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Travail pratique 1 - Programmation

1.

a) $\begin{array}{|c|c|c|c|c|c|} \hline 7^4 & 7^3 & 7^2 & 7^1 & 7^0 \\ \hline \end{array}$
 $7^4 7^3 7^2 7^1 7^0$
Ex: 31 425

b) $2AA3_{16}$
 $16^3 16^2 16^1 16^0$

2	A	A	3
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2 10 10 3

$$2AA3_{16} = 2 \cdot 16^3 + 10 \cdot 16^2 + 10 \cdot 16^1 + 3 \cdot 16^0 \\ = 10915_{10}$$

c) ① $\begin{array}{|c|c|} \hline 16^1 & 16^0 \\ \hline 4 & B \\ \hline 4 & 11 \\ \hline \end{array}$

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

② $\begin{array}{|c|c|} \hline 16^1 & 16^0 \\ \hline 4 & B \\ \hline 0100 & 1011 \\ \hline \end{array}$

$$4B_{16} = 1001011$$

Hélène

③ $HB_{10} = 75_{10}$

75 18
- 72 9 18
③ - 8 1 18
 1 - 0 0
 1

$HB_{10} = 113_8$

d) $1011_{10} \rightarrow \text{base } 16$

1011 16
- 1008 63 16
③ - 48 3 16
 15 - 0 0
 3

$1011_{10} = 3F3_{16}$

e) 0xee \Rightarrow

e	e
14	14

 $16^1 \quad 16^0$

$$\begin{aligned} 0xee &= 14 \cdot 16^1 + 14 \cdot 16^0 \\ &= 238 \end{aligned}$$

2.

① $17_{10} \rightarrow$ binaire

$$\begin{array}{r} 17 \text{ } |2 \\ -16 \quad 8 \quad |2 \\ \textcircled{1} \quad -8 \quad 4 \quad |2 \\ \textcircled{0} \quad \textcircled{-4} \quad 2 \quad |2 \\ \textcircled{0} \quad \textcircled{-2} \quad 1 \quad |2 \\ \textcircled{0} \quad \textcircled{-0} \quad 0 \quad |2 \\ \textcircled{1} \end{array}$$

$$17_{10} = 10001_2$$

3.

a) ① \oplus car commence par 0

② $01101 \rightarrow$ base 10

2 ⁴	2 ³	2 ²	2 ¹	2 ⁰
0	1	1	0	1

$$\begin{aligned} 01101_2 &= 0 \cdot 2^4 + 1 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \\ &= 0 + 8 + 4 + 0 + 1 \\ &= 13_{10} \end{aligned}$$

Résumé

b) ① \ominus car commence par 1

$$\textcircled{2} \quad 10011_2 \rightarrow 01100 \\ \begin{array}{r} + 1 \\ \hline 01101 \end{array}$$

③ $- 01101 \rightarrow \text{base } 10$

$$\begin{array}{cccccc} & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \\ \boxed{0} & 1 & 1 & 0 & 1 & = 0 \cdot 2^4 + 1 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \\ & & & & & = 0 + 8 + 4 + 0 + 1 \\ & & & & & = -13_{10} \end{array}$$

4.

a) ① conversion en binaire

$3_{10} \rightarrow \text{base } 2$

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

$$3_{10} = 11_2$$

$0.15^{10^0 10^{-1} 10^{-2}} \rightarrow \text{base } 2$

$$0.15 \cdot 2 = 0.30$$

$$0.30 \cdot 2 = 0.60$$

$$0.60 \cdot 2 = 1.20$$

$$0.20 \cdot 2 = 0.40$$

$$0.40 \cdot 2 = 0.80$$

$$\begin{aligned}
 0.80 \cdot 2 &= 1.60 \\
 0.60 \cdot 2 &= 1.20 \\
 0.20 \cdot 2 &= 0.40 \\
 0.40 \cdot 2 &= 0.80 \\
 0.80 \cdot 2 &= 1.60 \\
 0.60 \cdot 2 &= 1.20 \\
 0.20 \cdot 2 &= 0.40 \\
 0.40 \cdot 2 &= 0.80 \\
 0.80 \cdot 2 &= 1.60
 \end{aligned}$$

$$0.15_{10} = 00100110011\ldots \quad \begin{matrix} \uparrow \\ 4. [00110011] \end{matrix}$$

② normalisation

$$\begin{aligned}
 3.15_{10} &= 1.\underline{1}00100110011\ldots \\
 &= 1.\underline{100100110011\ldots} \times 2^f
 \end{aligned}$$

$$\begin{aligned}
 ③ \quad e &= 1 + 1023 \\
 &= 1024_{10} \\
 &= 2^{10} \\
 &= 10000000000
 \end{aligned}$$

$$\begin{aligned}
 ④ \quad s &\rightarrow 0 \\
 e &\rightarrow 10000000000 \\
 f &\rightarrow 100100110011\ldots \begin{matrix} \uparrow \\ 8. [0011] \end{matrix}
 \end{aligned}$$

b) ① $s \rightarrow 1$ car \ominus

② $4_{10} \rightarrow \text{base } 2$

$$- 4_{10} = 100_2$$

③ $100 = \underline{1.00}_f \times 2^2$

④ $e = 2 + 1023$
= 1025_{10}
= $2^{10} + 2^0$
= 10000000001

⑤ $s \rightarrow 1$

$$e \rightarrow 10000000001$$

$$f \rightarrow 000\dots 000$$

↑
46 zeros

5.

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