



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECB202 – LINEAR AND DIGITAL CIRCUITS

II YEAR/ III SEMESTER

UNIT 4 – COMBINATIONAL and SEQUENTIAL CIRCUITS

TOPIC - Code Converters (Excess 3 to BCD and BCD to Excess 3)



What is a Excess-3 and BCD code?



- **Excess-3 code** is non-weighted and self complementary code.
- **BCD** is a class of binary encodings of decimal numbers where each digit is represented by a fixed number of bits, usually four or eight.



BCD to Excess 3





BCD to Excess 3



BCD INPUT				EXCESS-3 OUTPUT			
B3	B2	B1	B0	E3	E2	E1	E0
0	0	0	0	0	0	1	1
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0
1	0	0	0	1	0	1	1
1	0	0	1	1	1	0	0
1	0	1	0	X	X	X	X
1	0	1	1	X	X	X	X
1	1	0	0	X	X	X	X
1	1	0	1	X	X	X	X
1	1	1	0	X	X	X	X
1	1	1	1	X	X	X	X



BCD to Excess 3



1. BCD code to Excess-3 code converter.

Consider the logic diagram below for BCD to Excess-3 code converter

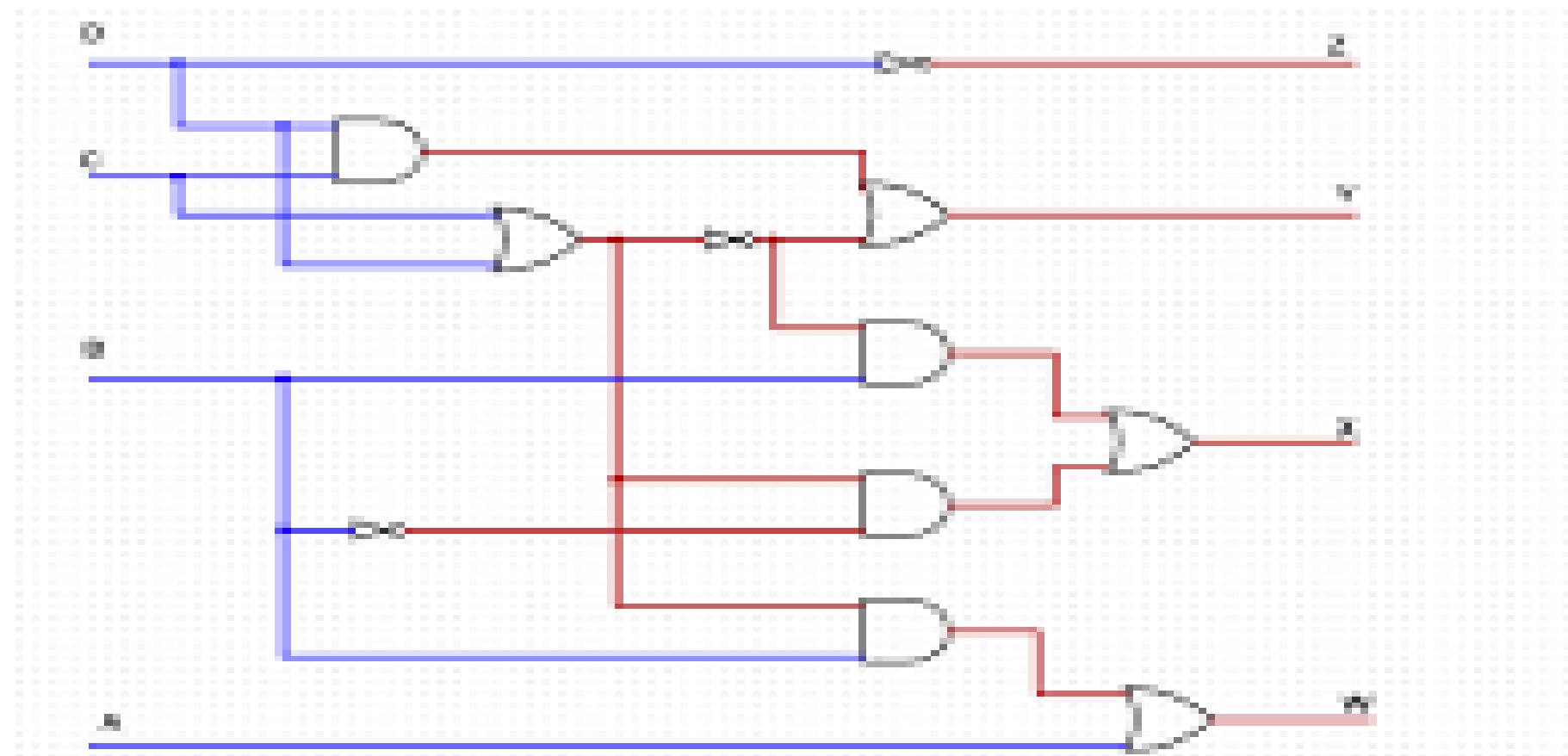


Figure 1: BCD to excess-3 code converter.

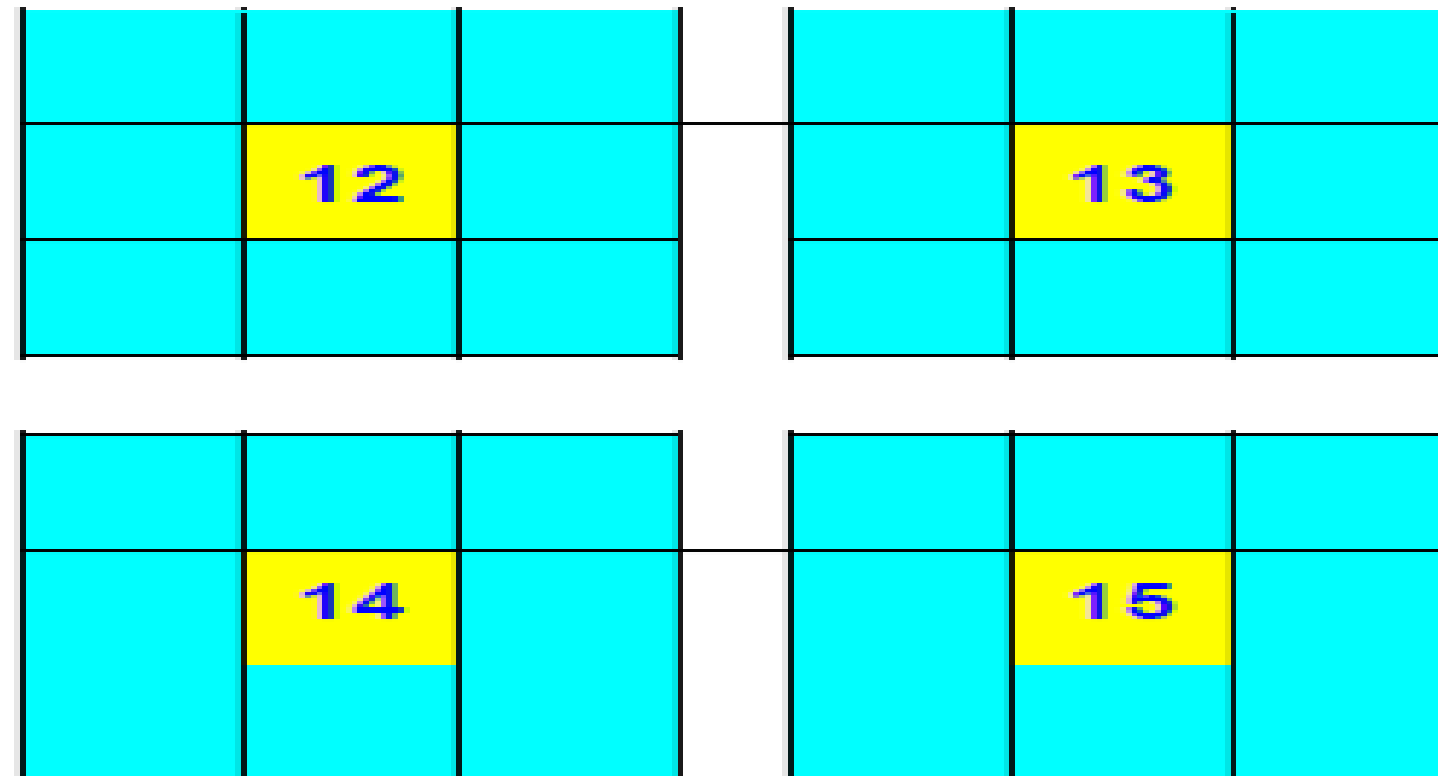


ACTIVITY



Puzzle time

12 to 15



Can you put the numbers 1 to 8 in each of the squares so that each side adds up to the middle number?





Excess 3 to BCD



2. Excess-3 code to BCD code converter.

Consider the logic diagram below for Excess-3 code to BCD converter

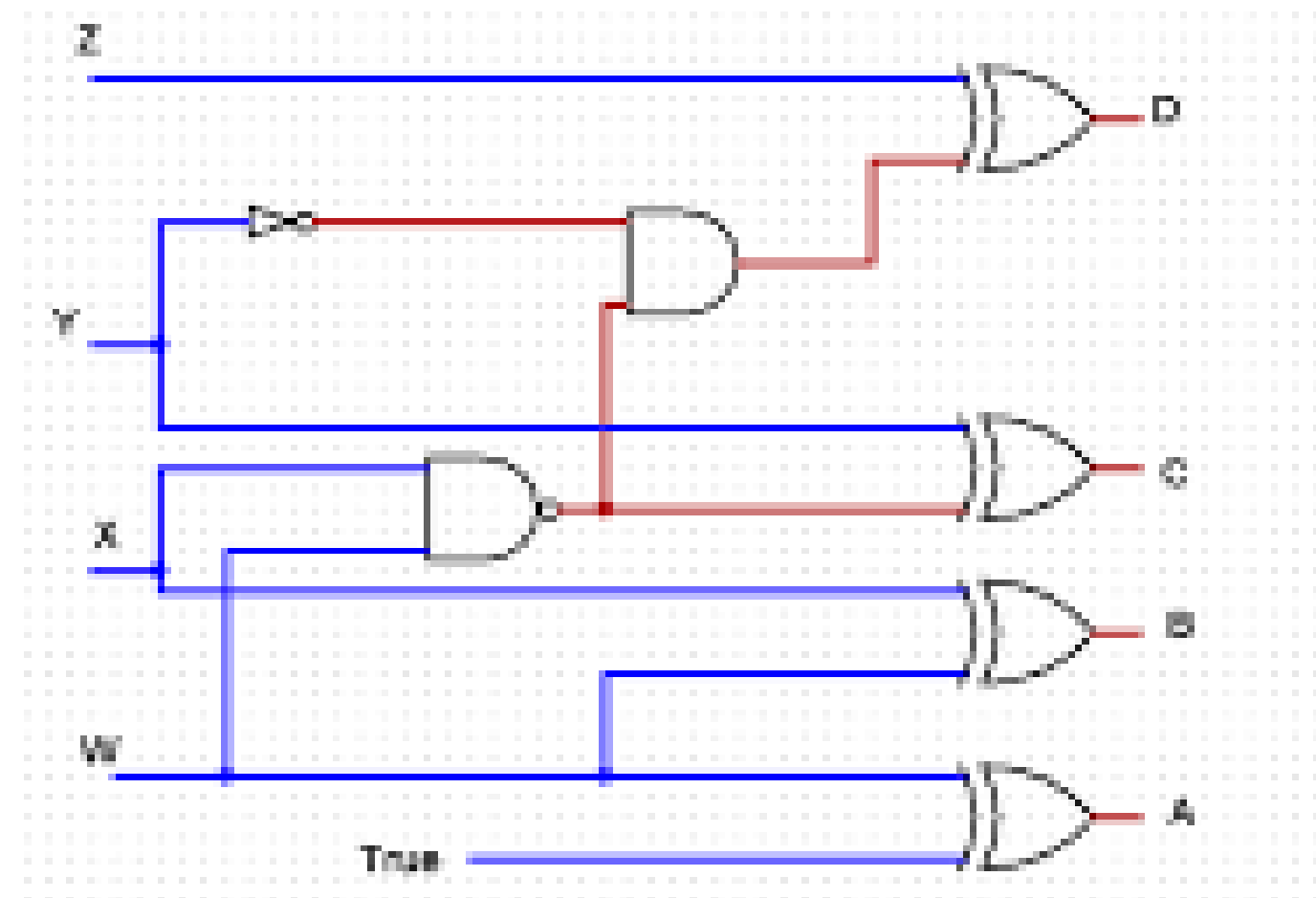


Figure 2: Excess-3 to BCD code converter



Excess 3 to BCD



Truth Table :

Inputs				Outputs			
W	X	Y	Z	A	B	C	D
0	0	1	1	0	0	0	0
0	1	0	0	0	0	0	1
0	1	0	1	0	0	1	0
0	1	1	0	0	0	1	1
0	1	1	1	0	1	0	0
1	0	0	0	0	1	0	1
1	0	0	1	0	1	1	0
1	0	1	0	0	1	1	1
1	0	1	1	1	0	0	0
1	1	0	0	1	0	0	1

MAP :

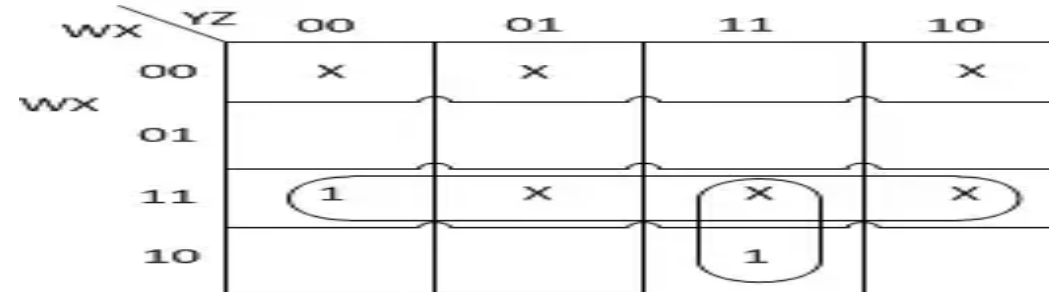


Fig: Map for A
 $A = WX + WYZ$

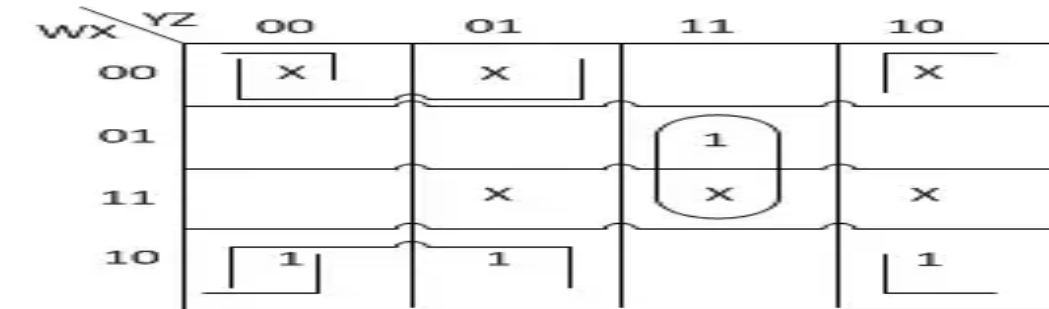


Fig: Map for B
 $B = XY' + XYZ + XZ'$

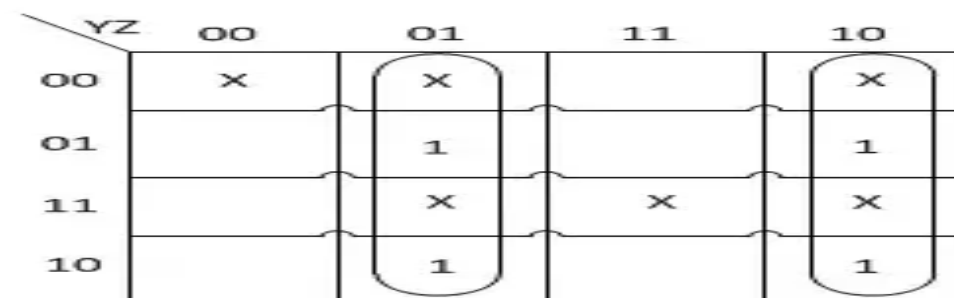


Fig: Map for C
 $C = Y'Z + YZ'$
OR
 $C = Y \oplus Z$

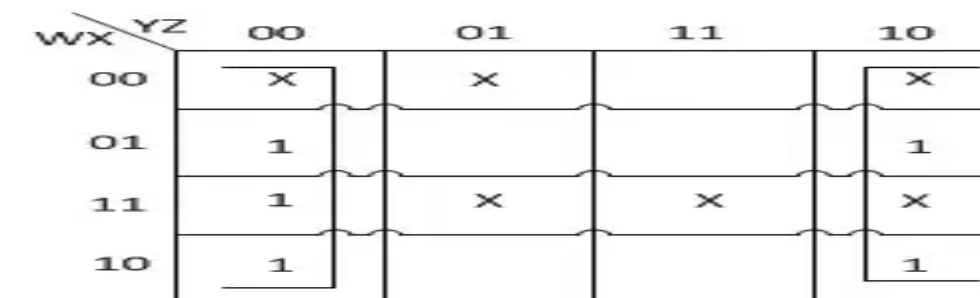


Fig: Map for D
 $D = Z'$



Excess-3 to BCD Code

2. Excess-3 code to BCD code converter.

Consider the logic diagram below for Excess-3 code to BCD converter

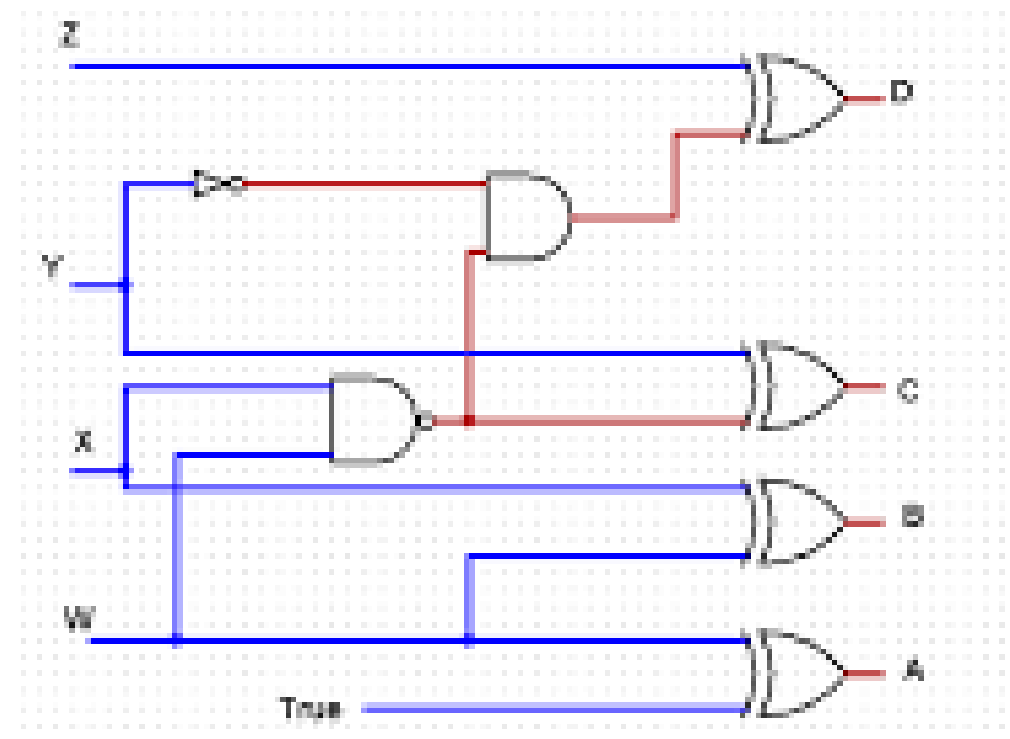


Figure 2: Excess-3 to BCD code converter



ASSESSMENT



1. ____ a _____ is used in simplifying ____ b _____
b) APM ARNAKGHU
a) RACE TOND NOCIDIONT
2. Name the gate which is called a coincidence detector? Justify
3. Name the gate which can be used as switch? Justify your reason
- 4) How many AND gates and OR gates are required to realize the expression $Y=BD+CA+EF+GH$. Explain
- 5) The complement function can be done by using an _____ (RTENIERV)



THANK YOU