Exercice noté #1

1. Conversions de bases

7^4	7^3	7^2	7^1	7^0
1	0	3	5	6

$2AA3_{16} \rightarrow ?_{10}$

$$\underset{2}{\underbrace{0010}} , \underset{A}{\underbrace{1010}} , \underset{A}{\underbrace{1010}} , \underset{3}{\underbrace{0011}} = 2^{13} + 2^{11} + 2^9 + 2^7 + 2^5 + 2^1 + 2^0$$

$$= 8192 + 2048 + 512 + 128 + 32 + 2 + 1$$

$$= 10915_{10}$$

a) $4B_{16} \rightarrow ?_{10}$

$$4B_{16} = 4 \cdot 16^1 + 11 \cdot 16^0$$
$$= 64 + 11$$
$$= 75_{10}$$

b) $4B_{16} \rightarrow ?_2$

$$4B_{16} = \underset{4}{\underbrace{0100}} , \underset{B}{\underbrace{1011}} = 01001011_2$$

c) $4B_{16} \rightarrow ?_8$

$$4B_{16} \rightarrow 75_{10} \quad (\text{voir a)})$$

$$\begin{array}{l} 75 \underline{|8} \\ \underline{72} \quad 9\underline{|8} \\ \textcircled{3} \quad \underline{8} \quad 1\underline{|8} \\ \qquad \underline{0} \quad \underline{0} \quad 0 \\ \qquad \textcircled{1} \quad \textcircled{1} \end{array}$$

$$4B_{16} = 113_8$$

$1011_{10} \rightarrow ?_{16}$

$1011_{10} \rightarrow ?_2$

$$1011 = 2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^1 + 2^1 + 2^0$$

$$\begin{array}{l} \underline{512} \\ \underline{499} \\ \underline{256} \\ \underline{243} \\ \underline{128} \\ \underline{115} \\ \underline{64} \\ \underline{51} \\ \underline{32} \\ \underline{19} \\ \underline{16} \\ \underline{3} \\ \underline{2} \\ \underline{1} \\ \underline{1} \\ 0 \end{array}$$

$1011_{10} = \underset{3}{\underbrace{0011}} \, \underset{F}{\underbrace{1111}} \, \underset{3}{\underbrace{0011}}_2 = 3F3_{16}$

ajoutés ne change pas la valeur mais pour avoir un multiple de 4

$0xee = ?$

$E \rightarrow 1110$

$$0xee = \underset{e}{\underbrace{1110}} \, \underset{e}{\underbrace{1110}} = 2^7 + 2^6 + 2^5 + 2^3 + 2^2 + 2^1$$

$$= 238$$

2.

$17_{10} \rightarrow 2^4 + 2^0 \qquad 17_{10} = 10001_2$

$$\begin{array}{l} 17 \\ \underline{-16} \\ \underline{1} \\ 0 \end{array}$$

Hilroy

3. • $01101 \rightarrow c\text{-à-}2$

Puisque commence par 0, positif donc simplement $01101_2 \rightarrow ?_{10}$

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

$01101_2 = 8 + 4 + 1$

$01101_2 = 13_{10}$

• $10011 \rightarrow c\text{-à-}2$

négatif

$c\text{-à-}1 \quad 10011 \rightarrow 01100$

$\begin{array}{r} + \quad 1 \\ \hline 01101 \end{array}$

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

$01101_2 = 13_{10}$

$10011_2 = -13_{10}$

4.

$\underbrace{}_{S} \text{1 bit} \quad \underbrace{}_{e} \text{11 bits} \quad \underbrace{}_{f} \text{52 bits}$

$3.15 \rightarrow$ point flottant

① $3.15_{10} \rightarrow ?_2 \qquad 3_{10} = 2^1 + 2^0 = 11_2 \qquad 0.15_{10} \rightarrow ?_2 = 0.0010011$

$\begin{array}{r} 3 \\ -2 \\ \hline 1 \\ -1 \\ \hline 0 \end{array}$

$0.15 \times 2 = \boxed{0}.3$

$0.3 \times 2 = \boxed{0}.6$

$0.6 \times 2 = \boxed{1}.2$

$0.2 \times 2 = \boxed{0}.4$

$0.4 \times 2 = \boxed{0}.8$

$0.8 \times 2 = \boxed{1}.6$

$0.6 \times 2 = \boxed{1}.2$

... (ça répète)

② Normalisation $11.001\overline{1001} = 1.\underset{f}{100\overline{1001}} \times 2^{①}e$

③ $e_1 = 1 \quad e = 1 + 1023 = 1024$

$= 2^{10}$

$= 10000000000_2$

④ $3.15 \rightarrow$ point flottant $= \underset{S}{0},\underset{e}{10000000000},\underset{f}{10010011001...}$ pour 52 bits restants : 1001

$-4 \rightarrow$ point flottant

① $4 \rightarrow ?_2 = 100_2$

② Normalisation $100.00... = 1.0000... \times 2^2$

③ $e_1 = 2 \quad e = 2 + 1023 = 1025$

$= 2^{10} + 2^0$

$= 10000000001_2$

④ $-4 \rightarrow$ point flottant $= \underset{S}{1}, \underset{e}{10000000001}, \underset{f}{0000000...}$

5. $10 + 4 - 2 - 3 = 9$