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Day: **M T W T F S**

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Roll **20P-0640**

Section **BCS-2B**

Manual # **10**

### Objective

The objective of today lab is to understand the working of 7 segment display and how to design by using different logic gates IC's

### Tools required

battery, bread board

LED

logic gates IC's

Used softwares

Multism

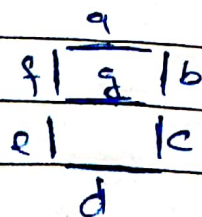
BCD to 7

In binary coded Decimal (BCD) encoding scheme each of the decimal number (0-9) is represented by its equivalent binary pattern.

### Types

Common Cathode type

Common Anode type



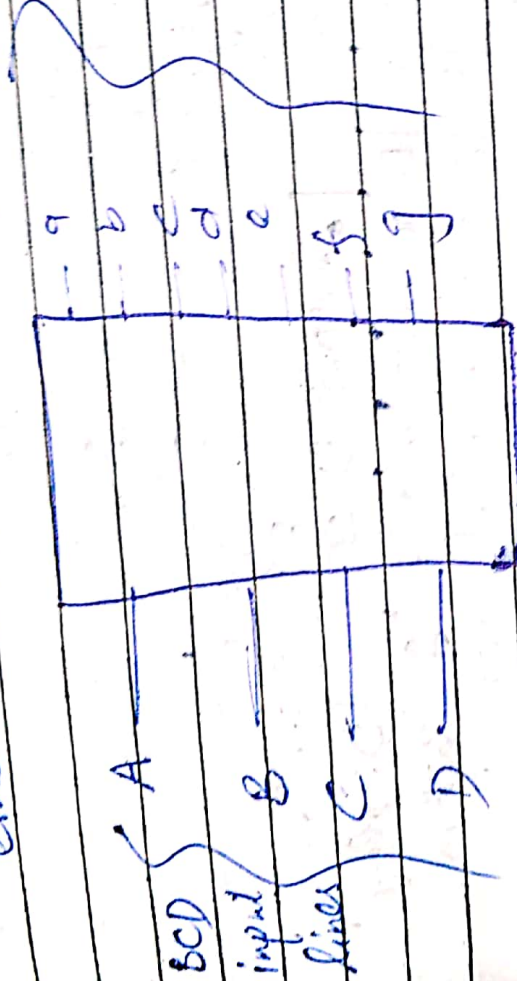
BCD to 7 segment Decodes

BCD to 7 segment decoder



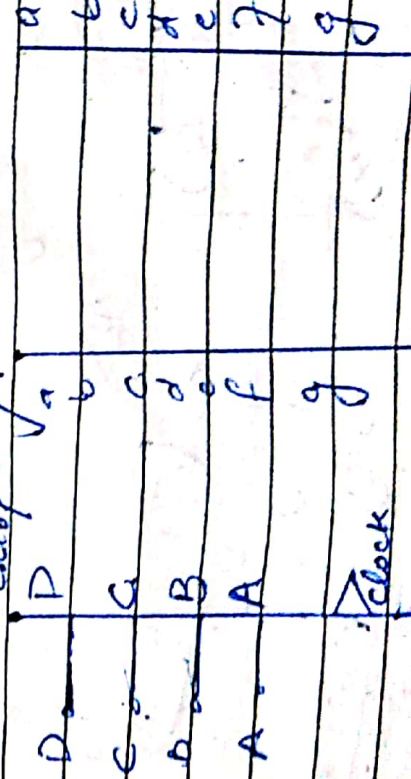
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is a circuit used to convert the input BCD into a form suitable for display. It has four input lines (A, B, C & D) and 7 output lines (a, b, c, d, e, f & g).



BCD to 7 segment Decoder Control.

Because 7-segment display does not work by directly supplying voltage to different segments of LED's. First, our decimal number is changed to its BCD equivalent signal then BCD to 7-segment decoder converts that signals to the form which is fed to 7-segment display.





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D	a	a
c	b	b
B	c	c
A	d	d
	e	e
	f	f
	g	g

BCD to 7 segment Decoder

Decimal Digit	A	B	C	D	a	b	c	d	e	f	g	Display Pattern
0	0	0	0	0	1	1	1	1	1	1	0	□
1	0	0	0	1	0	1	1	0	0	0	0	1
2	0	0	1	0	1	1	0	1	1	0	1	2
3	0	0	1	1	1	1	1	0	0	1	1	3
4	0	1	0	0	0	1	1	0	0	1	1	4
5	0	1	0	1	0	0	0	1	1	1	1	5
6	0	1	1	0	1	0	1	1	1	1	1	6
7	0	1	1	1	1	1	1	0	0	0	0	7
8	1	0	0	0	1	1	1	1	1	1	1	8
9	1	0	0	1	1	1	1	1	1	1	1	9

K-Map for segment (a, b, c, d, e, f, g)

AB \ CD	00	01	11	10
00	1	1	1	1
01	0	1	1	1
11	x	x	x	x
10	1	x	x	x

$$a = A + C + B'D + B'D'$$

$$b = C'D + CD + B'$$



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AB  $\begin{matrix} \text{cd} \\ \text{00} \end{matrix}$   $\begin{matrix} \text{01} \\ \text{01} \end{matrix}$   $\begin{matrix} \text{11} \\ \text{11} \end{matrix}$   $\begin{matrix} \text{10} \\ \text{10} \end{matrix}$

$\begin{matrix} \text{00} \\ \text{00} \end{matrix}$	$\begin{matrix} \text{01} \\ \text{01} \end{matrix}$	$\begin{matrix} \text{11} \\ \text{11} \end{matrix}$	$\begin{matrix} \text{10} \\ \text{10} \end{matrix}$
1	1	1	1
1	1	x	x
1	1	x	x
1	x	1	1
1	1	1	1

$C = B + D + C$

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$AB$   $CD$ 

00	01	11	10
00	0	0	0
01	0	0	0
11	0	0	0
10	0	0	0

$$e^2 B'D + CD$$

$y = A + C$

$$\sigma = A + CD + BD + C$$

### Conclusion

We have understood more  
how these electric devices like  
clock, watch, measuring tools  
numbers and how to make  
and work these.