

Corrigé de l'examen Architecture des Ordinateurs

Session Rattrapage

Exercice 1

1. Table de Vérité

a ₀	a ₁	C	D	S ₀
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Table de Karnaugh

a ₀ a ₁	00	01	11	10
00				
01			1	1
11	1	1	1	1
10		1	1	

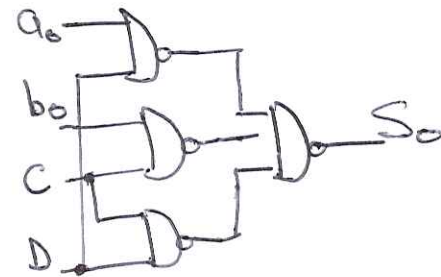


Schéma logique

$$S_0 = Cb_0 + Da_0 + CD$$

Avec des portes NAND

$$\overline{S_0} = \overline{S_0} = \overline{Cb_0 + Da_0 + CD} = \overline{Cb_0} \cdot \overline{Da_0} \cdot \overline{CD}$$

Exercice 2

Décim	Code de Gray				Code Aiken			
	Non pondéré				2	4	2	1
0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	1
2	0	0	1	1	0	0	1	0
3	0	0	1	0	0	0	1	1
4	0	1	1	0	0	1	0	0
5	0	1	1	1	0	1	0	1
6	0	1	0	1	1	1	0	0
7	0	1	0	0	1	1	0	1
8	1	1	0	0	1	1	1	0
9	1	1	0	1	1	1	1	1
	E ₃	E ₂	E ₁	E ₀	S ₃	S ₂	S ₁	S ₀

Equations booléennes des sorties

$$S_0 = \overline{E_3} \overline{E_2} \overline{E_1} E_0 + \overline{E_3} \overline{E_2} \overline{E_1} \overline{E_0} + \overline{E_3} E_2 \overline{E_1} E_0$$

$$S_0 = \overline{E_3} E_2 (\overline{E_1} \overline{E_0} + \overline{E_1} E_0) + \overline{E_3} \overline{E_2} \overline{E_1} E_0$$

$$S_0 = \overline{E_3} E_2 (\overline{E_1} \oplus E_0) + \overline{E_3} \overline{E_2} \overline{E_1} E_0$$

$$\text{ou } S_0 = E_2 \overline{E_1} (\overline{E_3} \overline{E_0} + \overline{E_3} E_0) + \overline{E_3} \overline{E_2} \overline{E_1} E_0$$

$$S_0 = E_2 \overline{E_1} (\overline{E_0} \oplus E_3) + \overline{E_3} \overline{E_2} \overline{E_1} E_0$$

$$S_1 = E_3$$

$$S_2 = \overline{E_2}$$

$$S_3 = \overline{E_3} \overline{E_2} \overline{E_1} E_0 + \overline{E_3} \overline{E_2} \overline{E_1} \overline{E_0} + \overline{E_3} E_2 \overline{E_1} E_0 + \overline{E_3} E_2 \overline{E_1} \overline{E_0}$$

$$= \overline{E_3} \overline{E_2} \overline{E_1} (E_0 + \overline{E_0}) + \overline{E_3} E_2 \overline{E_1} (E_0 + \overline{E_0}) = \overline{E_3} \overline{E_2} \overline{E_1} + \overline{E_3} E_2 \overline{E_1} = \overline{E_3} \overline{E_1} E_2$$

$$S_3 = \overline{E_3} \overline{E_1} E_2$$

Entrées du transcodeur: Code de Gray

Sorties du transcodeur: Code Aiken

