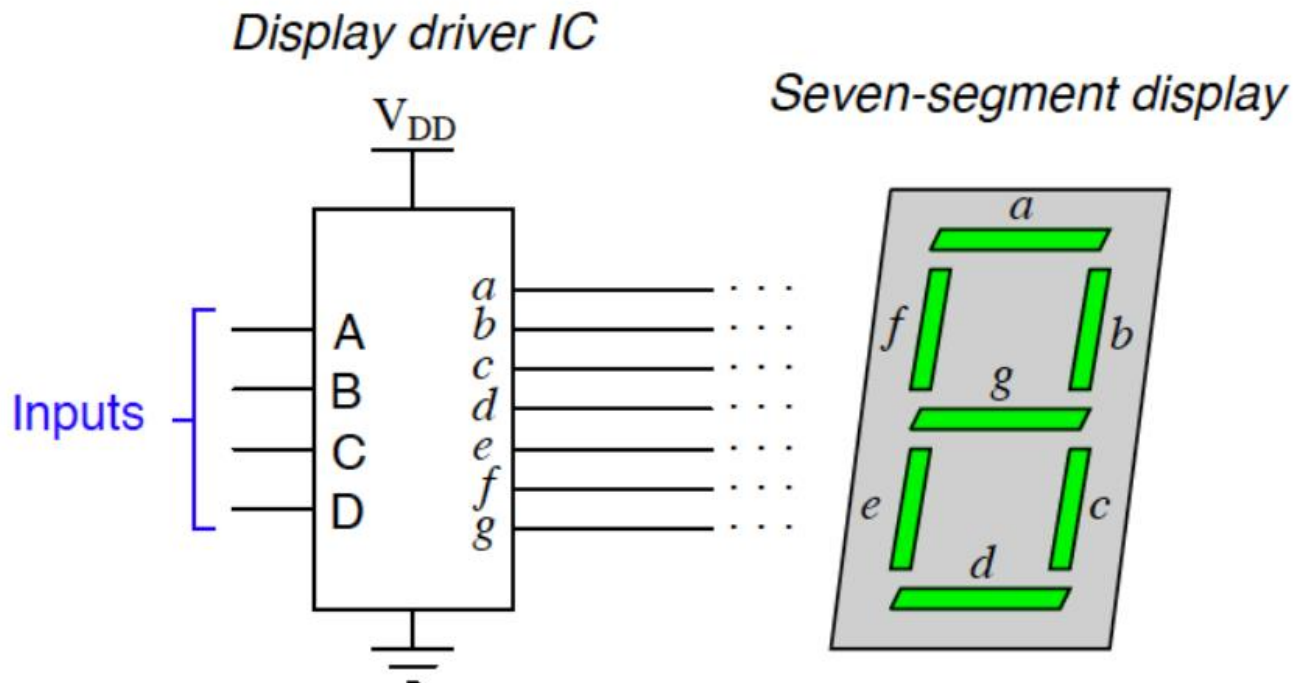
## 2. Design a Two bit Magnitude Comparator

INPUT				OUTPUT		
A1	A0	B1	B0	A<B	A=B	A>B
0	0	0	0	0	1	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	0	1	0
1	0	1	1	1	0	0
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	0	0	1
1	1	1	1	0	1	0

# Digital Design Tutorial : 05

## 3. Design a 7-segment Decoder

Inputs A,B,C, D  $(0-9)_{10}$  valid inputs &  $(10-15)_{10}$  Don't Care  
Outputs a,b,c,d,e,f



## 4. Production Line Control

- Rods of varying length ( $\pm 10\%$ ) travel on conveyor belt
  - Mechanical arm pushes rods within spec ( $\pm 5\%$ ) to one side
  - Second arm pushes rods too long to other side
  - Rods that are too short stay on belt
  - 3 light barriers (light source + photocell) as sensors
  - Design combinational logic to activate the arms
- Understanding the problem
  - Inputs are three sensors
  - Outputs are two arm control signals
  - Assume sensor reads "1" when tripped, "0" otherwise
  - Call sensors A, B, C