

CC3301 - Arquitectura de Computadores

Auxiliar 1

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1. Conversor BCD a Display de 7 Segmentos

1.1. Tabla de Verdad

| n | x_3 | x_2 | x_1 | x_0 | a | b | c | d | e | f | g |
|---|-------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| 3 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 4 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 5 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| 6 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 7 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 8 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| - | 1 | 0 | 1 | 0 | X | X | X | X | X | X | X |
| - | 1 | 0 | 1 | 1 | X | X | X | X | X | X | X |
| - | 1 | 1 | 0 | 0 | X | X | X | X | X | X | X |
| - | 1 | 1 | 0 | 1 | X | X | X | X | X | X | X |
| - | 1 | 1 | 1 | 0 | X | X | X | X | X | X | X |
| - | 1 | 1 | 1 | 1 | X | X | X | X | X | X | X |

1.2. Mapas de Karnaugh

Segmento a

| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 1 | 0 | 1 | 1 |
| | 01 | 0 | 1 | 1 | 1 |
| | 11 | X | X | X | X |
| | 10 | 1 | 1 | X | X |

$$f_a = \underline{x_3} \vee \underline{x_1} \vee \underline{x_2x_0} \vee \underline{\neg x_2\neg x_0}$$

Segmento b

| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 1 | 1 | 1 | 1 |
| | 01 | 1 | 0 | 1 | 0 |
| | 11 | X | X | X | X |
| | 10 | 1 | 1 | X | X |

$$f_b = \underline{\neg x_2} \vee \underline{\neg x_1\neg x_0} \vee \underline{x_1x_0}$$

Segmento c

| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 1 | 1 | 1 | 0 |
| | 01 | 1 | 1 | 1 | 1 |
| | 11 | X | X | X | X |
| | 10 | 1 | 1 | X | X |

$$f_c = \underline{\neg x_1} \vee \underline{x_0} \vee \underline{x_2}$$

Segmento d

| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 1 | 0 | 1 | 1 |
| | 01 | 0 | 1 | 0 | 1 |
| | 11 | X | X | X | X |
| | 10 | 1 | 1 | X | X |

$$f_d = \underline{x_3} \vee \underline{x_1\neg x_0} \vee \underline{\neg x_2x_1} \vee \underline{\neg x_2\neg x_0} \vee \underline{x_2\neg x_1x_0}$$

Segmento e

| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 1 | 0 | 0 | 1 |
| | 01 | 0 | 0 | 0 | 1 |
| | 11 | X | X | X | X |
| | 10 | 1 | 0 | X | X |

$$f_e = \neg x_2 \neg x_0 \vee x_1 \neg x_0$$

Segmento f

| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 1 | 0 | 0 | 0 |
| | 01 | 1 | 1 | 0 | 1 |
| | 11 | X | X | X | X |
| | 10 | 1 | 1 | X | X |

$$f_f = x_2 \neg x_1 \vee \neg x_1 \neg x_0 \vee x_3 \vee x_2 \neg x_0$$

Segmento g

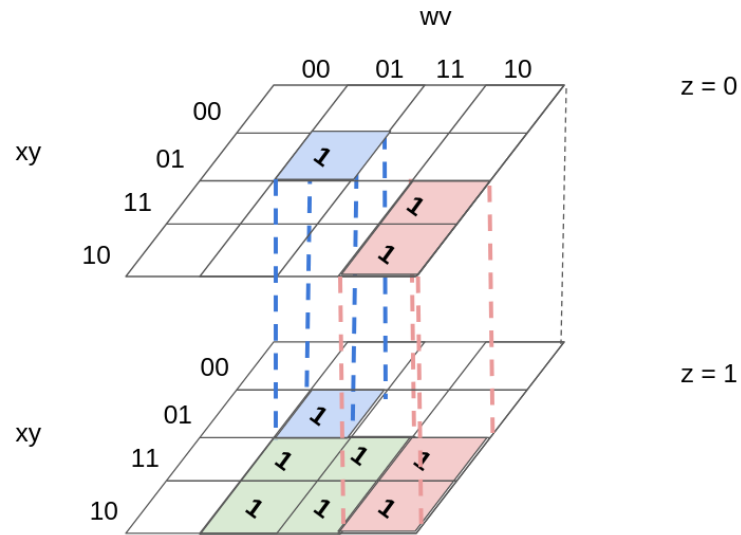
| | | x_1x_0 | | | |
|----------|----|----------|----|----|----|
| | | 00 | 01 | 11 | 10 |
| x_3x_2 | 00 | 0 | 0 | 1 | 1 |
| | 01 | 1 | 1 | 0 | 1 |
| | 11 | X | X | X | X |
| | 10 | 1 | 1 | X | X |

$$f_g = x_2 \neg x_1 \vee x_3 \neg x_2 \vee x_1 \neg x_0 \vee \neg x_2 x_1$$

En el archivo P1.circ encontrará la solución realizada en *Logisim* para esta pregunta.

2. Mapas de Karnaugh

| xy/zwv | 000 | 001 | 011 | 010 | 110 | 111 | 101 | 100 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|
| 00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 01 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| 11 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| 10 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |



$$f = \underline{xw \neg v} \vee \underline{xzv} \vee \underline{\neg xy \neg wv}$$

3. P2.B control 1 año 2005 (Propuesto)

| | | zw | | | |
|----|----|----|----|----|----|
| | | 00 | 01 | 11 | 10 |
| xy | 00 | 1 | 1 | 1 | 1 |
| | 01 | 0 | 1 | 0 | 0 |
| | 11 | 1 | 1 | 0 | 0 |
| | 10 | 1 | 1 | 1 | 1 |

$$f = (\underline{x \vee \neg y \vee w}) \wedge (\underline{\neg y \vee \neg z})$$