Valérie Panaite

Exercice noté 1

1. Conversions de bases

a) Ex. : $\overset{4}{6}\overset{3}{6}\overset{2}{6}\overset{1}{6}\overset{0}{6}_7$ → puissance

b) $\overset{3}{2}\overset{2}{A}\overset{1}{A}\overset{0}{3}_{16} = 2 \times 16^3 + 10 \times 16^2 + 10 \times 16^1 + 3 \times 16^0$

$= 4096 + 2560 + 160 + 3$

$= 6819_{10}$

Rép. : 6819_{10}

c) 1) $\overset{1}{4}\overset{0}{B}_{16} = 4 \times 16^1 + 11 \times 16^0$

$= 75_{10}$

2)

$75 \div 2$: $75 - 74 = 1$, quotient 37

$37 \div 2$: $37 - 36 = 1$, quotient 18

$18 \div 2$: $18 - 18 = 0$, quotient 9

$9 \div 2$: $9 - 8 = 1$, quotient 4

$4 \div 2$: $4 - 4 = 0$, quotient 2

$2 \div 2$: $2 - 2 = 0$, quotient 1

$1 \div 2$: $1 - 0 = 1$, quotient 0

Rép. : $4B_{16} = 1001011_2$

3)

$75 \div 8$: $75 - 72 = 3$, quotient 9

$9 \div 8$: $9 - 8 = 1$, quotient 1

$1 \div 8$: $1 - 0 = 1$, quotient 0

Rép. : $4B_{16} = 113_8$

d) $1011 \div 16$

$$\begin{array}{l} 1011 = 16 \times 63 + 3 \quad (1011 - 1008 = 3) \\ 63 = 16 \times 3 + 15 \quad (63 - 48 = 15) \\ 3 = 16 \times 0 + 3 \quad (3 - 0 = 3) \end{array} \rightarrow 3F3$$

Rép.: 0x3F3

e) $ee_{16} = 14 \times 16^1 + 14 \times 16^0$
$= 238$

Rép.: 0xee = 238

2. 17_{10} $n = 5$ bits

$$\begin{array}{l} 17 = 2 \times 8 + 1 \quad (17 - 16 = 1) \\ 8 = 2 \times 4 + 0 \quad (8 - 8 = 0) \\ 4 = 2 \times 2 + 0 \quad (4 - 4 = 0) \\ 2 = 2 \times 1 + 0 \quad (2 - 2 = 0) \\ 1 = 2 \times 0 + 1 \quad (1 - 0 = 1) \end{array}$$

$17_{10} = 10001_2$

10001 déjà sur 5 bits

$$\begin{array}{r} 10001 \\ 01110 \\ + \quad 1 \\ \hline 01111 \end{array}$$

2 c-à-1

Rép.: 01111

3\. a) $$\begin{array}{r} \cancel{1}\cancel{0}\cancel{0}\cancel{0}\cancel{0}\cancel{0} \\ -\ 01101 \\ \hline 10011 \end{array}$$ → positif

$10011_2 = 2^4 + 2^1 + 2^0 = 19_{10}$

Rép. : 19_{10}

b) 10011 → négatif

$$\begin{array}{r} \cancel{1}\cancel{0}\cancel{0}\cancel{0}\cancel{0}\cancel{0} \\ -\ 10011 \\ \hline 01101 \end{array}$$

$01101_2 = 2^3 + 2^2 + 2^0 = 13$

4\. a) 3.15

$3_{10} = 11_2$

$0,15 \times 2 = \boxed{0},3$ $\quad 0,3 \times 2 = \boxed{0},6$ $\quad 0,6 \times 2 = \boxed{1},2$
$0,2 \times 2 = \boxed{0},4$ $\quad 0,4 \times 2 = \boxed{0},8$ $\quad 0,8 \times 2 = \boxed{1},6$
$0,6 \times 2 = \boxed{1},2$ $\quad 0,2 \times 2 = \boxed{0},4$ $\quad 0,4 \times 2 = \boxed{0},8$
$0,8 \times 2 = \boxed{1},6$ $\quad 0,6 \times 2 = \boxed{1},2$ $\quad 0,2 \times 2 = \boxed{0},4 \ldots$

la suite 0011 se répète à l'infini

$3,15_{10} = 11.00100110011\ldots_2$

$\rightarrow 1.\underbrace{1001\,0011\,0011}_{F}\ldots \times 2^1$

$e - 1023 = 1 \Rightarrow e = 1024_{10}$

$1024 = 2^{10}$ donc

$= 10000000000_2$

positif donc $s = 0$

$f = 1001001100 1100\ldots$ *

* continuer la suite 1100 jusqu'à avoir 52 bits *

$e = 10000000000$

Rép. : $\underbrace{0}_{s}\,\underbrace{10000000000}_{e}\,\underbrace{1001001100 1100\ldots}_{f}$

b) $4_{10} = 100_2 = 1.00 \times 2^2$

$e - 1023 = 2 \Rightarrow e = 1025$

$1025_{10} = \underbrace{2^{10}}_{1024} + \underbrace{2^0}_{1} = 10000000001_2$

négatif donc $s = 1$

$e = 10000000001$

$f = \underbrace{0000\ldots0}_{52\text{ fois}}$

Rép. : $\underbrace{1}_{s}\,\underbrace{10000000001}_{e}\,\underbrace{000\ldots}_{f}$

5. $9-4=5$

$5+10=15$

$15-\underbrace{(2\times 3)}_{6}=9$

Rép.: $9-4+10-(2\times 3)=9$