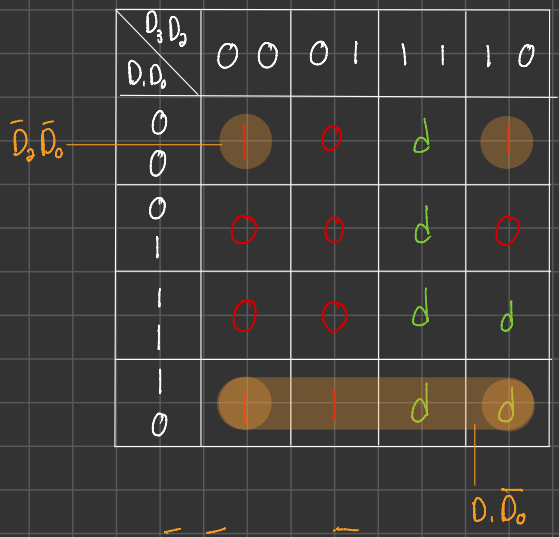
Question 1

D_3	D_2	D_1	D_0	E
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	d
1	0	1	1	d
1	1	0	0	d
1	1	0	1	d
1	1	1	0	d
1	1	1	1	d



$$E = \bar{D}_2\bar{D}_0 + D_1\bar{D}_0$$

Vu que les 7 segments sont en BCD, les valeurs au dessus de 9 peuvent être ignorer puisque l'afficheur peut uniquement afficher 1 chiffre à la fois. Les valeurs de 10 à 15 sont donc remplacer par d. Dans le tableau de Karnaugh les d peuvent être pris en concidération ou non.

Question 2

$$\bar{D}_0\bar{D}_1 + \bar{D}_0D_2 + D_1D_3 + \bar{D}_2D_3 + \bar{D}_1D_2\bar{D}_3 = \bar{D}_0\overline{(D_1\bar{D}_2)} + D_3 \oplus (\bar{D}_1D_2)$$

Théorème T13 $\overline{(X_0 \cdot X_1 \dots X_n)} = \bar{X}_1 + \bar{X}_2 \dots + \bar{X}_n$

$$= \bar{D}_0(\bar{D}_1 + D_2) + D_3 \oplus (\bar{D}_1D_2)$$

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Définition XOR $A \oplus B = \bar{A}B + A\bar{B}$

$$= \bar{D}_0(\bar{D}_1 + D_2) + D_3 \oplus (\bar{D}_1D_2)$$

$$= \bar{D}_0(\bar{D}_1 + D_2) + \bar{D}_3(\bar{D}_1D_2) + D_3\overline{(\bar{D}_1D_2)}$$

$$= \bar{D}_0(\bar{D}_1 + D_2) + \bar{D}_3(\bar{D}_1D_2) + D_3\overline{(\bar{D}_1D_2)}$$

Théorème T13 $\overline{(X_0 \cdot X_1 \dots X_n)} = \bar{X}_1 + \bar{X}_2 \dots + \bar{X}_n$

$$= \bar{D}_0(\bar{D}_1 + D_2) + \bar{D}_3\bar{D}_1D_2 + D_3(D_1 + \bar{D}_2)$$

$$= \bar{D}_0(\bar{D}_1 + D_2) + \bar{D}_3\bar{D}_1D_2 + D_3(D_1 + \bar{D}_2)$$

Théorème T8 $X \cdot (Y + Z) = X \cdot Y + X \cdot Z$

$$= \bar{D}_0(\bar{D}_1 + D_2) + \bar{D}_3\bar{D}_1D_2 + D_3(D_1 + \bar{D}_2)$$

$$= \bar{D}_0\bar{D}_1 + \bar{D}_0D_2 + \bar{D}_3\bar{D}_1D_2 + D_3D_1 + D_3\bar{D}_2$$

$$\bar{D}_0\bar{D}_1 + \bar{D}_0D_2 + D_1D_3 + \bar{D}_2D_3 + \bar{D}_1D_2\bar{D}_3 = \bar{D}_0\bar{D}_1 + \bar{D}_0D_2 + D_1D_3 + \bar{D}_2D_3 + \bar{D}_1D_2\bar{D}_3$$

$$0 = 0$$