

Lab-9

Design of combinational logic circuits

Design a combinational circuit with three inputs, x, y, and z, and three outputs, A, B, and C. When the binary input is 0, 1, 2, or 3, the binary output is one greater than the input. When the binary input is 4, 5, 6, or 7, the binary output is two less than the input.

1-Draw Truth Table

X	Y	Z	A	B	C
0	0	0	0	0	1
0	0	1	0	1	0
0	1	0	0	1	1
0	1	1	1	0	0
1	0	0	0	1	0
1	0	1	0	1	1
1	1	0	1	0	0
1	1	1	1	0	1

2-Obtain Boolean function.

$$A = m_3 + m_6 + m_7$$

$$B = m_1 + m_2 + m_4 + m_5$$

$$C = m_0 + m_2 + m_5 + m_7$$

3-Obtain simplified Boolean function.

$$A = YZ + XY$$

	YZ	00	01	11	10
X					
0		0	0	1	0
1		0	0	1	1

$$B = XY' + Y'Z + X'YZ'$$

	YZ	00	01	11	10
X					
0		0	1	0	1
1		1	1	0	0

$$C = X'Z' + XZ$$

	YZ	00	01	11	10
X					
0		1	0	0	1
1		0	1	1	0

4- Draw logic diagram.

