

Exercices fonctions booléennes

Correction

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Première - NSI

ArchMat 07

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Exercice 1

P	Q	non (P) ou Q
0	0	1
0	1	1
1	0	0
1	1	1

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La réponse est : $\neg(Q)$ et P . Pour s'en convaincre il faut dresser les tables de vérité de chaque proposition.

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A	B	C	C et (A ou B)
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	0
1	1	1	1

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Il faut établir la table de vérité des deux parties de l'égalité.

► $f_1(x, y, z) = (x \wedge y) \vee (\neg y \wedge z)$

► $f_2(x, y, z) = (x \vee \neg y) \wedge (y \vee z)$

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x	y	z	$x \wedge y$	$\neg y \wedge z$	$f_1(x, y, z)$
0	0	0	0	0	0
0	0	1	0	1	1
0	1	0	0	0	0
0	1	1	0	0	0
1	0	0	0	0	0
1	0	1	0	1	1
1	1	0	1	0	1
1	1	1	1	0	1

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x	y	z	$x \vee \neg y$	$y \vee z$	$f_2(x, y, z)$
0	0	0	1	0	0
0	0	1	1	1	1
0	1	0	0	1	0
0	1	1	0	1	0
1	0	0	1	0	0
1	0	1	1	1	1
1	1	0	1	1	1
1	1	1	1	1	1

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x	y	z	$f_1(x, y, z)$
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

x	y	z	$f_2(x, y, z)$
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

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x	y	z	$f(x, y, z)$
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

Cette fonction vérifie si une et une seule variable vaut 1

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$$\begin{array}{r} r \\ e_0 \quad e_1 \\ + \quad e_2 \quad e_3 \end{array}$$

Le premier additionneur ajoute e_1 et e_3 . L'entrée c_0 vaut 0.
La retenue du premier additionneur est envoyée dans le second (r).

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e_0	e_1	e_2	e_4	s_0	s_1	c
0	0	0	0	0	0	0
0	0	0	1	0	1	0
0	0	1	0	1	0	0
0	0	1	1	1	1	0
0	1	0	0	0	1	0
0	1	0	1	1	0	0
0	1	1	0	1	1	0
0	1	1	1	0	0	1
1	0	0	0	1	0	0
1	0	0	1	1	1	0
1	0	1	0	0	0	1
1	0	1	1	0	1	1
1	1	0	0	1	1	0
1	1	0	1	0	0	1
1	1	1	0	0	1	1
1	1	1	1	1	0	1

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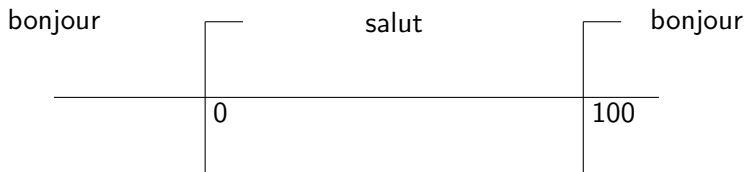
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Exercise 7

```
1 if x >= 0 and x < 100:  
2     print("salut")  
3 else:  
4     print("bonjour")
```



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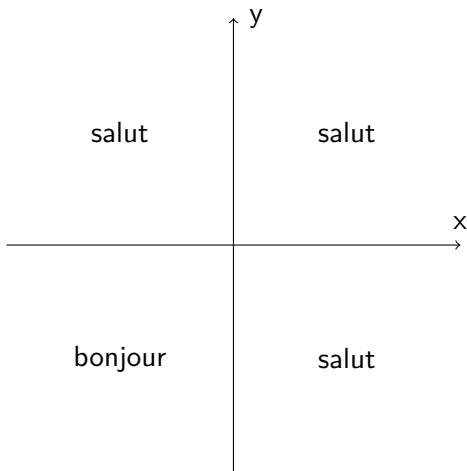
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```
1 if x >= 0 or y < 0:  
2     print("salut")  
3 else:  
4     print("bonjour")
```



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```
1 def xor(x: bool, y: bool) -> bool:
2     return (x and not y) or (not x and y)
3
4 print(xor(False, False)) # False
5 print(xor(False, True)) # True
6 print(xor(True, False)) # True
7 print(xor(True, True)) # False
8
9 print(xor(2>1, 0==1)) # True
```

Code 1 – Fonction xor