Outils mathématiques
développement logiciel

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- Question 1

a) $204_{10} = 128 + 76$
$= 128 + 64 + 12$
$= 128 + 64 + 8 + 4$
$= 1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$
$= \underline{11001100_2}$

b) $F84,A = \underline{1111\ 1000\ 0100,1010}$

c) $10000101,01_2$

$= 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2}$
$= 64 + 4 + 1 + 0,25$
$= \underline{69,25_{10}}$

d) $723,5_{10} =$

723 | 16		16 | 0,5	$= \underline{2D3,8_{16}}$
45 | 3	A	8 | 0	
2 | 13			
0 | 2			

• Question #2

a) $-1X0XX10,0X010$

$0\ 1\ 10\ 10 \qquad 0\ 1$

$0\ 0\ 0\ 1\ 1\ 1\ ,\ 0\ 0\ 1\ 1$

$1\ 0\ 1\ 1\ 1\ 1\ ,\ 0\ 0\ 0\ 1$

$5\ 4\ 3\ 2\ 1\ 0\ -1\ -2\ -3\ -4$

$= 1\ 0\ 1\ 1\ 1\ 1\ ,\ 0\ 0\ 0\ 1$

$= 1 \times 2^5 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-4}$

$= 32 + 8 + 4 + 2 + 1 + 0,0625$

$= 47,0625_{10}$

b) $10\ 1\ 0\ 1\ 1\ 0\ 0\ 0\ 0 \;|\; 1\ 1\ 0\ 1$

$1\ 1\ 0\ 1 \qquad\qquad 1\ 1\ 0,1\ 0\ 0$

$0\ 0\ 0\ 0\ 1$

$0\ 1\ 1\ 0\ 1$

$0\ 0\ 0\ 0\ 0\ 1\ 0$

$0\ 1\ 1\ 0\ 1$

$0\ 0\ 0\ 1\ 1\ 0\ 0$

$2\ 1\ 0\ -1\ -2\ -3$

$= 1\ 1\ 0,1\ 0\ 0$

$= 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^{-1}$

$= 4 + 2 + 0,5$

$= 6,5_{10}$

• Question #3

a) $-75 =$

75	2
37	1
18	1
9	0
4	1
2	0
1	0
0	1

$= 75_{10} = 01001011$

$-75_{10} = 10110101_2$

b) $-75 = -75 + 127 = 52$

52	2
26	0
13	0
6	1
3	0
1	1
0	1

$= 00110100$

- Question #4

a)
$$\begin{array}{r} 1\ 1\ 1 \\ +\ 1\ 0\ 0\ 1\ 1\ 0\ 1 \\ 1\ 1\ 1\ 1\ 0\ 0\ 0\ 0 \\ \hline *\ \boxed{1}\ 0\ 0\ 0\ 1\ 1\ 0\ 1 \end{array}$$

$\hookrightarrow 01110011$

$= 2^6 + 2^5 + 2^4 + 2^1 + 2^0 = -115_{10}$

b)
$$\begin{array}{r} \quad 1\ 1\ \quad\quad 1 \\ +\ 1\ 0\ 1\ 1\ 0\ 0\ 0\ 1 \\ 1\ 0\ 0\ 1\ 0\ 1\ 0\ 1 \\ \hline *\ \boxed{0}\ 1\ 0\ 0\ 0\ 1\ 1\ 0 \end{array}$$

$\hookrightarrow$ débordement