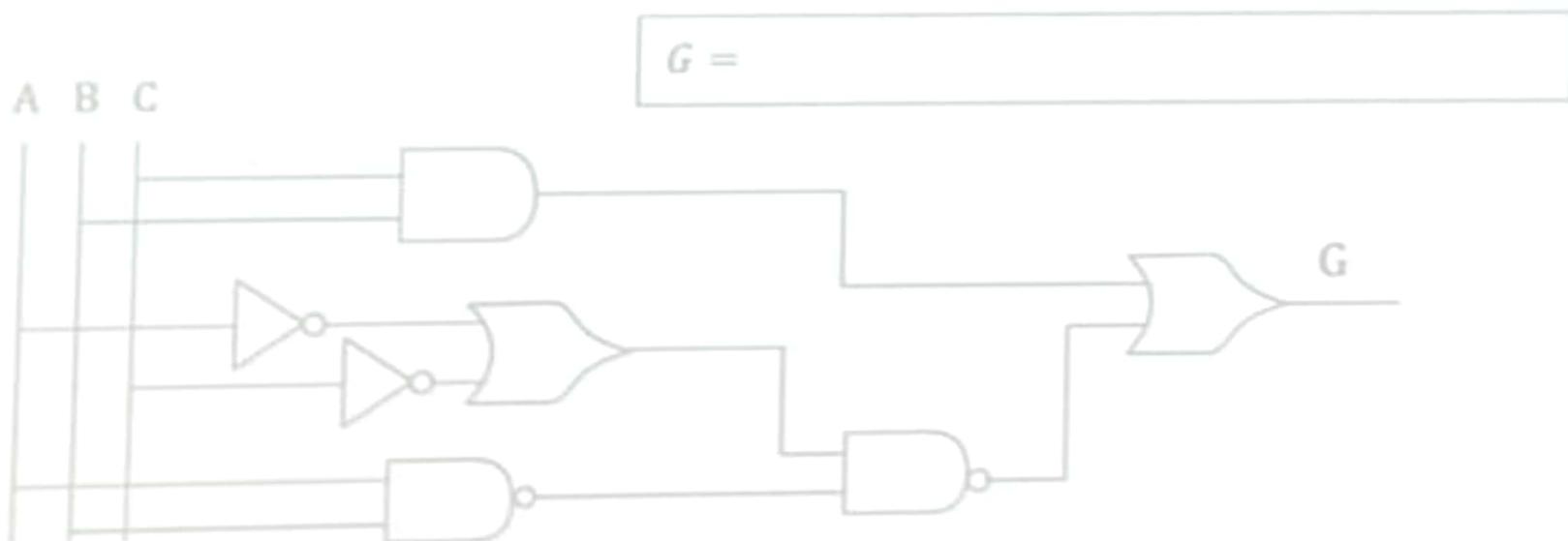


10. Simplifier la fonction : $F = A(\bar{B} + \bar{C} \cdot \bar{B}\bar{C}) + (\bar{B} + \bar{C} + ABC)$ $F =$

11. Réaliser le circuit compact de F

12. Donner l'expression de la fonction G définie par le logigramme suivant :



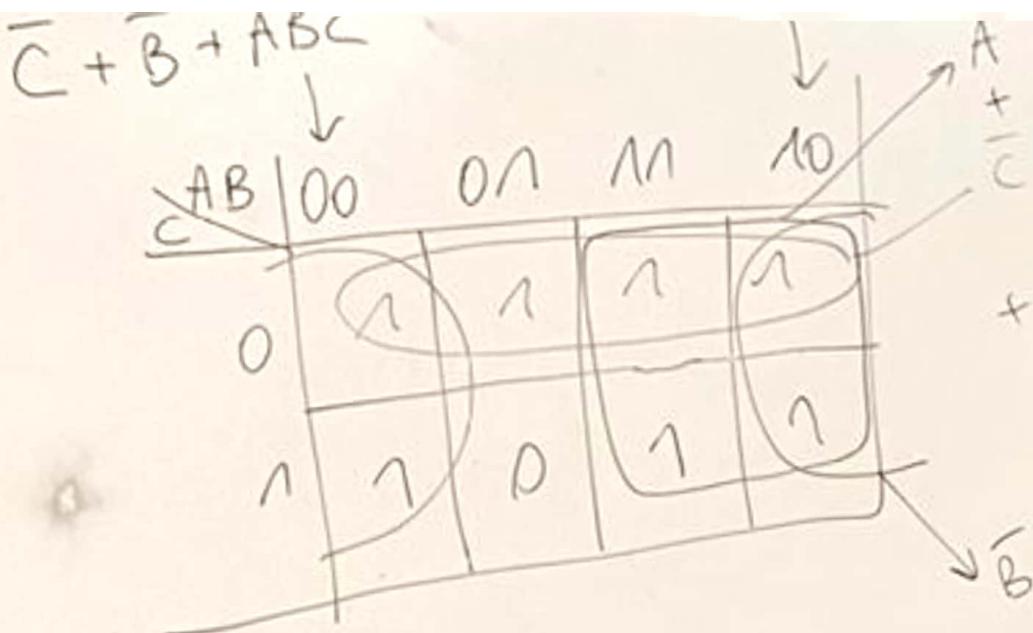
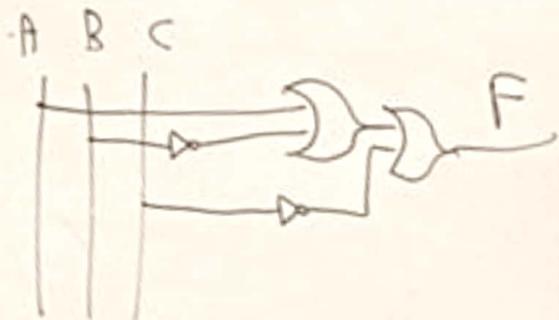
13. Donner l'expression simplifiée de la fonction H donnée par : $H = F \times G$ $H =$

I

 $H =$

$$\begin{aligned}
 F &= A(B + C \cdot BC) + (B + C + ABC) \\
 &= A\bar{B} + A(\bar{C} \cdot BC) + \bar{B} \cdot \bar{C} + ABC \\
 &= A\bar{B} + \underline{A}\bar{C} + \underline{ABC} + \bar{B} + \underline{\bar{C}} + \underline{ABC} \\
 &= \bar{C}(A+1) + ABC + \bar{B}(A+1) \\
 &= \bar{C} + \bar{B} + ABC \\
 &= \bar{C} + AB + \bar{B} \\
 &= \boxed{\bar{C} + A + \bar{B}}
 \end{aligned}$$

$X + \bar{X}Y = X + Y$



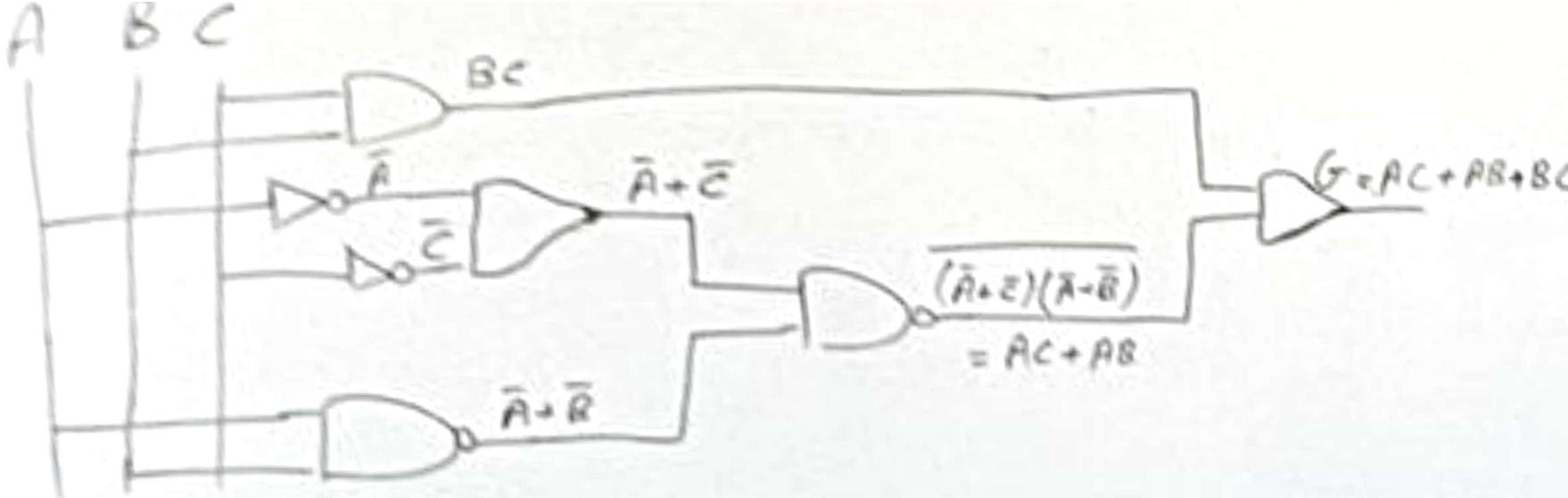
$$C + B + ABC$$

$$\overline{B}(\overline{A} + \overline{B})(\overline{C} + \overline{E})$$

$$\overline{B}\overline{A} + \overline{B}\overline{B} + \overline{B}\overline{C} + \overline{B}\overline{E}$$

$$\overline{B}\overline{A} + \overline{B}\overline{C} + \overline{B}\overline{E}$$

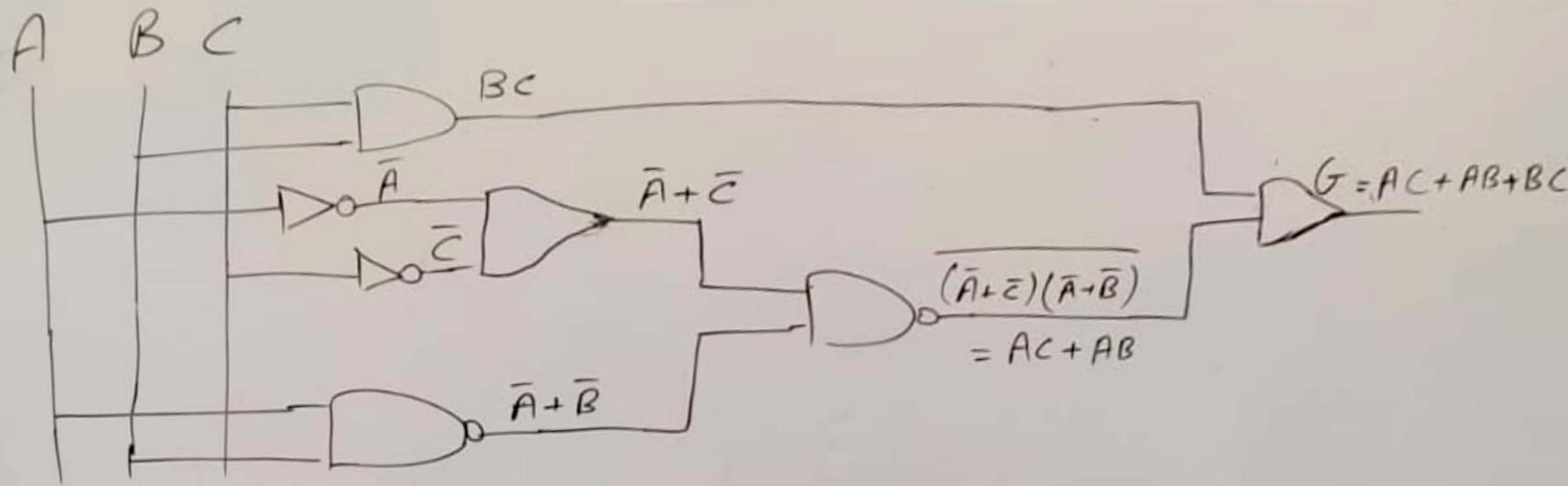
A	B	C	F
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
<hr/>			
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0



$$\overline{(\bar{A} + \bar{C})(\bar{A} + \bar{B})} = \overline{(\bar{A} + \bar{C})} + \overline{(\bar{A} + \bar{B})}$$

$$: AC + AB$$

$$\begin{aligned}
 H &= F \times G = (\bar{B} + \bar{C} + A)(AC + AB + BC) = A\bar{B}\bar{C} + A\bar{B}\bar{C} + AC + AB + ABC \\
 &= AC + AB + \underbrace{A\bar{B}\bar{C}}_{AC} + \underbrace{ABC}_{AB} + \underbrace{A\bar{B}\bar{C}}_{AC} + \underbrace{ABC}_{AB} \\
 &= AC + AB + AC + AB \\
 &= AB + AC
 \end{aligned}$$

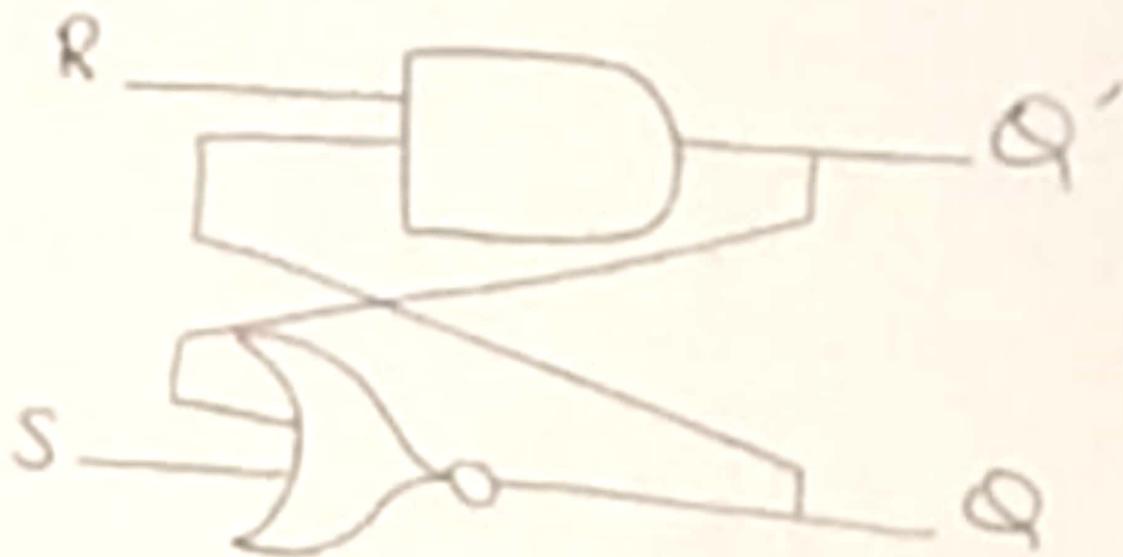


$$\overline{(\bar{A} + \bar{C})(\bar{A} + \bar{B})} = \overline{(\bar{A} + \bar{C})} + \overline{(\bar{A} + \bar{B})}$$

$$= AC + AB$$

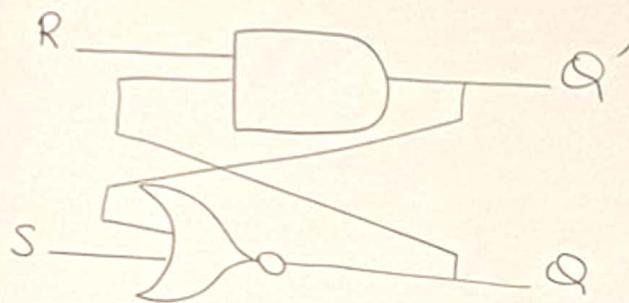
$$\begin{aligned}
 H &= F \times G = (\bar{B} + \bar{C} + A)(AC + AB + BC) = A\bar{B}\bar{C} + A\bar{B}\bar{C} + AC + AB + ABC \\
 &= AC + AB + \cancel{A\bar{B}\bar{C}} + \underbrace{ABC}_{\cancel{A\bar{B}\bar{C}}} + \cancel{ABC} + \underbrace{ABC}_{\cancel{ABC}}
 \end{aligned}$$

Bascule RS.



1. Étudiez le système $R=1, S=1$
2. Quelles valeurs a-t-on aux sorties
à $t+4,5$ s pour $R=1, S=0$?

Bascule RS.



- 1- Etudiez le système $R=1, S=1$.
- 2- Quelles valeurs a-t-on aux sorties à $t+4,5\epsilon$ pour $R=1, S=0$?

$$Q'(t+\epsilon) = R \cdot Q(t) = Q(t)$$

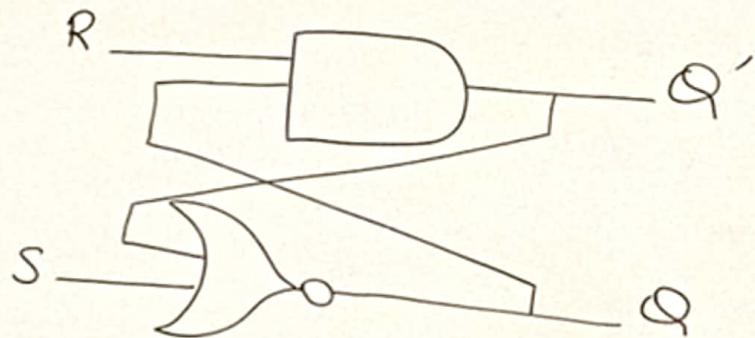
$$Q(t+\epsilon) = \frac{S}{S + Q'(t)} = \frac{1}{Q'(t)}$$

t	$t+\epsilon$	$t+2\epsilon$	$t+3\epsilon$	$t+4\epsilon$	$t+5\epsilon$	\dots
Q'	Q	\bar{Q}'	\bar{Q}	Q'	Q	Q'
Q	\bar{Q}'	\bar{Q}	Q'	Q	\bar{Q}'	\dots

si $Q = Q'$
indefini.

si $Q = \bar{Q}'$
indefini.

Bascule RS.



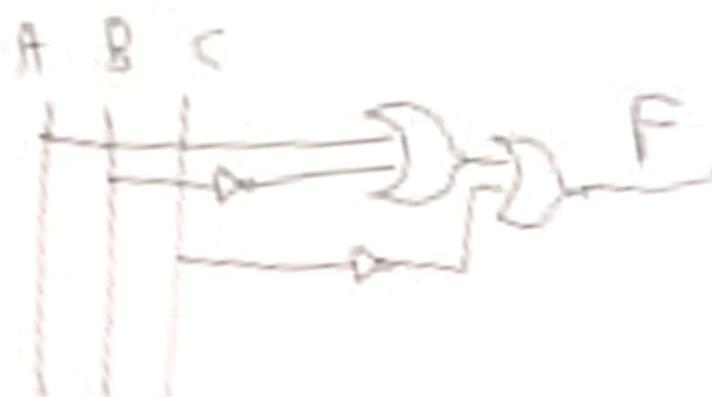
1. Étudiez le système $R=1, S=1$.
2. Quelles valeurs a-t-on aux sorties à $t+4,5\epsilon$ pour $R=1, S=0$?

1) $Q'(t+\epsilon) = R \cdot Q(t)$, $R=1$
 $Q(t+\epsilon) = \frac{S + Q'(t)}{1}$, $S=1$

t	$t+\epsilon$	$t+2\epsilon$	$t+3\epsilon$	$t+4\epsilon$
Q'	0	0	0	0
Q	0	0	0	0

indéfini

$$\begin{aligned}
 F &= A(B + C)BC + (B + C + ABC) \\
 &= AB + A(C + BC) + B + C + ABC \\
 &= AB + AC + ABC + B + C + ABC \\
 &= C(A + 1) + ABC + B(A + 1) \\
 &= C + B + ABC \\
 &= C + AB + B \\
 &= \boxed{C + A + B}
 \end{aligned}$$

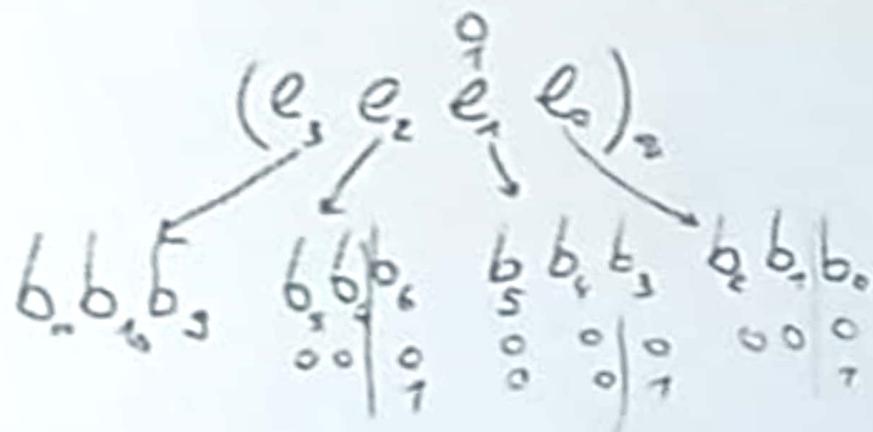


$$X + \bar{X}Y = X + Y$$

\bar{X} X $= X + Y$

$$\bar{C} + \bar{B} + ABC$$





$b_{3k} \in \{0, 1\}$

$b_1 = 0$

$1 \neq 3k$

$$\textcircled{1} + 17,875 = \begin{array}{r} 1000 \ 0011 \\ \hline 1000111000000000000000 \end{array}$$

$$\begin{array}{r} 17 \\ \times 2 \\ \hline 34 \\ \hline 01 \\ \hline 02 \\ \hline 04 \\ \hline \end{array}$$

$$17_M = 10001$$

$$0,175 \times 2 = 1,75$$

$$0,75 \times 2 = 1,5$$

$$0,5 \times 2 = 1,0$$

$$\begin{array}{r} 17,875 = 10001,111 \\ \downarrow c=4 \\ 1,000111 \end{array}$$

$$\begin{aligned} E &= 127 + 4 \\ &= 131_M \end{aligned}$$

$$\begin{array}{r} 131 \\ \swarrow \searrow \\ 65 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \quad 0 \\ 4 \quad 0 \\ \hline 2 \quad 2 \end{array}$$

$$= 100000011_{(2)}$$

Example 1

$$1 - \frac{19}{19} = \begin{array}{r} 00010011 \\ CR(0) 11101100 \\ CR(1) \boxed{11101101} \end{array}$$

$$\text{E}_1 = \frac{1}{2} \log^2(11,11,11) = 2^3 - 1$$

$$3 - \left(A_2 \underline{B} \right) \underline{C} \underline{D}$$

$$= \begin{pmatrix} 1 & 0 & 1 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 5 & 0 & 5 & 3 & 0 & 7 & 0 & 0 \end{pmatrix}_{(12)} \quad (18)$$

sung Quad Camera
se avec Galaxy A32

5

$$\begin{array}{r}
 1001 \\
 -\underline{0011} \\
 \hline
 110 \\
 -\underline{0011} \\
 \hline
 0111 \\
 -\underline{111} \\
 \hline
 110
 \end{array}$$

100 100 |

$$\begin{array}{r} 0.00 \\ - 1.00 \\ \hline 0.00 \end{array}$$

$$-\underline{1'00}$$

八〇

0010

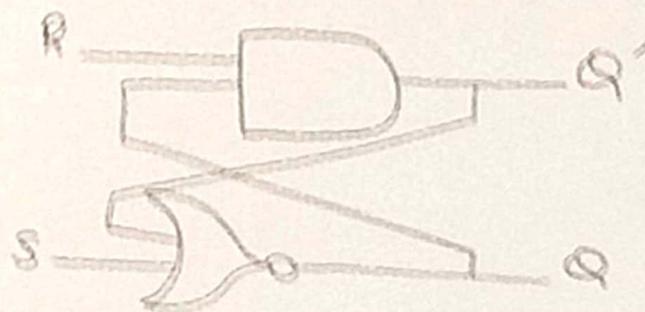
10

10

47

$$\frac{110}{1101,00101}$$

Bascule RS.



1. Etudiez le système $R=1, S=1$.
2. Quelles valeurs a-t-on aux sorties à $t+4,5\epsilon$ pour $R=1, S=0$?

$$R=1 \quad S=0$$

$$Q(t+\epsilon) = R \cdot Q(t) = Q(t)$$

$$Q(t+\epsilon) = \frac{S + Q(t)}{1 + Q(t)} = \frac{S}{Q(t)}$$

t	$t+\epsilon$	$t+2\epsilon$	$t+3\epsilon$	$t+4\epsilon$	$t+5\epsilon$...
Q	Q	\bar{Q}	\bar{Q}	Q'	Q	...
Q'	\bar{Q}'	\bar{Q}	Q'	Q	\bar{Q}'	...

$S = Q - Q'$
indefini

$R = Q - \bar{Q}$
indefini

$$R=1 \quad S=0$$

$$Q(t+\varepsilon) = R \cdot Q(t) = Q(t)$$

$$Q(t+\varepsilon) = \frac{S}{S + Q(t)} = \frac{1}{Q(t)}$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$	$t+5\varepsilon$	\dots
Q	Q'	\bar{Q}	\bar{Q}	Q'	Q	\dots
Q	\bar{Q}'	Q	Q'	Q	\bar{Q}'	\dots

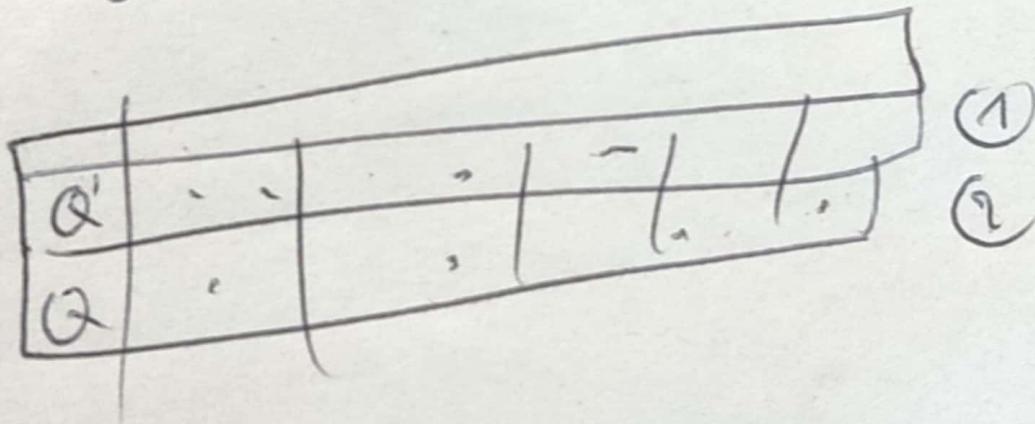
$S \cdot Q - Q'$
moléculaire

$S \cdot Q = \bar{Q}$,
indefin

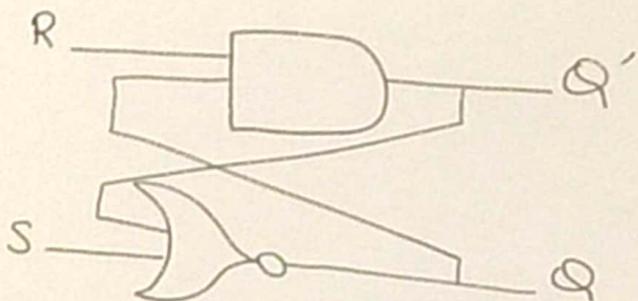
$$Q'(t+\varepsilon) = Q(t)$$

définis

la lug ① et B Bne de ② au le contanci



Bascule RS.



- 1- Etudiez le système $R=1, S=1$.
- 2- Quelles valeurs a-t-on aux sorties à $t+4,5\epsilon$ pour $R=1, S=0$?

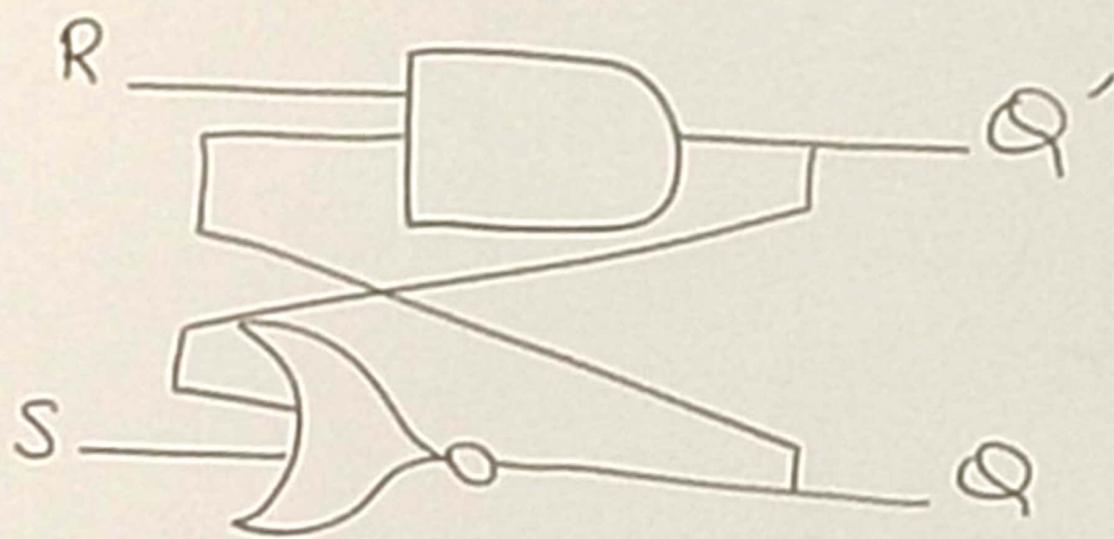
1) $g'(t+\epsilon) = R \cdot g(t)$, $R=1$
 $g(t+\epsilon) = \frac{S + g'(t)}{1}$, $S=1$

t	$t+\epsilon$	$t+2\epsilon$	$t+3\epsilon$	$t+4\epsilon$
Q'	0	0	0	0
Q	1	1	1	1

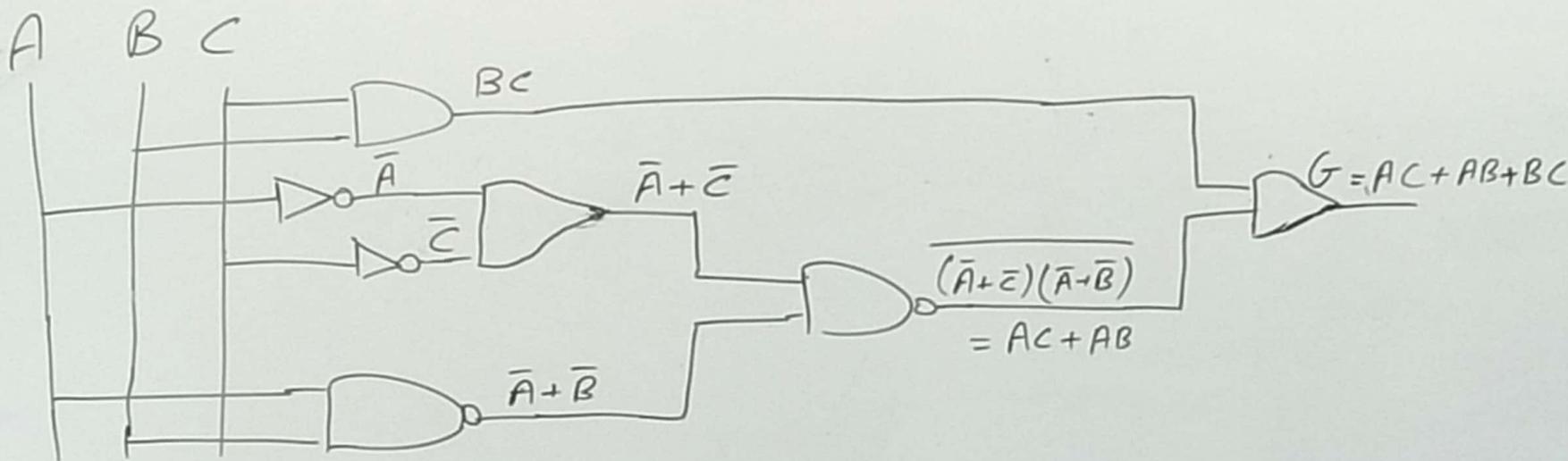
indéfini



Bascule RS.



- 1- Étudiez le système $R=1, S=1$.
- 2- Quelles valeurs a-t-on aux sorties à $t+4,5\epsilon$ pour $R=1, S=0$?



$$\begin{aligned} (\bar{A} + \bar{C})(\bar{A} + \bar{B}) &= \overline{(\bar{A} + \bar{C})} + \overline{(\bar{A} + \bar{B})} \\ &= AC + AB \end{aligned}$$

$$\begin{aligned} H = F \times G &= (\bar{B} + \bar{C} + A)(AC + AB + BC) = A\bar{B}\bar{C} + A\bar{B}\bar{C} + AC + AB + ABC \\ &= AC + AB + \underbrace{A\bar{B}\bar{C}}_{ABC} + \underbrace{ABC}_{AB\bar{C}} + \underbrace{A\bar{B}\bar{C}}_{ABC} + \underbrace{ABC}_{ABC} \\ &= AC + AB + AC + AB \\ &= AB + AC \end{aligned}$$

$$\bar{C} + \boxed{\bar{B} + ABC}$$

$$\bar{B}(A+A)(C+\bar{C})$$

$$AB\bar{C} + A\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}BC$$

A	B	C	F
0	0	0	1
0	0	1	1
0	1	0	.
0	1	1	.
1	0	0	1
1	0	1	1
1	1	0	.
1	1	1	1

$$\bar{C}) + (\bar{B} + \bar{C} + ABC)$$

$$BC) + \bar{B} + \bar{C} + ABC$$

$$BC + \bar{B} + \bar{C} + ABC$$

$$ABC + \bar{B}(A+1)$$

$$BC$$

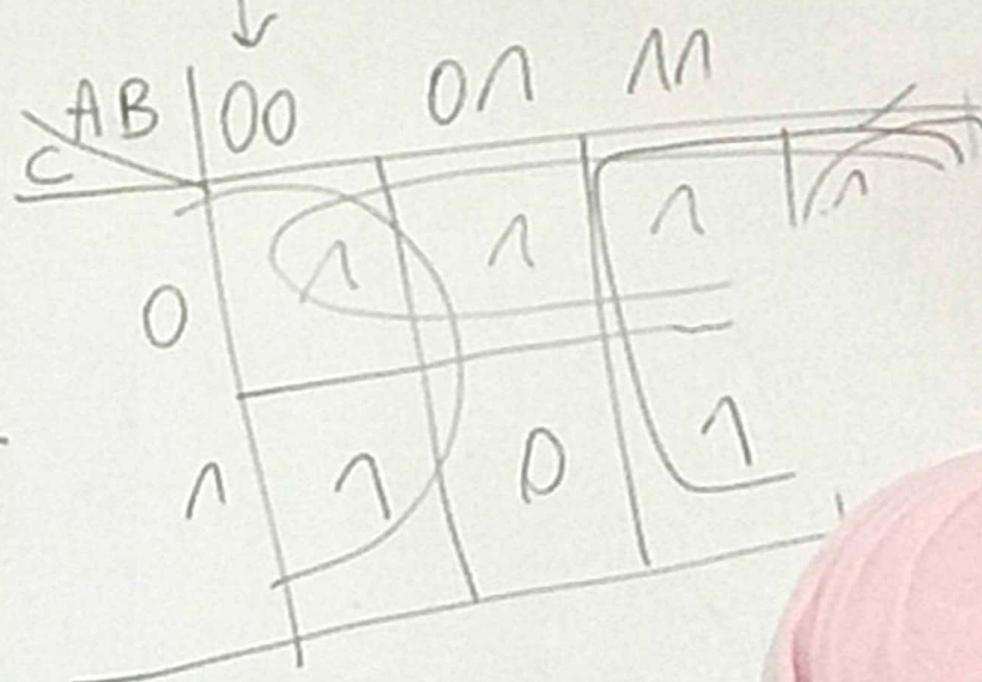
$$X + \bar{X}Y = X + Y$$

$$\bar{B} \quad A \quad \bar{B} + A$$

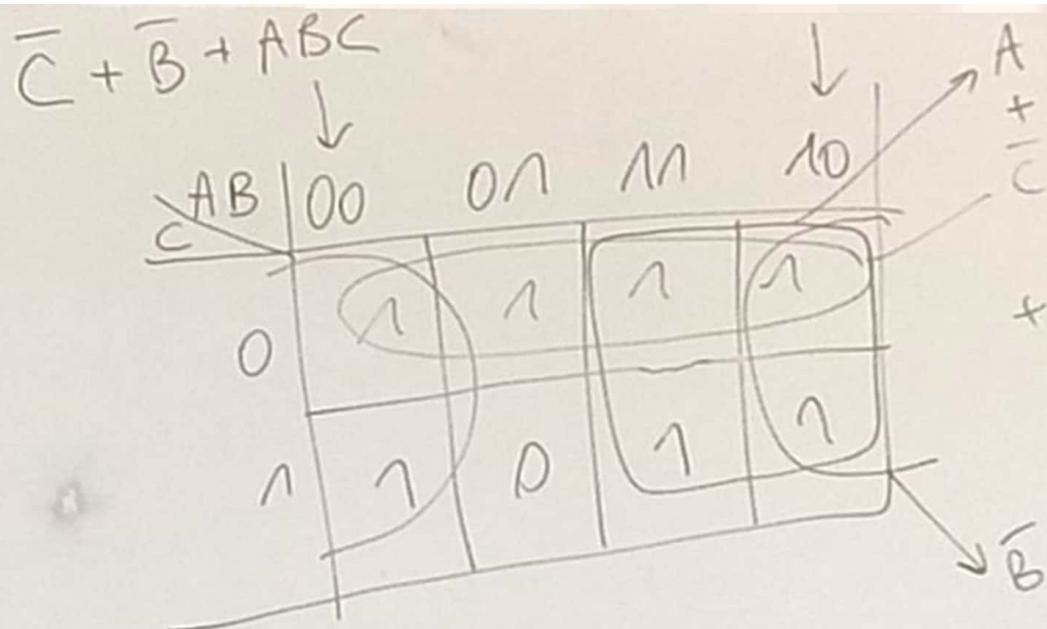
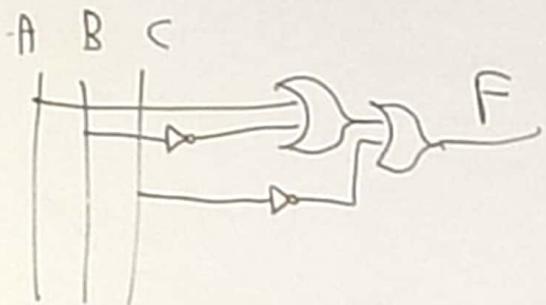


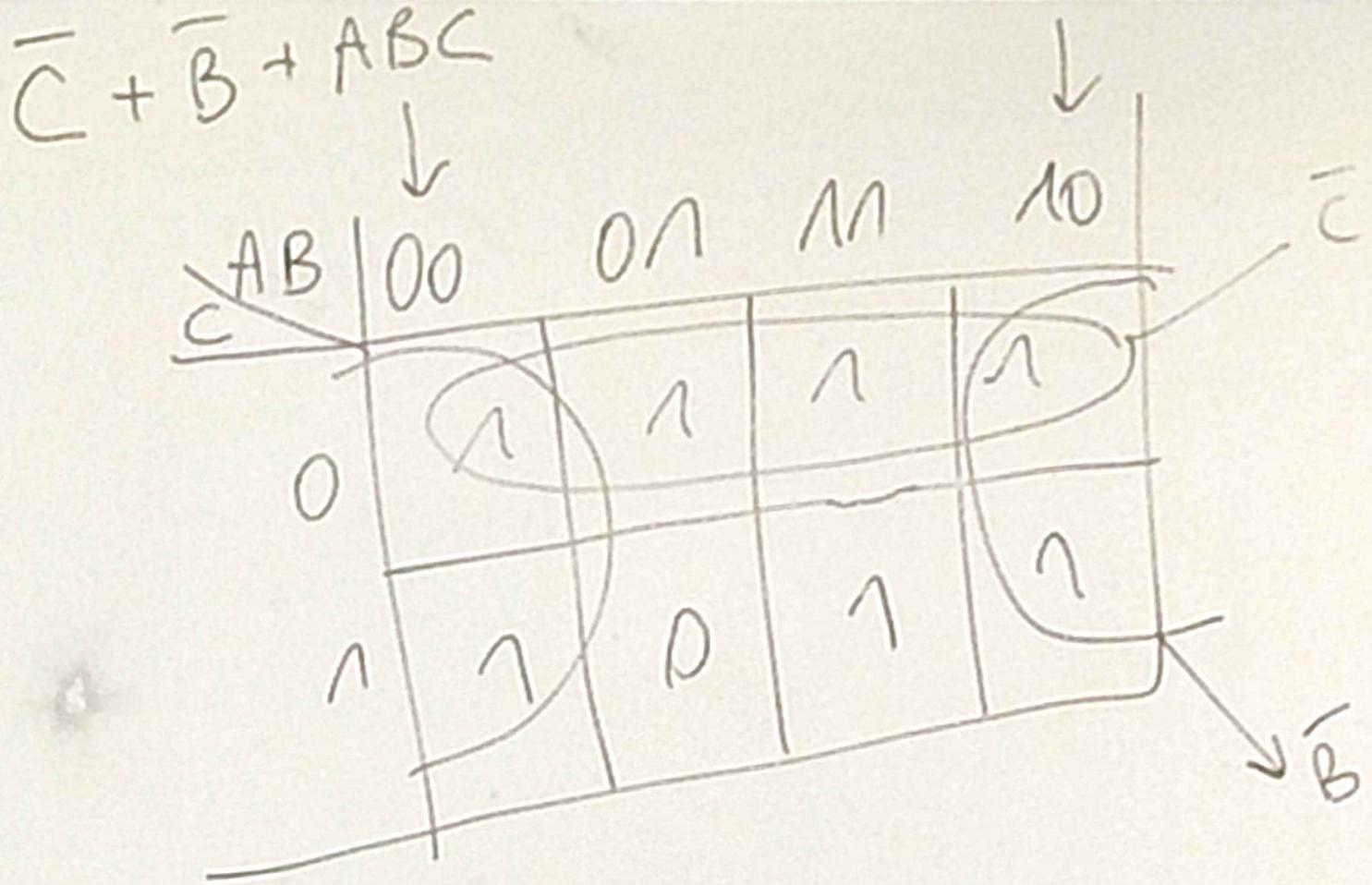
$$\begin{aligned} & A + \bar{B} + \bar{C} \\ &= A + \overline{B, C} \end{aligned}$$

$$\bar{C} + \bar{B} + ABC$$

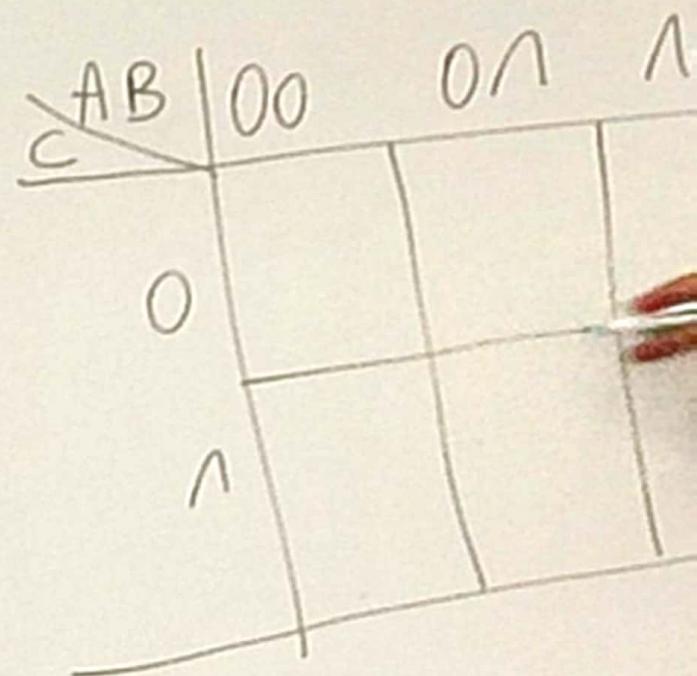


$$\begin{aligned}
 F &= A(\bar{B} + \overline{C\bar{B}C}) + (\bar{B} + \bar{C} + ABC) \\
 &= A\bar{B} + A(\bar{C} + BC) + \bar{B} + \bar{C} + ABC \\
 &= A\bar{B} + A\bar{C} + ABC + \bar{B} + \bar{C} + ABC \\
 &= \bar{C}(A+1) + ABC + \bar{B}(A+1) \\
 &= \bar{C} + \bar{B} + ABC \\
 &= \bar{C} + AB + \bar{B} \\
 &= \boxed{\bar{C} + A + \bar{B}}
 \end{aligned}$$





$$\begin{aligned}
 F &= A(\bar{B} + \overline{C\bar{B}C}) + (\bar{B} + \bar{C} + ABC) \\
 &= A\bar{B} + A(\bar{C} + BC) + \bar{B} + \bar{C} + ABC \\
 &= A\bar{B} + A\bar{C} + ABC + \bar{B} + \bar{C} + ABC \\
 &= \bar{C}(A+1) + ABC + \bar{B}(A+1) \\
 &= \bar{C} + \bar{B} + ABC
 \end{aligned}$$



Scanned with CamScanner

10. Simplifier la fonction : $F = A(\bar{B} + \overline{C \cdot BC}) + (\bar{B} + \bar{C} + ABC)$

11. Réaliser le circuit compact de F

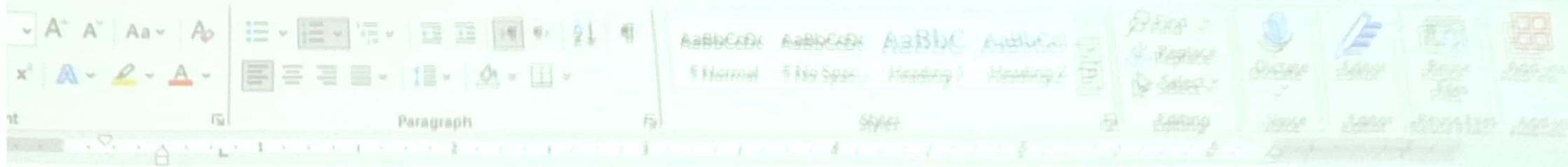
12. Donner l'expression de la fonction G définie par le logigramme suivant :

$G =$

A B C

13. Donner l'expression simplifiée de la fonction H donnée par : $H = F \times G$

66°F

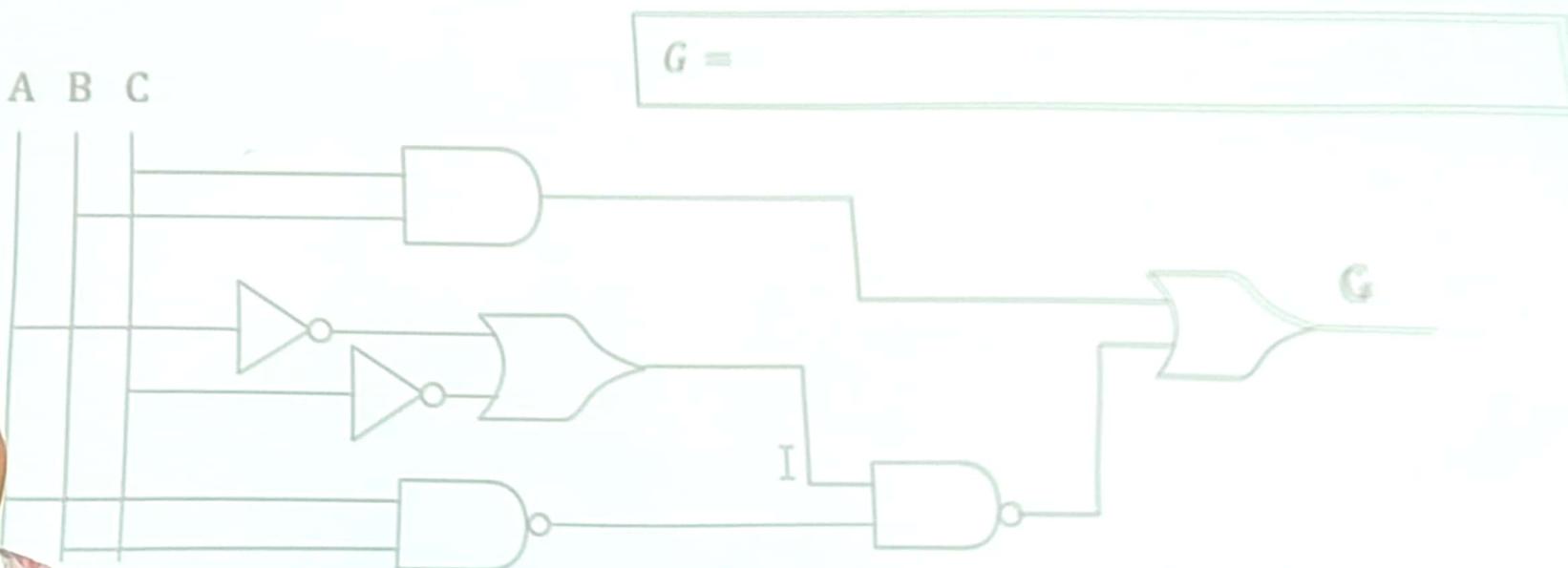


10. Simplifier la fonction : $F = A(\bar{B} + \bar{C}, \bar{B}\bar{C}) + (\bar{B} + \bar{C} + ABC)$

$$\bar{F} =$$

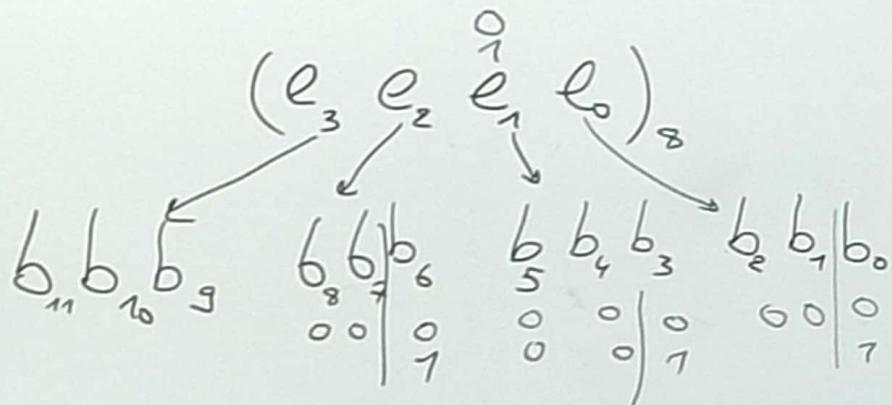
11. Réaliser le circuit compact de F

12. Donner l'expression de la fonction G définie par le logigramme suivant :



expression simplifiée de la fonction H donnée par : $H = F \times G$

$$H =$$



$b_{3k} \in \{0, 1\}$
 $b_i = 0$.
 $i \neq 3k$

$$\textcircled{7} + 17,875 = \textcircled{10} \quad \begin{array}{r} 1000 \\ 1 \end{array} \quad \begin{array}{r} 0011 \\ 8 \end{array} \quad \begin{array}{r} 0001110000000000000000 \\ 23 \end{array} \quad \underline{\underline{001}}$$

$$17 \begin{array}{r} 2 \\ 8 \end{array} \begin{array}{r} 2 \\ 0 \end{array}$$

$$17_{(10)} = 10001$$

$$\begin{aligned} 0,895 \times 2 &= 1,75 \\ 0,75 \times 2 &= 1,5 \\ 0,5 \times 2 &= 1,0 \end{aligned}$$

$$17,875 = \underbrace{10001}_{\downarrow c=4}, \underbrace{111}_{1,0001111}$$

$$\begin{aligned} E &= 127 + 4 \\ &= 131_{(10)} \end{aligned}$$

$$131 \begin{array}{r} 2 \\ 65 \end{array} \begin{array}{r} 2 \\ 32 \end{array} \begin{array}{r} 2 \\ 0 \end{array} \begin{array}{r} 2 \\ 16 \end{array} \begin{array}{r} 2 \\ 0 \end{array} \begin{array}{r} 2 \\ 8 \end{array} \begin{array}{r} 2 \\ 0 \end{array} \begin{array}{r} 2 \\ 4 \end{array} \begin{array}{r} 2 \\ 0 \end{array} \begin{array}{r} 2 \\ 0 \end{array} \begin{array}{r} 2 \\ 1 \end{array}$$

$$= 100000011_{(2)}$$



⑦ + 17,875 =

$$\begin{array}{ccccccccc} & (e_3 & e_2 & e_1 & e_0) & & & & \\ & \swarrow & \downarrow & \searrow & \searrow & & & & \\ b_1 & b_2 & b_3 & & & & & & \\ & b_8 & b_7 & b_6 & & b_5 & b_4 & b_3 & b_2 & b_1 & b_0 \\ & | & | & | & & | & | & | & | & | & | \\ & 0 & 0 & 0 & & 0 & 0 & 0 & 0 & 0 & 0 \\ & & & & & & & & & & \\ & & & & & & & & & & \end{array}$$

$$\boxed{\begin{array}{l} b_{3k} \in \{0,1\} \\ b_i = 0 \\ i \neq 3k \end{array}}$$

- | | |
|---|--|
| 1 | Donner le complément vrai de 19 sur 8 bits |
| 2 | Quel est le plus grand nombre qu'on peut représenter sur 8 bits signés ? |
| 3 | Convertir en octale : A2B1C0 |
| 4 | Donner le résultat binaire de : 1001111 / 110 |
| 5 | Donner une CNS sur les bits (b_i) pour que son écriture octale ($e_m \dots e_1 e_0$) ne contienne que 1 ou 0 |
| 6 | Donner une CNS sur les bits (b_i) pour que le nombre binaire ($b_3 b_2 b_1 b_0$) soit un multiple de 3* |
| 7 | Représentez via la norme IEEE 754 :
+ 17,875 |
| 9 | Quel est le plus grand nombre qu'on peut représenter avec la norme IEEE 754 ? (donner son expression décimale) |

Exercice n°1

$$1 - \begin{array}{r} 19_{(10)} = \\ \hline 19 \\ \hline 2 | 9 \quad 2 | 4 \quad 2 | 2 \quad 2 | 1 \end{array}$$

CR(11): $\begin{array}{r} 00010011 \\ \downarrow 11101100 \\ \hline 11101101 \end{array}$
 CV(13): $\boxed{11101101}$

$$2 - \frac{01}{2^7} 11 \cdot 11 \cdot 11 = 2^7 - 1$$

$$3 - (A_2 \underset{1011}{B_1} \underset{100}{C_0})_{16}$$

$$= (10100011010111000111000000)_{2}$$

$$= (5 \underset{(8)}{0} 5 \underset{(8)}{3} 0 \underset{(8)}{7} 0 \underset{(8)}{0})_{10}$$

4.

$$\begin{array}{r} 1'001 \quad 111 \\ \hline 0011 \quad 110 \\ \hline 0011 \quad 000 \\ \hline 0111 \\ \hline 110 \end{array}$$

$$\begin{array}{r} 0010 \\ \hline 000 \\ \hline 100 \\ \hline 000 \\ \hline 110 \\ \hline 0010 \\ \hline 000 \\ \hline 1000 \end{array}$$

110
1101,00101

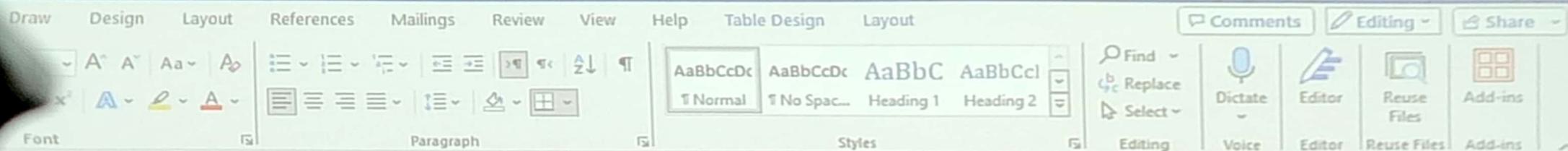
Exercice n° 1

$$1 - 19_{(10)} =$$

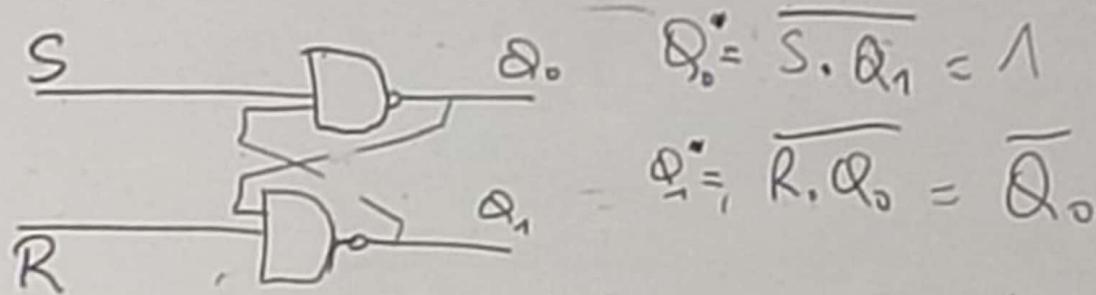
$$\begin{array}{r} 19 \\ \hline 2 | 9 \\ 1 | 4 \\ \hline 0 | 2 \\ 0 | 1 \end{array}$$

$$\begin{array}{l} 00010011_2 \\ CR(11) : 11101100 \\ CU(19) \sqrt{11101101} \end{array}$$

$$2 - 011111 = 2^7 - 1$$



		Réponse
1	Donner le complément vrai de 19 sur 8 bits	
2	Quel est le plus grand nombre qu'on peut représenter sur 8 bits signés ?	
3	Convertir en octale : A2B1C0	
4	Donner le résultat binaire de : 1001111 / 110	
5	Donner une CNS sur les bits (b_i) pour que son écriture octale ($e_m \dots e_1 e_0$) ne contienne que 1 ou 0	
	Donner une CNS sur les bits (b_i) pour que le nombre binaire ($b_3 b_2 b_1 b_0$) soit un multiple de 3	
	Présentez via la norme IEEE 754 :	
	Le plus grand nombre qu'on peut représenter avec IEEE 754 ? (donner son expression décimale)	



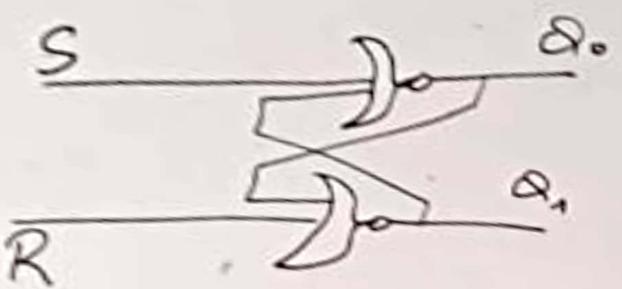
$$R=1, S=0$$

$$Q_0 = 0$$

$$Q_1 = \overline{Q_0}$$

t	$t+\epsilon$	$t+2\epsilon$	$t+3\epsilon$	$t+4\epsilon$
Q_0	1	1	1	1
Q_1	$\overline{Q_0}$	0	0	0

\rightarrow état défini $(t+2\epsilon)$
 \rightarrow stable, mémorisé 1 en Q_0 : $(t+2\epsilon)$
 0 en Q_1



$$Q_0^* = Q_0(t+\varepsilon) = \overline{S + Q_1(t)}$$

$$Q_1^* = Q_1(t+\varepsilon) = \overline{R + Q_0(t)}$$

$R=1, S=0$

$$Q_0^* = \overline{Q_1}$$

$$Q_1^* = 0$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
\bar{Q}_1	1	1	1	
Q_1	0	0	0	0
\bar{Q}_0				

→ état défini à partir $t+2\varepsilon$
→ stable, mémorise 1 en Q_1 et 0 en Q_0 à partir de $t+2\varepsilon$

$R=0, S=1$

$$Q_0^* = 0$$

$$Q_1^* = \overline{Q_0}$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
\bar{Q}_0	0	0	0	0
Q_0	0	0	0	0

\bar{Q}_1	\bar{Q}_0	1	1	1
1	1	1	1	1

→ état défini à partir $t+2\varepsilon$
→ stable, mémorise 0 en Q_0 et 1 en Q_1 à partir de $t+2\varepsilon$

$R=1, S=1$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
\bar{Q}_0	0	0	0	0
Q_0	0	0	0	0

→ état indéfini.

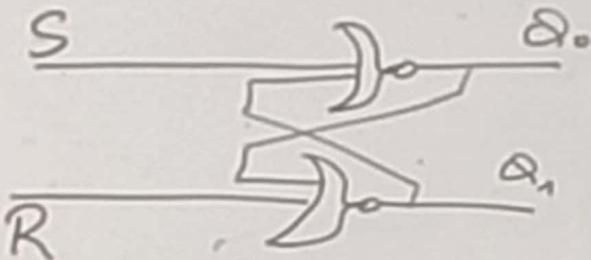
$R=0, S=0$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
\bar{Q}_0	\bar{Q}_1	Q_0	\bar{Q}_1	Q_0
Q_1	\bar{Q}_0	Q_1	\bar{Q}_0	Q_1

$Si Q_0 = Q_1$

instable

Si $Q_0 \neq Q_1$
 $Q_0 = \bar{Q}_1$
stable négative
 $Q_0 = Q_1 \neq \bar{Q}_1$
 $Q_1 = \bar{Q}_0 \neq Q_0$
stable positive



$$Q^* = Q_0(t+\varepsilon) = \overline{S + Q_1(t)}$$

$$Q^* = Q_1(t+\varepsilon) = \overline{R + Q_0(t)}$$

$$R=1, S=0$$

$$\begin{aligned} Q_0^* &= \overline{Q_1} \\ Q_1^* &= 0 \end{aligned}$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
\emptyset	$\overline{Q_1}$	1	1	1
Q_1	0	0	0	0

→ état défini à partir $t+2\varepsilon$
→ stable, mémorise 0 en Q_0 et 1 en Q_1 à partir de $t+2\varepsilon$

$$R=0, S=1$$

$$\begin{aligned} Q_0^* &= 0 \\ Q_1^* &= \overline{Q_0} \end{aligned}$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
Q_0	0	0	0	0
Q_1	1	1	1	1

→ état défini à partir $t+2\varepsilon$
→ stable, mémorise 0 en Q_0 et 1 en Q_1 à partir de $t+2\varepsilon$

$$R=1, S=1$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
Q_0	0	0	0	0
Q_1	0	0	0	0

→ état indéfini.

$$R=0, S=0$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
Q_0	$\overline{Q_1}$	Q_0	$\overline{Q_1}$	Q_0
Q_1	$\overline{Q_0}$	Q_1	$\overline{Q_0}$	Q_1

$$\text{Si } Q_0 = Q_1$$

stable

$$\text{Si } Q_0 \neq Q_1$$

stable si $Q_0 = Q_1$
instable si $Q_0 \neq Q_1$
 $Q_0 = 0$ et $Q_1 = 1$
 $Q_0 = 1$ et $Q_1 = 0$

$$Q_0^* = Q_0(t+\varepsilon) = \overrightarrow{S + Q_1(t)}$$

$$Q_1^* = Q_1(t+\varepsilon) = \overrightarrow{R + Q_0(t)}$$

$$R=1, S=0$$

$$Q_0^* = \overline{Q_1}$$

$$Q_1^* = 0$$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
\emptyset	$\overline{Q_1}$	1	1	1
Q_1	0	0	0	0

→ état défini à partir $t+2\varepsilon$
→ stable, mémorise 1 en Q_0 , et 0 en Q_1

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
Q_0	0	0	0	0
Q_1	0	1	1	1

→ état défini à partir $t+2\varepsilon$
→ stable, mémorise 0 en Q_0 et 1 en Q_1 à partir de $t+2\varepsilon$

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
Q_0	0	0	0	0
Q_1	0	0	0	0

→ état indéfini

t	$t+\varepsilon$	$t+2\varepsilon$	$t+3\varepsilon$	$t+4\varepsilon$
Q_0	$\overline{Q_1}$	Q_0	$\overline{Q_1}$	Q_0
Q_1	$\overline{Q_0}$	Q_1	$\overline{Q_0}$	Q_1

Si $Q_0 = Q_1$

instable

Si $Q_0 \neq Q_1$

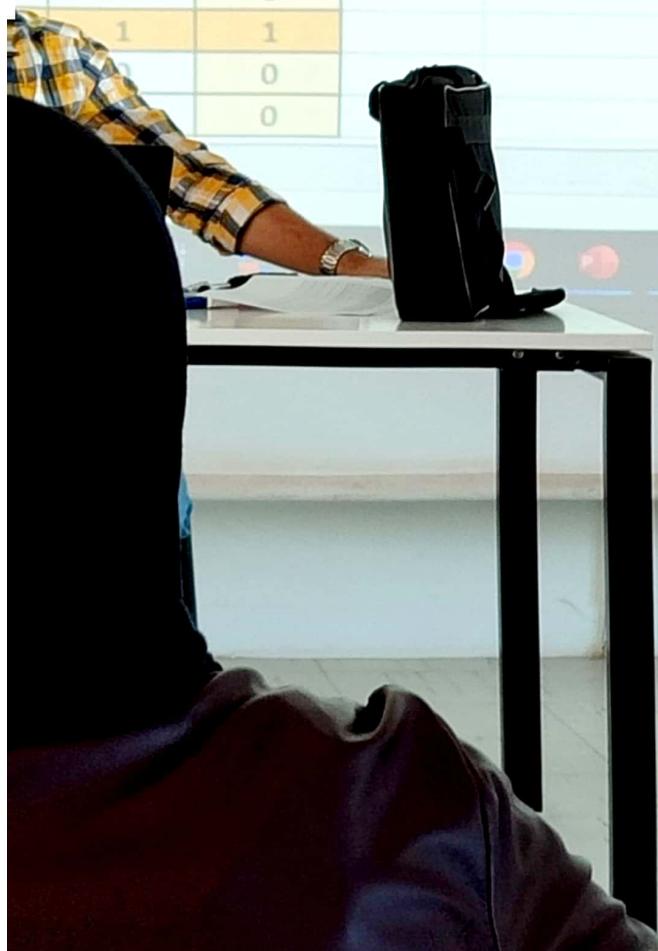
stable si $Q_0 = \overline{Q_1}$
instable si $Q_0 \neq \overline{Q_1}$

v	0
1	1
0	0
1	0
0	1
1	0
0	0
1	1
0	0
1	0
0	1
1	0
0	0
1	1
0	0
0	0

e3e2 \ e1e0	.00	.01	.11	.10
.00		1		
.01	1		1	
.11		1		
.10				1

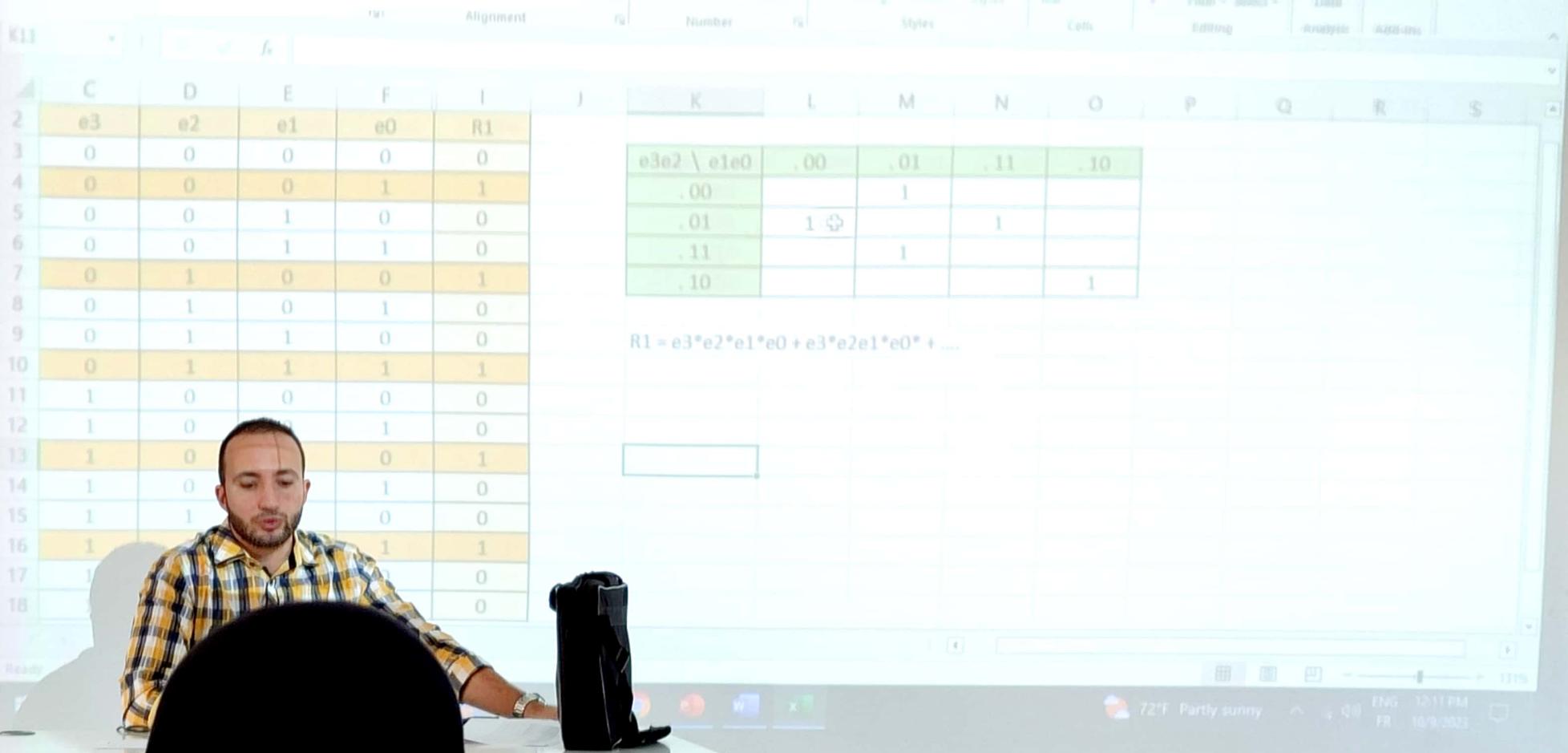
+

$$R1 = e3^*e2^*e1^*e0 + e3^*e2e1^*e0^* + \dots$$



72°F Partly sunny

ENG 12:11 PM
FR 10/9/2023



A screenshot of a Microsoft Excel spreadsheet. The visible portion shows two tables. The first table has columns labeled C through I and rows numbered 2 through 18. Cells C2, D2, E2, F2, and I2 contain the labels e3, e2, e1, e0, and R1 respectively. The remaining cells in this table contain binary values (0 or 1). The second table starts at J10 and has columns K through O and rows K through O. It contains binary values and some text labels like 'e3e2 \ e1e0' and '1 ⊕'. Below the tables, the formula R1 = e3*e2*e1*e0 + e3*e2e1*e0* + ... is written.

C	D	E	F	I
e3	e2	e1	e0	R1
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	0	0
1	1	1	1	1
1	1	0	0	0

K	L	M	N	O
e3e2 \ e1e0	,00	,01	,11	,10
,00		1		
,01	1 ⊕		1	
,11		1		
,10				1

$$R1 = e3 \cdot e2 \cdot e1 \cdot e0 + e3 \cdot e2 \cdot e1 \cdot e0^* + \dots$$



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FR 10/9/2023





H2	C	D	E	F	G	H	I	J	K	L	M	N
2	e3	e2	e1	e0	R	R2	R1					
3	0	0	0	0	0	0	0					
4	0	0	0	1	1	0	1					
5	0	0	1	0	2	1	0					
6	0	0	1	1	0	0	0					
7	0	1	0	0	1	0	1					
8	0	1	0	1	2	1	0					
9	0	1	1	0	0	0	0					
10	0	1	1	1	1	0	1					
11	1	0	0	0	2	1	0					
12	1	0	0	1	0	0	0					
13	1	0			0	1	0					
14	1	0			1	2	1					
15	1	1			0	0	0					
16	1	1			1	0	1					
17	1				2	1	0					
18	1				0	0	0					



E	en binnaire				$E/3$	R_2	R_1
	s	e ₁	e ₂	e ₃			
0	0	0	0	0	0	0	0
1	0	0	0	1	1	1	1
2	0	0	0	0	2	2	2
3	0	0	0	1	0	0	0
4	0	0	1	0	1	1	1
5	0	0	1	0	2	2	2
6	0	1	0	1	0	0	0
7	0	1	1	0	1	0	0
...
15	1	1	1	1	0	0	0

$$C = AB$$

$$E = C + D$$

$$D = \bar{A}B$$

A	B	C	D	E
0	0	0	0	1
0	1	0	1	0
1	0	1	0	0
1	1	0	0	1

$$E = B \cdot (C + C\bar{B})$$

$$= B \cdot C(1 + \bar{B}) = BC$$

$$D = (A + C)(A \cdot B)$$

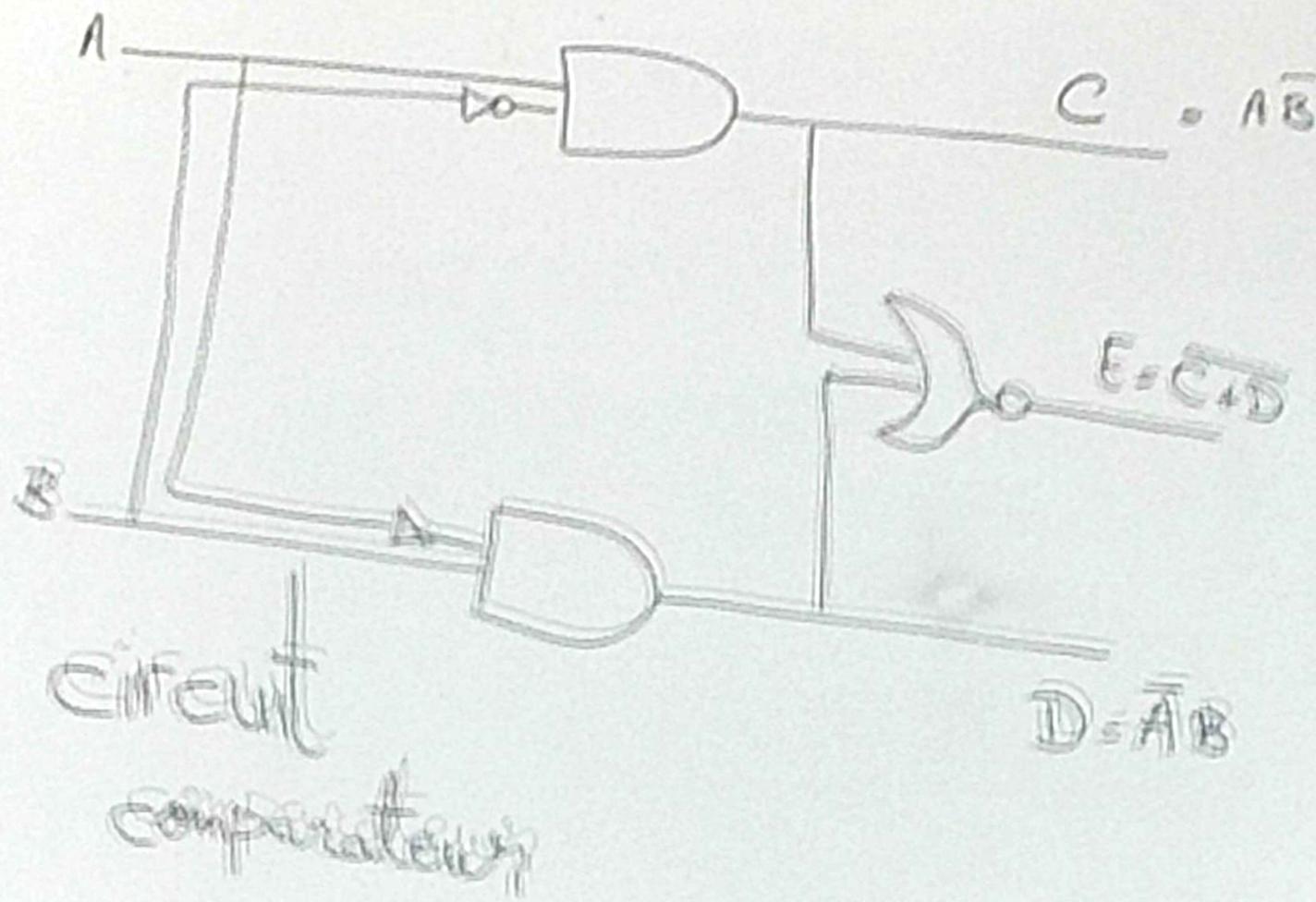
$$= AB + ABC = AB(1 + C) = AB$$

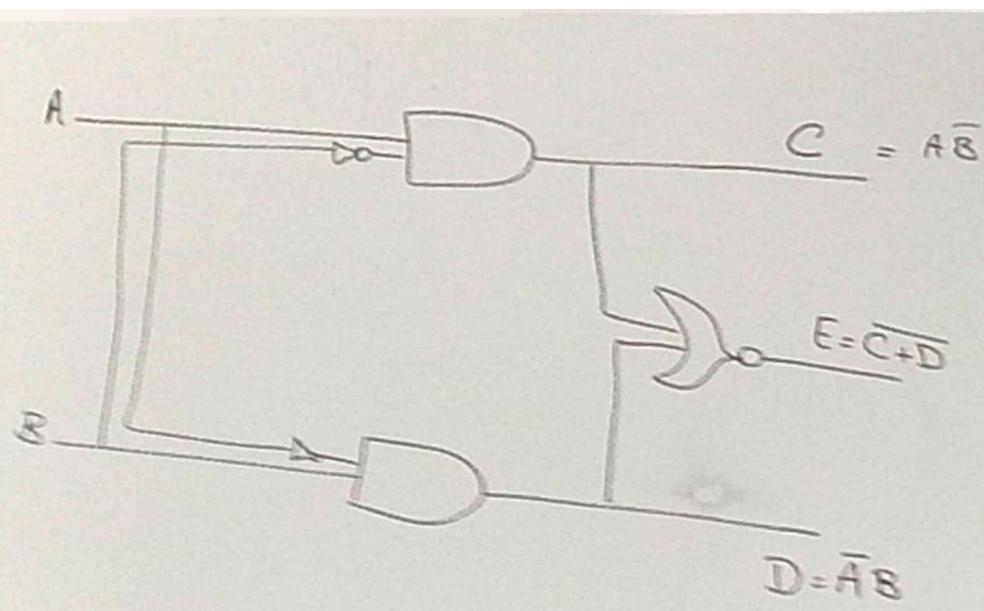
$$M = (x - 1 + y) \cdot (x + y + z) \cdot (x + y - z)$$

En l'image précédent

(com)

c) pour ce que vient au dessus
du TD





A	B	C	D	E
0	0	0	0	1
0	1	0	1	0
1	0	1	0	0
1	1	0	0	1

Scanned with CamScanner

Microsoft Word - CHERIF.docx

Clipboard Font Alignment Number Conditional Formatting Insert Format Cells Sort & Filter Select Editing Analyze Data Add-ins

Font Alignment Number Conditional Formatting Insert Format Cells Sort & Filter Select Editing Analyze Data Add-ins

C D E F G H I J K L M

	X	Y	Z	G								
2	0	0	0	1								
3	0	0	1	0								
4	0	1	0	1								
5	0	1	1	0								
6	0	1	1	0								
7	1	0	0	1								
8	1	0	1	0								
9	1	0	1	1								
10	1	0	1	1								

X.Y >= Z

Z \ XY	.00	.01	.11	.10
.0	1	1	1	1
.1	0	0	1	0

Z* + XY

72°F Partly sunny ENG 11:49 AM FR 10/9/2023

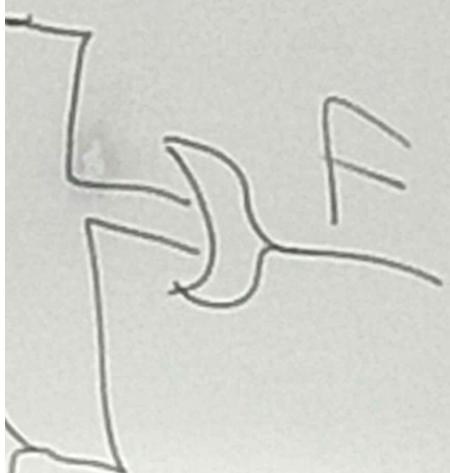
A man with a beard, wearing a yellow and black plaid shirt, sits at a desk in front of a whiteboard. He is looking towards the camera. On the desk, there is a laptop, a small black boot, and some papers. In the foreground, a spiral-bound notebook with handwritten notes is visible. The whiteboard behind him displays a Microsoft Excel spreadsheet and some handwritten logic equations.

$$\begin{aligned}F &= XY(\bar{Z}\bar{T} + X) + X(Y\bar{Z}\bar{T} + Y\bar{Z}) \\&= XY(\bar{Z}\bar{T} + X) + XY(Z + \bar{Z}\bar{T}) \\&= XY(X + (\bar{Z}\bar{T} + Z) + \bar{T}) \\&= XY\left(X + \underbrace{Z + T}_{1} + \bar{T}\right) \\&= XY.\end{aligned}$$

$$A + AB = A(1+B) = A$$

$$A + \bar{A}B = A(1+B) + \bar{A}B$$
$$= A + (AB + \bar{A}B)$$
$$= A + B$$

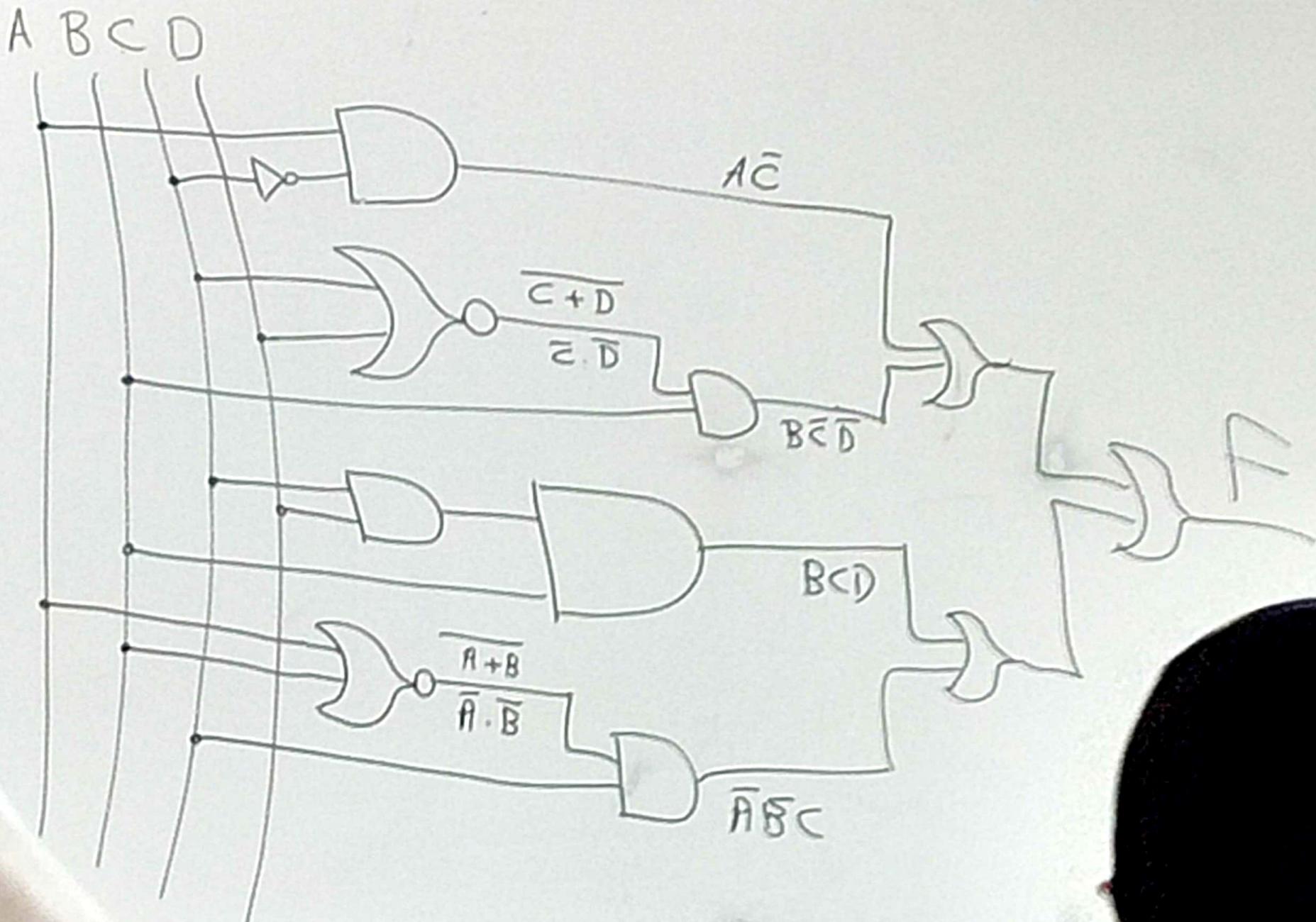
$$\begin{aligned}& \bar{x}\bar{y}z + \bar{x}yz + xy\bar{z} \\&= \bar{x}\bar{y}z + (\bar{x} + x)yz \\&= \bar{x}\bar{y}z + yz \\&= (\bar{x}\bar{y} + y)z \\&= (y + \bar{x})z\end{aligned}$$



$$A + AB = A(1+B) = A$$

$$A + \bar{A}B = A(1+B) + \bar{A}B$$
$$= A + (AB + \bar{A}B)$$
$$= A + B$$

F



a) $F = \bar{A}\bar{B}C\bar{D} + \bar{A}\bar{B}CD + A\bar{B}\bar{C}\bar{D} + A\bar{B}CD + A\bar{B}\bar{C}\bar{D} + A\bar{B}CD + AB\bar{C}\bar{D} + ABC\bar{D}$

$+ AB\bar{C}D$

b) $F = (A+B+C+D)(A+B+C+\bar{D}) - (A+\bar{B}+C+\bar{D})$ $(A+\bar{B}+\bar{C}+D)$ $(\bar{A}+B+\bar{C}+D)$ $(\bar{A}+B+\bar{C}+\bar{D})$

$(\bar{A}+\bar{B}+\bar{C}+D)$

$F = A\bar{C} + B\bar{C}\bar{D} + BCD + \bar{ABC}$

c)

CD \ AB	00	01	11	10
00	0	1	1	1
01	0	1	1	1
11	1	1	1	0
10	1	0	0	0

$$a) F = \bar{A} \bar{B} C \bar{D} + \bar{A} \bar{B} C D + \bar{A} B \bar{C} \bar{D} + A B C D + A \bar{B} \bar{C} \bar{D} + A \bar{B} C \bar{D} + A B \bar{C} \bar{D} + A B \bar{C} D$$
$$+ A B C D$$

$$b) F = (A + B + C + D)(A + B + C + \bar{D}) - (A + \bar{B} + C + \bar{D})(A + \bar{B} + \bar{C} + D)$$
$$(A + \bar{B} + \bar{C} + \bar{D})(\bar{A} + \bar{B} + \bar{C} + D)$$

Book1 - Excel

Search

Valid CHERIF WC

me Insert Draw Page Layout Formulas Data Review View Automate Help

Comments Share...

Font Alignment Number Styles Cells Editing Analysis Add-ins

SIMPLIFIER PAR TABLEAUX DE KARNAUGH

A	B	C	D	F	AB CD	.00	.01	.11	.10
0	0	0	0	0	.00	0	0	1	1
0	0	0	1	1	.01	1	1	0	0
0	0	1	0	1	.11	1	1	0	1
0	0	1	1	1	.10	1	1	1	1
0	1	0	0	0					
0	1	0	1	1					
0	1	1	0	1					
0	1	1	1	1					
1	0	0	0	1					
1	0	0	1	0					
1	0	1	0	1					
1	0	1	1	1					
1	1	0	0	1					
1	1	0	1	0					
1	1	1	0	1					

ELIMINER LES GROUPEMENTS DONT LES 1 APPARTIENNENT TOUS A D'AUTRES GROUPEMENTS

Sheet1

SIMPLIFIER PAR TABLEAUX DE KARNAUGH																			
	A	B	C	D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
0	0	0	0	0	0														
0	0	0	0	1	1														
0	0	0	1	0	1														
0	0	0	1	1	1														
0	0	1	0	0	0														
0	1	0	0	0	0														
0	1	0	0	1	1														
0	1	0	1	0	1														
0	1	1	0	1	1														
0	1	1	1	1	1														
1	0	0	0	0	1														
1	0	0	0	1	0														
1	0	1	0	0	1														
1	0	1	1	1	1														
1	1	0	0	0	1														
1	1	0	0	1	0														
1	1	1	0	0	1														
1	1	1	0	1	0														
1	1	1	1	0	1														

Sheet1

Samsung Quad Camera

e avec Galaxy A32

The screenshot shows the Microsoft Word ribbon with the 'Home' tab selected. The ribbon includes tabs for File, Home, Insert, Draw, Page Layout, Formulas, Data, Review, View, Automate, and Help. Under the Home tab, there are sections for Clipboard (Paste, Cut, Copy, Undo, Redo), Font (Font: Calibri, Size: 11, Bold, Italic, Underline, Font Color: A, A), Alignment (Text Orientation: A, A, Horizontal, Vertical, Center, Justify, Align Left, Align Right, Align Center, Align Text), Number (Number Format: General, Currency, Percentage, Decimal, Comma, Decimal, Minus, Text, Date, Time, Scientific, Large Number, Custom), Styles (Conditional Formatting, Table, Cell Styles, Format), Cells (Insert, Delete, Format), Editing (Sum, Sort & Find, Filter, Select), and Analysis (Analyze Data, Analyze). The status bar at the bottom indicates 'Word 2013'.

DIRECT



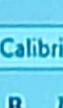
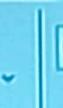
ΣT^{xy}	00	01	11	10
00	0	1	1	0
01	0	0	0	0
11	0	0	0	0
10	0	1	1	0

Σxy	00	01	10	11
00	0	1	0	0
01	1	0	0	0
10	0	0	0	0
11	0	0	0	0

xz	xy	yz
1	00	01
0	1	0
1	0	0
0	1	1
1	1	0
0	0	1
0	0	0
1	0	0

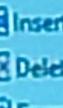
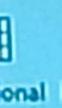
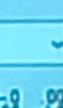
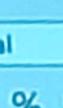
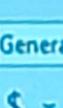
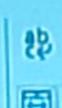
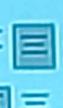
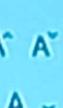
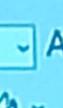
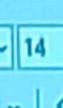
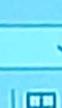
xz	xy	yz
00	01	11
01	0	10
0	0	0
1	1	1
1	1	1
0	0	0

$\bar{y} \bar{z}$



Calibri

14



Clipboard

Font

Alignment

Number

Styles

Cells

H2



SIMPLIFIER PAR TABLEAUX DE KARNAUGH

A	B	C	D	E	F	G	H	I	J	K	L	M	N
							SIMPLIFIER PAR TABLEAUX DE KARNAUGH						
0	0	0	0	0	0								
0	0	0	1	0	1								
0	0	1	0	0	1								
0	0	1	1	1	1								
0	1	0	0	0	0								
0	1	0	1	1	1								
0	1	1	0	0	1								
0	1	1	1	1	1								
1	0	0	0	0	1								
1	0	0	1	0	0								
1	0	1	0	0	1								
1	0	1	1	1	1								
1	1	0	0	0	1								
1	1	0	1	0	1								
1	1	1	0	1	1								
1	1	1	1	0	1								
1	1	1	1	1	0								

Sheet1



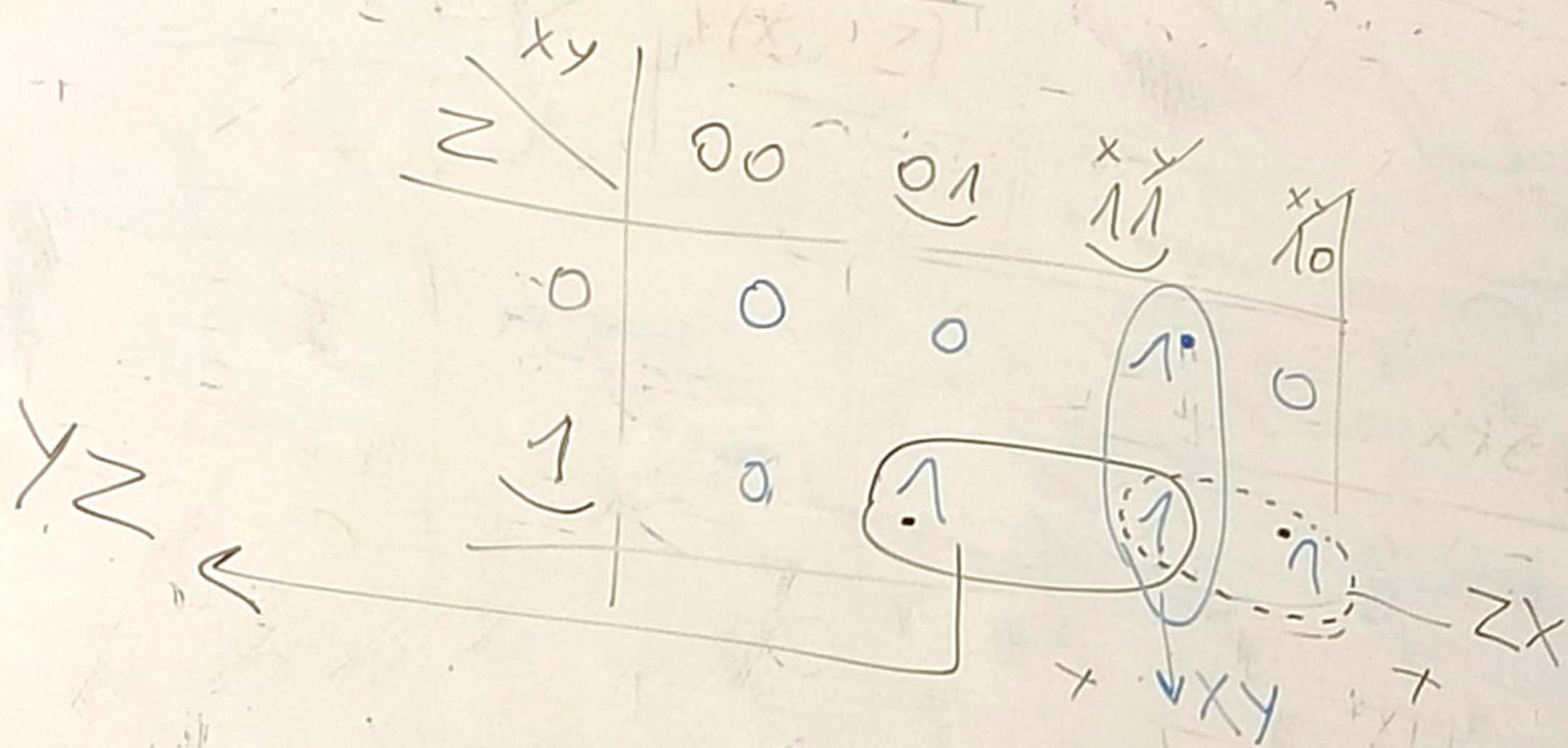
Ready

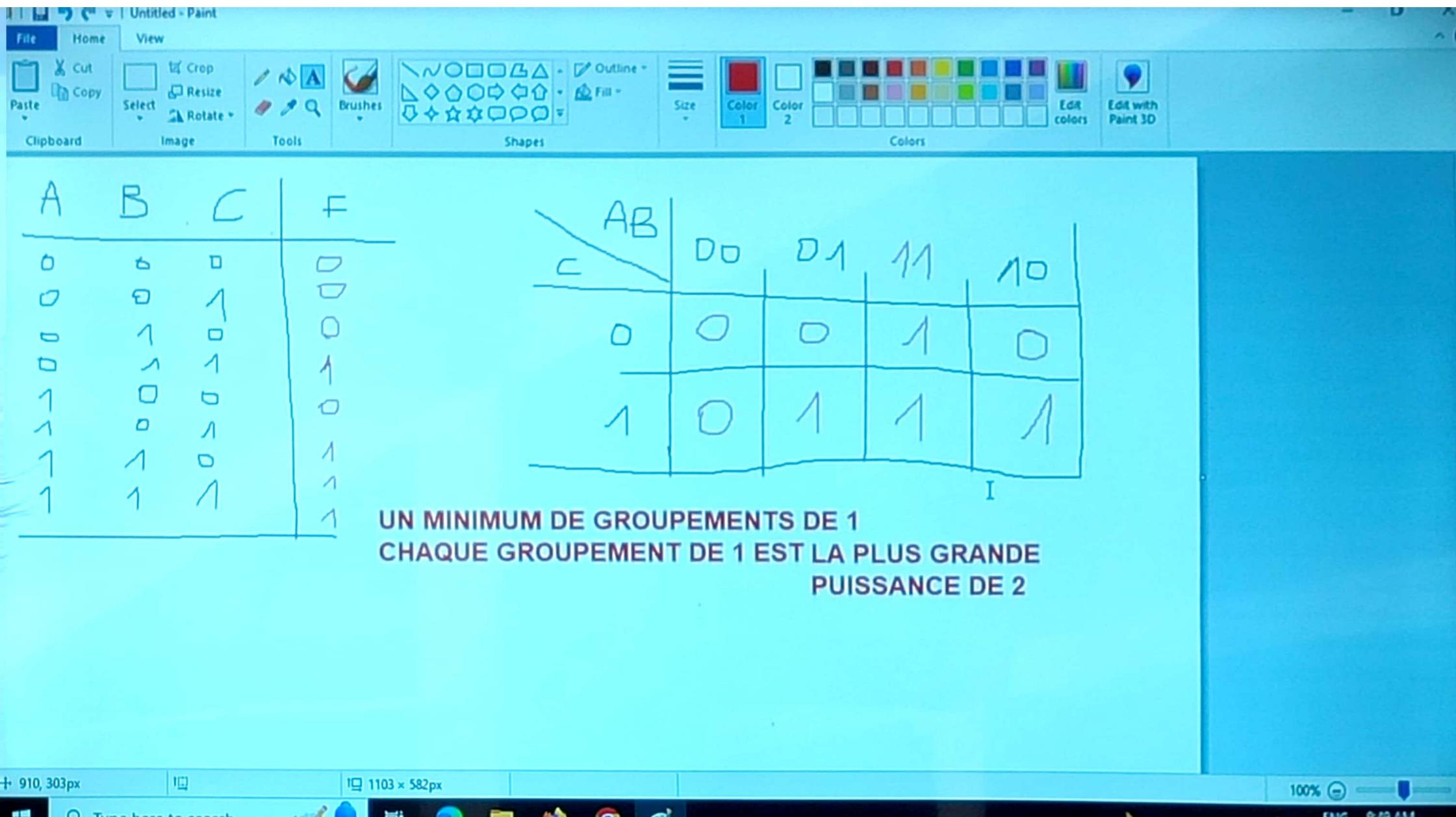
Accessibility: Investigate



Type here to search







Paste Copy Select Resize Rotate Clipboard Image Tools Shapes Colors Edit colors Edit with Paint 3D

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

AB | D0 D1 11 10

0	0	0	1	0
1	0	1	1	1

UN MINIMUM DE GROUPEMENTS DE 1
CHAQUE GROUPEMENT DE 1 EST UNE PUISSANCE DE 2

- 435, 326px 1103 x 582px 100% 69°F Clear ENG 9:48 AM

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Simplification algébrique

$$\begin{aligned} F &= \overline{x}yz + \overline{x}\bar{y}z + xy\bar{z} + \underline{xyz} + \overline{xyz} \\ &= (\cancel{\overline{x}yz} + \cancel{xyz}) + (\cancel{x\bar{y}z} + \cancel{xyz}) + (\cancel{xy\bar{z}} + \cancel{xyz}) \\ &= yz(\bar{x}+x) + xz(\bar{y}+y) + xy(\bar{z}+z) \\ &= \boxed{yz + xz + xy} \end{aligned}$$

X	Y	Z	F(X,Y,Z)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

1^{ère} forme canonique
 \sum mintermes

$$F = \bar{X}YZ + X\bar{Y}Z + XY\bar{Z} + XYZ$$

2^{ème} forme canonique.
 \prod maxtermes.

$$F = (X+Y+Z) \cdot (X+Y+\bar{Z}) \cdot (X+\bar{Y}+Z) \cdot (\bar{X}+Y+Z)$$

$$\begin{pmatrix} 3 & 1 & 1 \\ 6 & 9 & 1 \\ 1 & 2 & 5 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 10 \\ 14 \\ 12 \end{pmatrix} \quad X^0 \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

$$\begin{cases} 3x_1 + x_2 + x_3 = 10 \\ 6x_1 + 9x_2 + x_3 = 14 \\ x_1 + 2x_2 + 5x_3 = 12 \end{cases}$$

$$\begin{cases} x_1^{k+1} = \frac{10}{3} - \frac{1}{3}x_2^k - \frac{1}{3}x_3^k \\ x_2^{k+1} = \frac{14}{9} - \frac{2}{3}x_1^k - \frac{1}{3}x_3^k \\ x_3^{k+1} = \frac{12}{5} - \frac{1}{5}x_1^k - \frac{2}{5}x_2^k \end{cases}$$

JACOBI

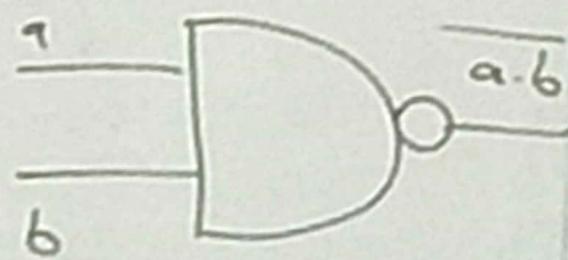
$$X^1 = \begin{pmatrix} x_1^1 = \frac{10}{3} - 0 - 0 = \frac{10}{3} \\ x_2^1 = \frac{14}{9} - 0 - 0 = \frac{14}{9} \\ x_3^1 = \frac{12}{5} - 0 - 0 = \frac{12}{5} \end{pmatrix}$$

GAUSS-SEIDEL

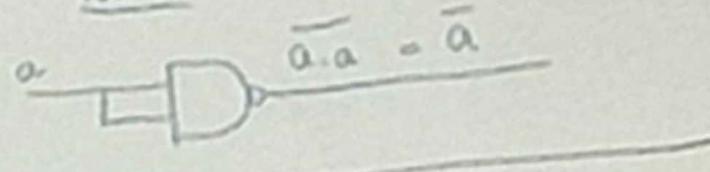
$$X^1 = \begin{pmatrix} x_1^1 = \frac{10}{3} \\ x_2^1 = \frac{14}{9} \\ x_3^1 = \frac{12}{5} \end{pmatrix}$$

NON ET et complete

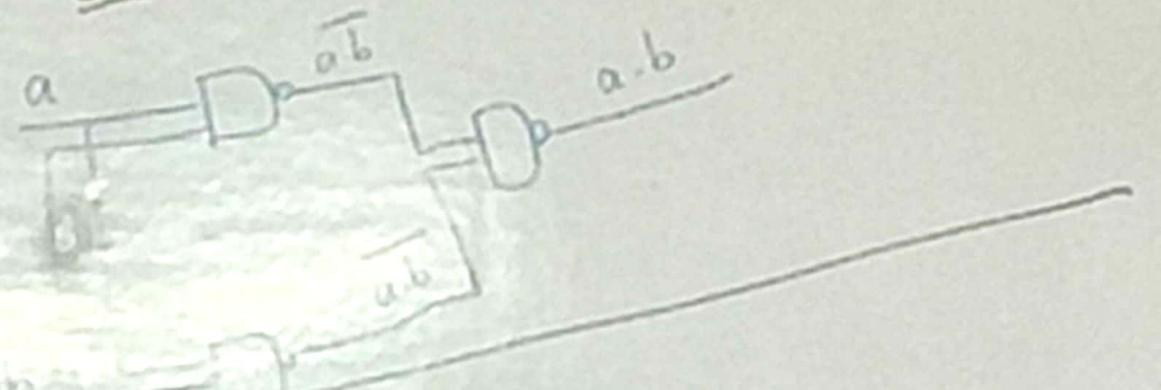
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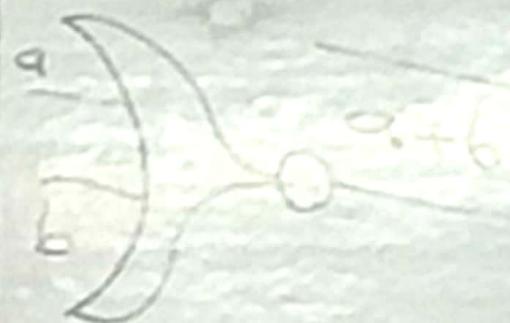
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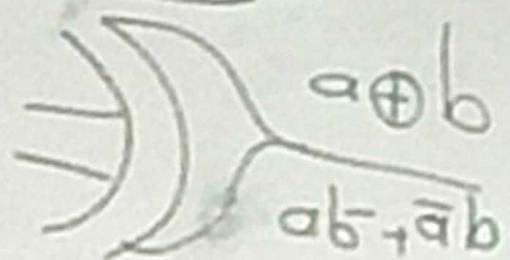
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NON OU

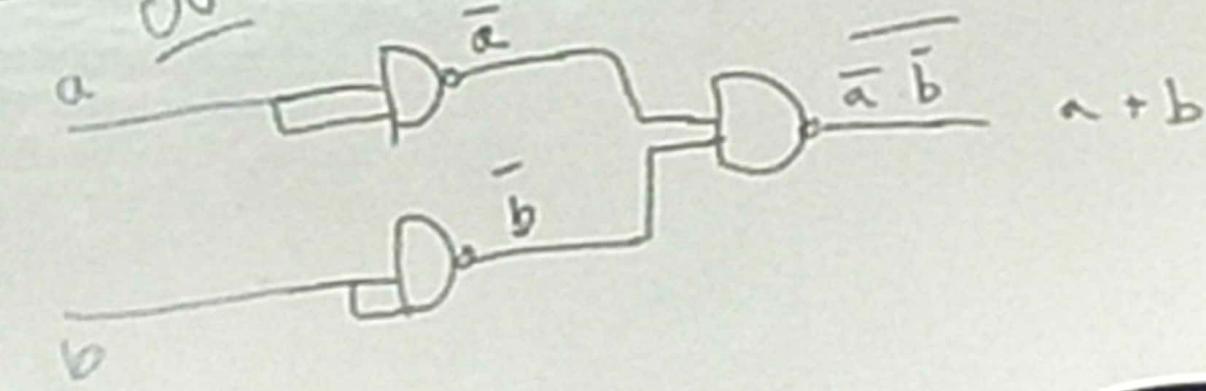


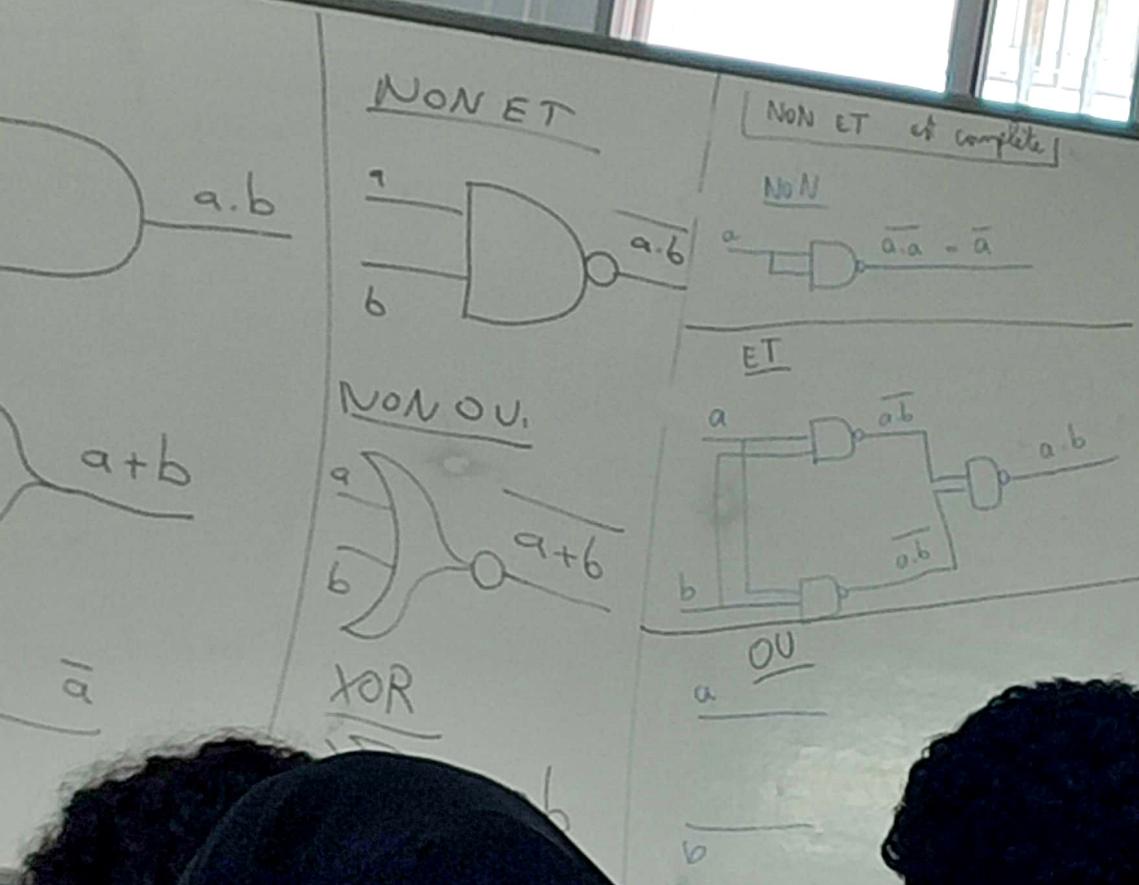
XOR



$$a \oplus b \\ ab, \bar{a}\bar{b}$$

OU

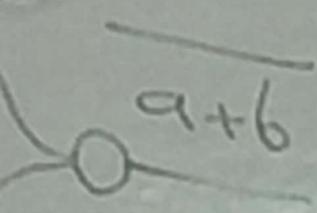




ET



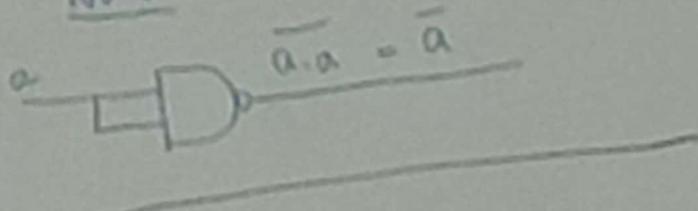
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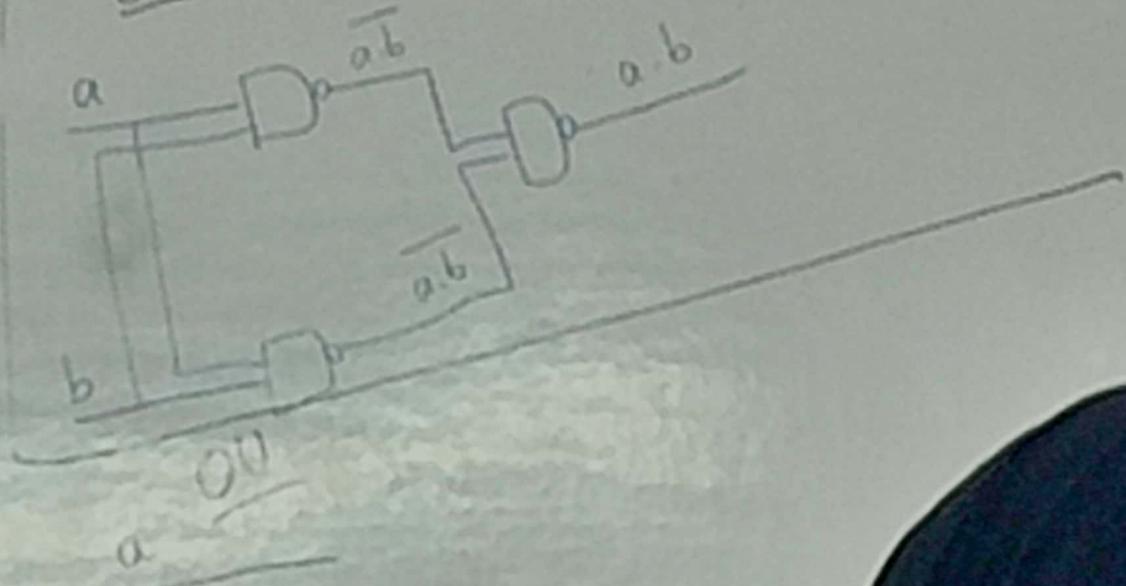
$a \oplus b$

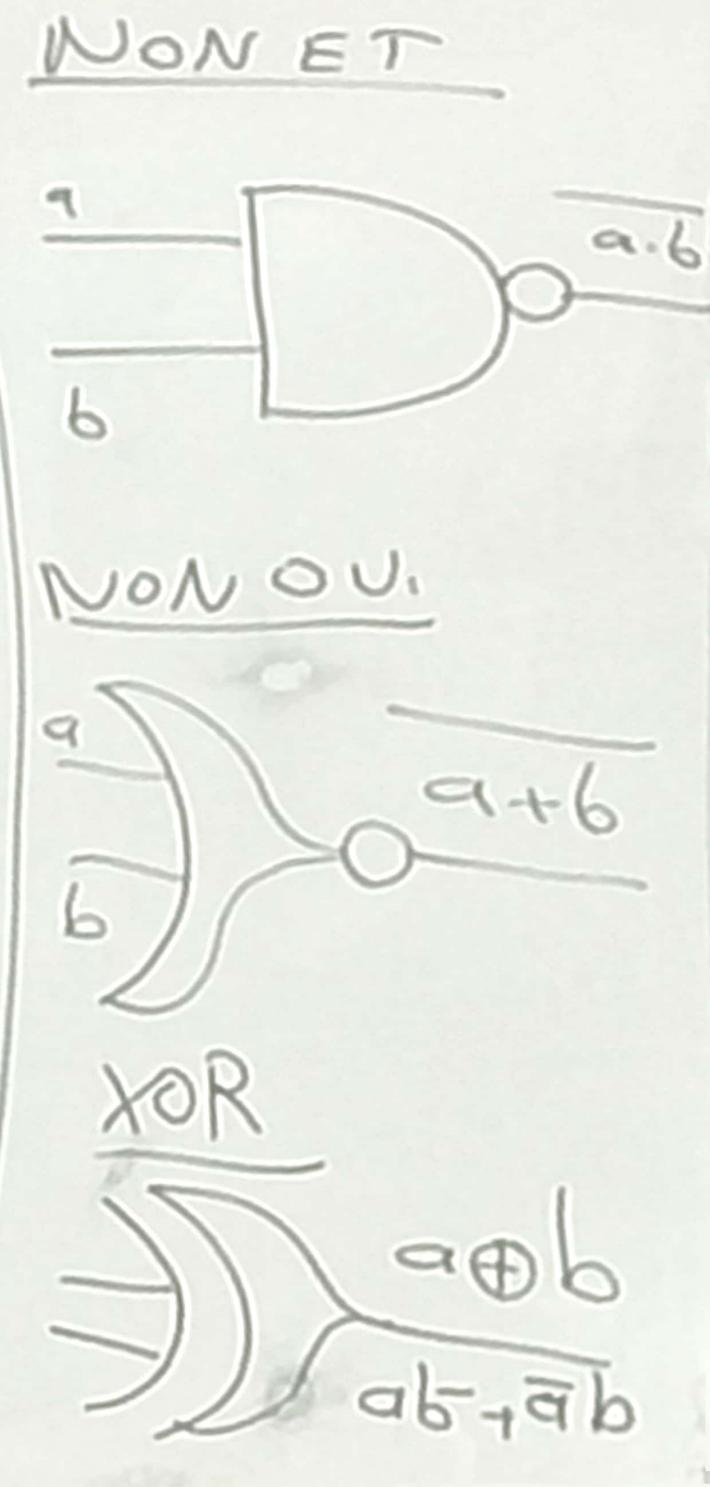
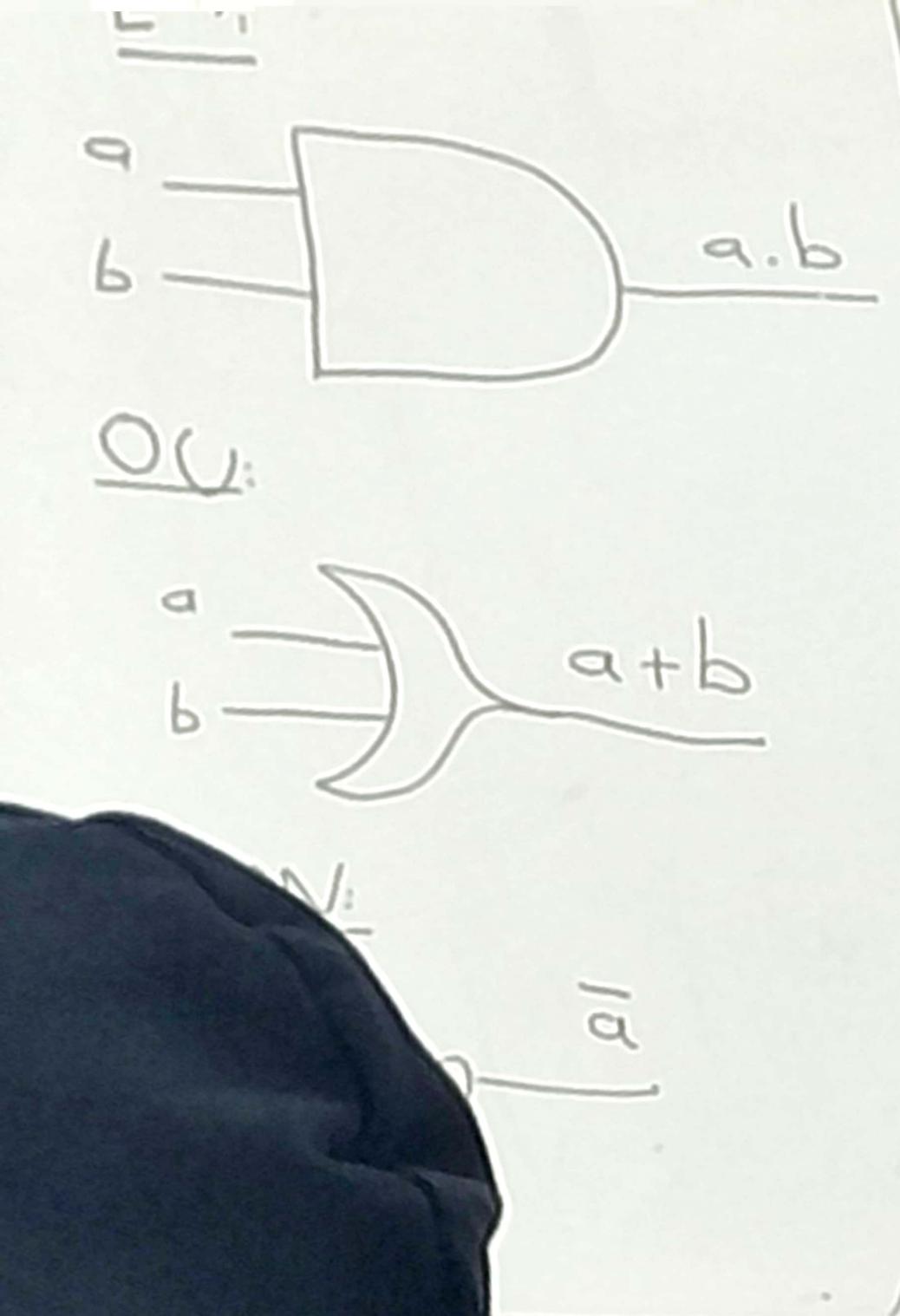
NON ET et complete

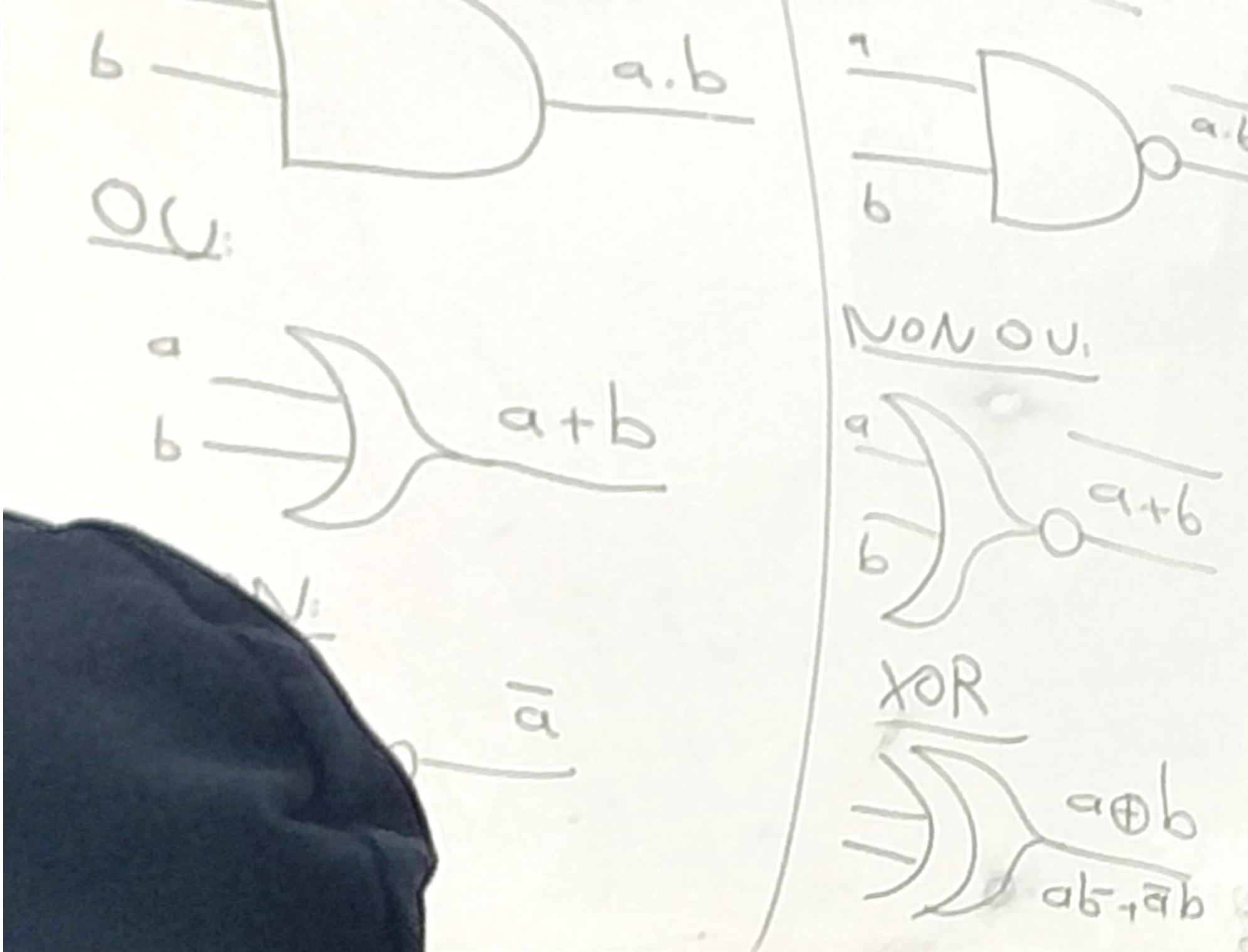
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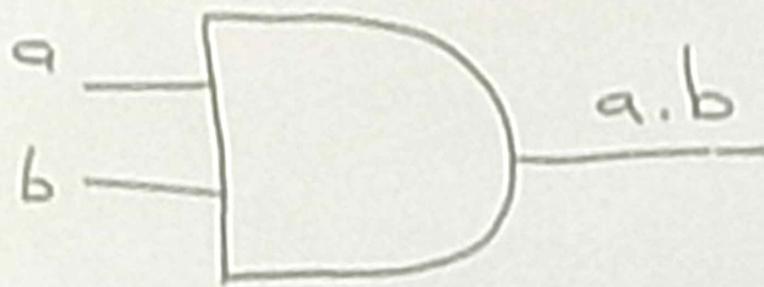
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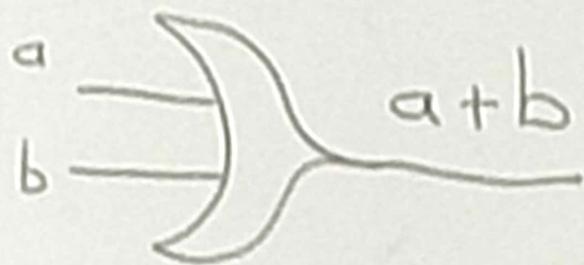




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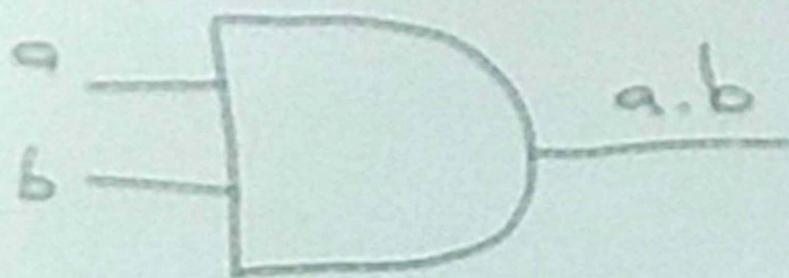
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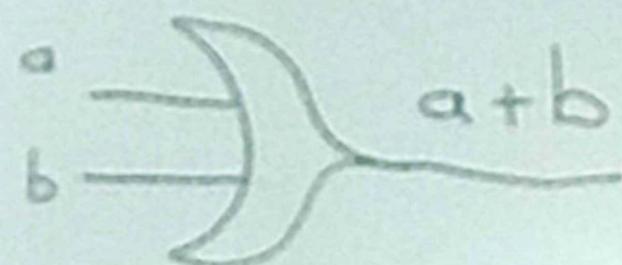
NON



ET



OU



$$N: 0 \quad | \quad \underbrace{1111 \ 1111}_{E_{\max}} \quad | \quad \underbrace{111 \dots - 1}_{M_{\max}} \quad | \quad \dots$$

$$E_{\max} = 2^8 - 1$$

$$= 256 - 1$$

$$= 255$$

$$C_{\max} = E_{\max} - 127$$

$$\boxed{C_{\max} = 128}$$

$$N = (1, \underbrace{111 \dots - 1}_{23 \text{ bits}}) \times 2^{128}$$

$$= (\underbrace{111 \dots - 1}_{24 \text{ bits}} \times 2^{-23}) \times 2^{128}$$

$$= (2^{24} - 1) \times 2^{-23} \times 2^{128}$$

$$= (2^{24} - 1) \times 2^{105}$$

$$= \boxed{2^{123}}$$

[IEEE 754]
32 bits

N

-10,125₍₁₀₎

1 signe 1000 0010101000100... Exponent E Mantine M ...

10,125 :

$$\begin{array}{r} 10 \\ | \quad | \\ 0 \quad 5 \\ | \quad | \\ 1 \quad 2 \\ | \quad | \\ 0 \quad 1 \end{array}$$

$$\begin{aligned} 0,125 \times 2 &= 0,25 \\ 0,25 \times 2 &= 0,5 \\ 0,5 \times 2 &= 1 \end{aligned}$$

$$\begin{array}{c} 1010 \\ | \\ 1, M \times 2^C \end{array}$$

$$\begin{array}{c} 10,125 = 1010,001 \\ | \\ 1, 010001 \times 2^3 \\ \text{Mantine} \end{array}$$

$$\begin{aligned} E &= C + 127 \\ &= 3 + 127 \\ &= 130 \\ &= 10000010 \end{aligned}$$

+13,625

$4: 100$

$4 \times 2 = 8: 1000$

$$A(x_n x_{n-1} \dots x_0)_2$$

$$A = x_0 \cdot 2^0 + x_1 \cdot 2^1 \dots x_n \cdot 2^n$$

$$2 \times A = 0 \cdot 2^0 + x_0 \cdot 2^1 + x_1 \cdot 2^2 \dots$$

$$\boxed{A \times 2 = (x_n \ x_{n-1} \dots x_0 \ 0)}$$

$$\boxed{A/2: x_n x_{n-1} \dots x_1, x_0}$$

10^{-K}

Écrire 5 sur 8 bits signés

0 0 0 0 0 1 0 1

g-5

$$\begin{array}{r} -1'001 \\ -1'101 \\ \hline 0100 \end{array} \quad 4$$

sur 4 bits:

5 sur 4 bit

C.R(5)

conflict à 1 de(s) :

C.V(s)

conflict à 2 de(s):
= C.R(s)+1

$$\begin{array}{r} 0101 \\ 101 \\ +1 \\ \hline 1011 \end{array}$$
$$\begin{array}{r} 1 \\ +1 \\ \hline 1001 \end{array}$$
$$\begin{array}{r} 1011 \\ +1 \\ \hline 0100 \end{array}$$

(6)

Compléments restreints et complément vrai

nombre signé sur n bits

ex:

écrire (-13)

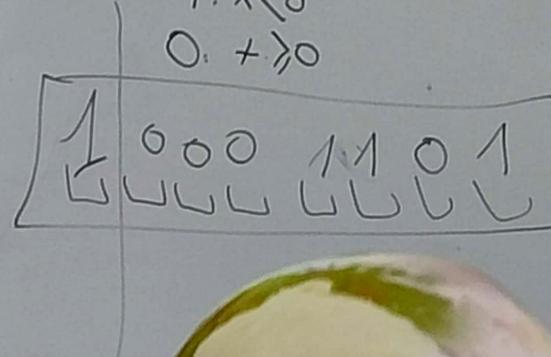
sur 8 bits signés

Udem

signe $(n-1)$ bits

1: $x < 0$

0: $+ > 0$



$13,375_{10}$

$$\begin{array}{r} 13 \\ \times 2 \\ \hline 16 \\ \begin{array}{l} 1 \\ 3 \\ \hline 0 \\ 3 \end{array} \end{array}$$

$$13 = 11101_4$$

$$\begin{aligned} 0,375 \times 2 &= 0,750 \\ 0,750 \times 2 &= 1,50 \\ 0,5 \times 2 &= 1,0 \end{aligned}$$

$$13,375_{10} = 11001,011_4$$

Conversion des nombres à virgule

$$\begin{aligned}
 & \text{1101,011}_{(2)} \\
 &= 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3} \\
 &= 1 + 4 + 8 + \frac{1}{4} + \frac{1}{8} \\
 &= 13 + 0,25 + 0,125 \\
 &= \boxed{13,375}
 \end{aligned}$$