

Nom :
 Prénom :
 Groupe :

Examen Structure Machine2

Exercice 1 (4 pts)

Donner la forme canonique adéquate des fonctions booléennes suivantes :

$F_3(a,b,c,d) = abc + a\bar{b}cd$ <input type="checkbox"/> $abcd + a\bar{b}cd$ <input checked="" type="checkbox"/> $abcd + abc\bar{d} + a\bar{b}cd$ <input type="checkbox"/> $abc\bar{d} + a\bar{b}cd$	$F_1(a,b,c) = a + \bar{b}c$ <input checked="" type="checkbox"/> $abc + ab\bar{c} + a\bar{b}c + a\bar{b}\bar{c} + a\bar{b}\bar{c}$ <input type="checkbox"/> $abc + ab\bar{c} + a\bar{b}c + a\bar{b}\bar{c} + a\bar{b}\bar{c}$ <input type="checkbox"/> $a\bar{b}c + a\bar{b}\bar{c} + a\bar{b}\bar{c}$
$F_4(a,b,c,d,e) = abcde$ <input type="checkbox"/> $abcde + ab\bar{c}de$ <input checked="" type="checkbox"/> $abcde$ <input type="checkbox"/> $a + b + c + d + e$	$F_2(a,b) = a + b$ <input checked="" type="checkbox"/> $ab + a\bar{b} + \bar{a}b$ <input type="checkbox"/> $ab + \bar{a}\bar{b} + \bar{a}b$ <input type="checkbox"/> $ab + \bar{a}\bar{b} + \bar{a}b$

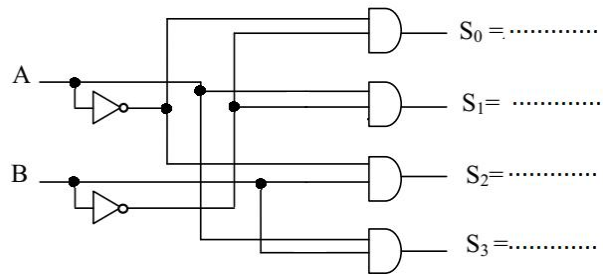
Exercice 2 (6 pts)

Simplifier les fonctions booléennes suivantes :

$F_2(a,b,c) = abc + a\bar{b}\bar{c} + a\bar{b}c + a\bar{b}\bar{c} + a\bar{b}c$ <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr><th>ab \ c</th><th>00</th><th>01</th><th>11</th><th>10</th></tr> <tr><th>0</th><td>1</td><td></td><td></td><td>1</td></tr> <tr><th>1</th><td>1</td><td></td><td>1</td><td>1</td></tr> </table> <p style="text-align: center;">$F_2 = \dots \bar{b} + ac \dots$</p>	ab \ c	00	01	11	10	0	1			1	1	1		1	1	$F_1(a,b,c) = abc + ab\bar{c} + a\bar{b}c$ <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr><th>ab \ c</th><th>00</th><th>01</th><th>11</th><th>10</th></tr> <tr><th>0</th><td></td><td></td><td>1</td><td></td></tr> <tr><th>1</th><td></td><td></td><td>1</td><td>1</td></tr> </table> <p style="text-align: center;">$F_1 = \dots ab + ac \dots$</p>	ab \ c	00	01	11	10	0			1		1			1	1																																								
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$F_6(a,b,c,d) = \Sigma(0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15)$ <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr><th>ab \ cd</th><th>00</th><th>01</th><th>11</th><th>10</th></tr> <tr><th>00</th><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><th>01</th><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><th>11</th><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><th>10</th><td>1</td><td>1</td><td>1</td><td>1</td></tr> </table> <p style="text-align: center;">$F_6 = \dots 1 \dots$</p>	ab \ cd	00	01	11	10	00	1	1	1	1	01	1	1	1	1	11	1	1	1	1	10	1	1	1	1	$F_5(a,b,c,d,e) = \Sigma(1,3,4,5,6,7,9,11,13,15,17,19,21,23,25,27,29,31)$ <table border="1" style="width: 100%; text-align: center; border-collapse: collapse;"> <tr><th>abc \ de</th><th>000</th><th>001</th><th>011</th><th>010</th><th>110</th><th>111</th><th>101</th><th>100</th></tr> <tr><th>00</th><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><th>01</th><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><th>11</th><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><th>10</th><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> <p style="text-align: center;">$F_5 = \dots e + \bar{a}\bar{b}c \dots$</p>	abc \ de	000	001	011	010	110	111	101	100	00		1							01	1	1	1	1	1	1	1	1	11	1	1	1	1	1	1	1	1	10		1						
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Exercice 3 (3 pts)

Donner les sorties du logigramme suivant :



Que fait ce circuit : ...**Démultiplexeur**.....

Exercice 4 (7 pts)

Trois interrupteurs A, B, C commandent le démarrage de deux moteurs F et H selon les conditions suivantes :

- Dès qu'un ou plusieurs interrupteurs sont activés, le moteur F doit démarrer.
- Le moteur H doit démarrer si **au moins deux** interrupteurs sont activés

On considère A, B, C des variables d'entrées et F, H des fonctions de sorties, faire la synthèse du circuit en traçant le logigramme de F et H.

1. Table de vérité

A	B	C	F	H
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	1	1
1	0	0	1	0
1	0	1	1	1
1	1	0	1	1
1	1	1	1	1

2. Forme Canonique

$$F = \dots \Sigma(1,2,3,4,5,6,7) \dots$$

$$H = \dots \bar{a}bc + a\bar{b}c + ab\bar{c} + abc \dots$$

3. Simplification

ab	00	01	11	10
c				
0		1	1	1
1	1	1	1	1

$$F = \dots a+b+c \dots$$

ab	00	01	11	10
c				
0			1	
1		1	1	1

$$H = \dots ab+ac+bc \dots$$

4. Logigramme

