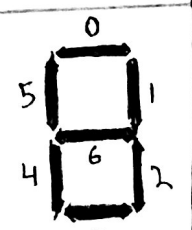
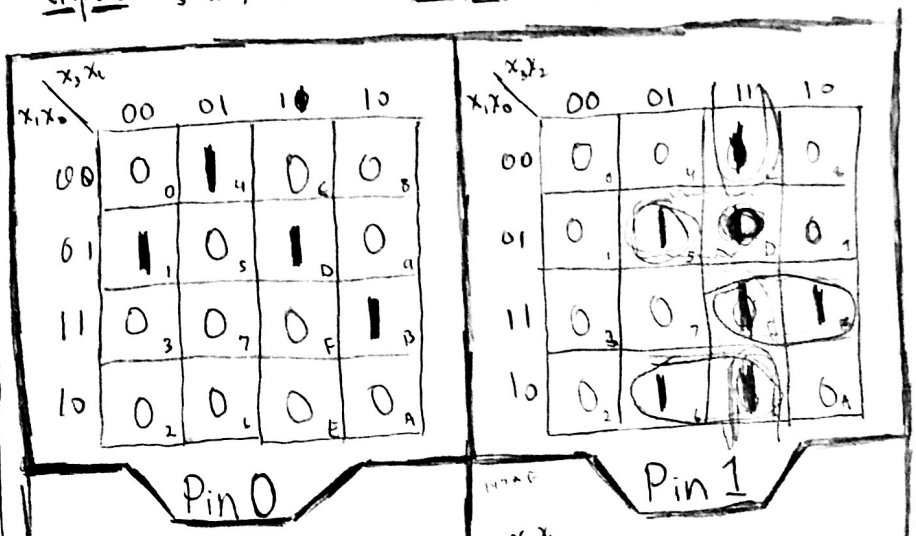
7 Segment Display
ENCODER

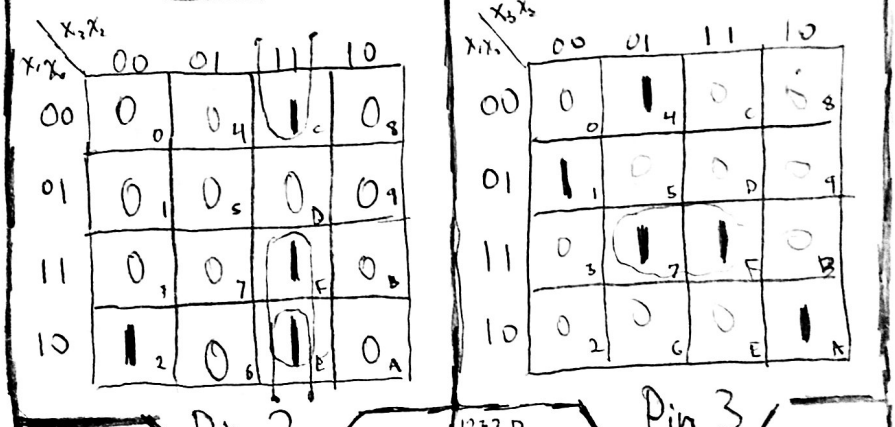


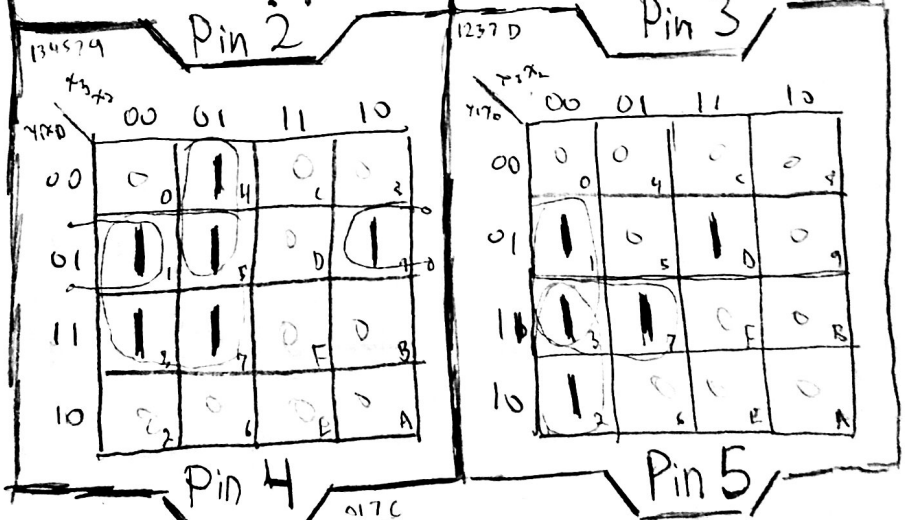
Pin labels For DEO. 7seg. Display

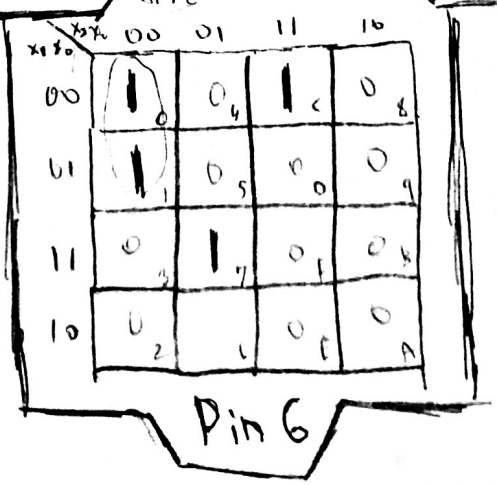
Note:
High off (1)
Low on (0)

inputs: $X_3 X_2 X_1 X_0$ **Outputs:** $S_0, S_1, S_2, S_3, S_4, S_5, S_6$









$S_0 = \bar{X}_3\bar{X}_2\bar{X}_1X_0 + \bar{X}_3X_2\bar{X}_1\bar{X}_0 + \ldots$
$\ldots + X_3X_2\bar{X}_1X_0 + X_3\bar{X}_2X_1X_0$

$S_1 = X_2\bar{X}_1X_0 + X_3\bar{X}_2X_1X_0 + \bar{X}_3X_2X_1\bar{X}_0$

$S_2 = X_3X_2X_1 + X_3X_2\bar{X}_0 + \bar{X}_3\bar{X}_2X_1\bar{X}_0$

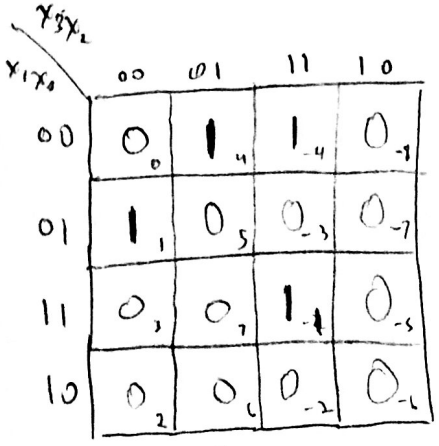
$S_3 = \bar{X}_3X_2\bar{X}_1\bar{X}_0 + X_2X_1X_0 + \bar{X}_3\bar{X}_2X_1X_0 +$
$\ldots + X_3\bar{X}_2X_1\bar{X}_0$

$S_4 = \bar{X}_3X_0 + \bar{X}_3X_2\bar{X}_1 + \bar{X}_2\bar{X}_1X_0$

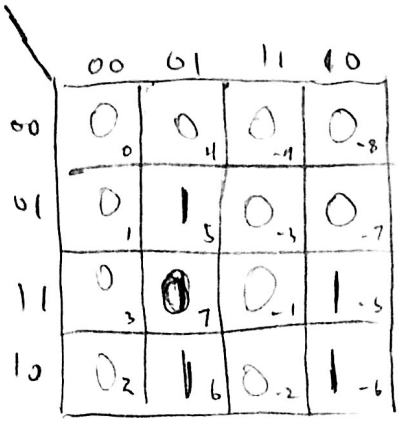
$S_5 = \bar{X}_3\bar{X}_2X_0 + \bar{X}_3\bar{X}_2X_1 + \bar{X}_3X_1X_0 + X_3X_2\bar{X}_1X_0$

$S_6 = \bar{X}_3\bar{X}_2\bar{X}_1 + X_3X_2\bar{X}_1\bar{X}_0 + \bar{X}_3X_2X_1X_0$

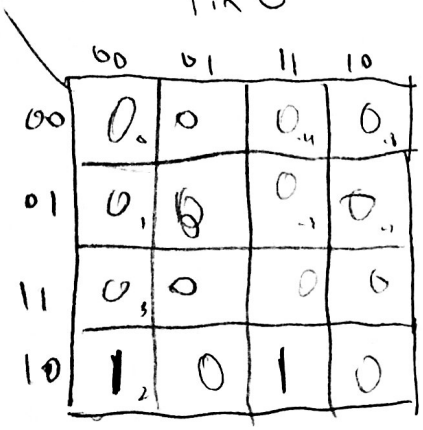
encoder for 2's compl



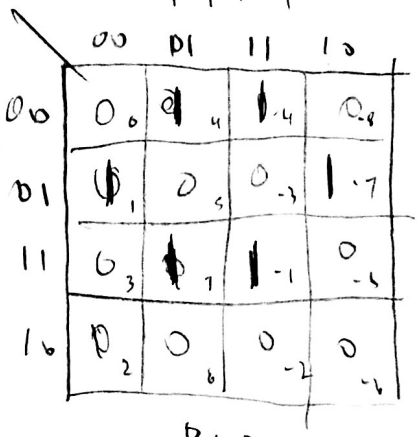
Pin 0



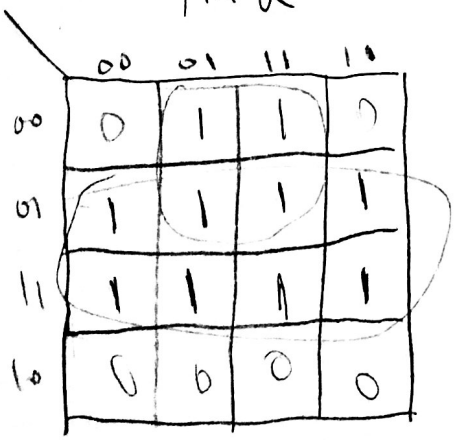
Pin 1



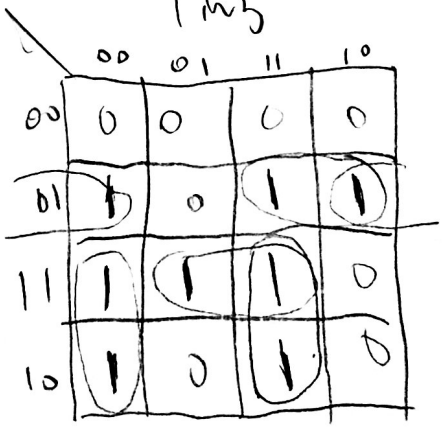
Pin 2



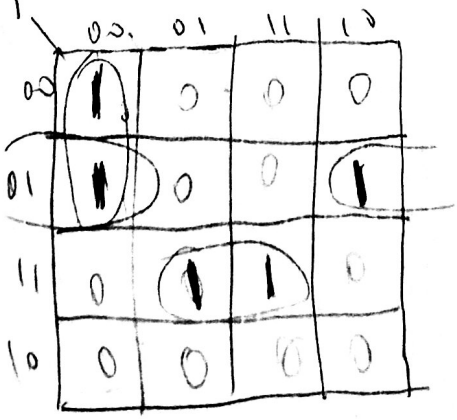
Pin 3



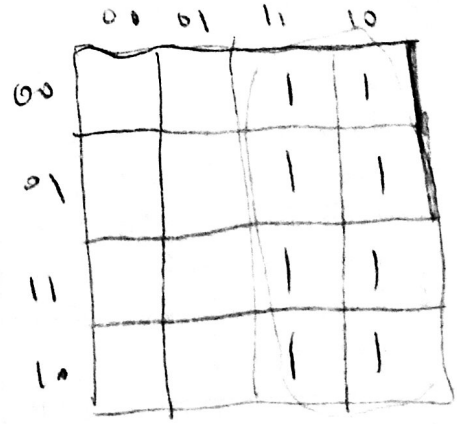
Pin 4



Pin 5



Pin 6



neg

$$S_0 = \bar{x}_3\bar{x}_2\bar{x}_1x_0 + \bar{x}_3x_2\bar{x}_1\bar{x}_0 + x_3x_2\bar{x}_1x_0 + x_3\bar{x}_2x_1x_0$$

$$= \bar{x}_3\bar{x}_1(x_0 \oplus x_2) + x_3x_0(x_2 \oplus x_1)$$

$$S_1 = x_2\bar{x}_1x_0 + x_3\bar{x}_2x_1x_0 + \bar{x}_3x_2x_1\bar{x}_0$$

$$= x_2\bar{x}_1x_0 + x_1(x_3\bar{x}_2x_0 + \bar{x}_3x_2\bar{x}_0)$$

$$S_2 = x_3x_2x_1 + x_3x_2\bar{x}_0 + \bar{x}_3\bar{x}_2x_1\bar{x}_0$$

$$x_3x_2(x_1 + \bar{x}_0) + \bar{x}_3\bar{x}_2x_1\bar{x}_0$$

$$S_3 = \bar{x}_3x_2\bar{x}_1\bar{x}_0 + x_2x_1x_0 + \bar{x}_3\bar{x}_2\bar{x}_1x_0 + x_3\bar{x}_2x_1\bar{x}_0$$

$$= \bar{x}_3\bar{x}_1(x_2 \oplus x_0) + x_1(x_2x_0 + x_3\bar{x}_2\bar{x}_0)$$

$$S_4 = \bar{x}_3x_0 + \bar{x}_3x_2\bar{x}_1 + \bar{x}_2\bar{x}_1x_0$$

$$= \bar{x}_3(x_0 + x_2\bar{x}_1) + \bar{x}_2\bar{x}_1x_0$$

$$S_5 = \bar{x}_3\bar{x}_2x_0 + \bar{x}_3\bar{x}_2x_1 + \bar{x}_3x_1x_0 + x_3x_2\bar{x}_1x_0$$

$$= \bar{x}_3(\bar{x}_2(x_0 + x_1) + x_1x_0) + x_3x_2\bar{x}_1x_0$$

$$S_6 = \bar{x}_3\bar{x}_2\bar{x}_1 + x_3x_2\bar{x}_1\bar{x}_0 + \bar{x}_3x_2x_1x_0$$

$$S_6 = \bar{x}_3(\bar{x}_2\bar{x}_1 + x_2x_1x_0) + x_3x_2\bar{x}_1\bar{x}_0$$