Laborator Proiectare Logică 2

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Exerciții schimbare bază de numerație

$$(\forall)x \in \mathbb{R}, x = \sum_{i(\forall)} a_i b^i; a \in \mathbb{Z}, b \in \mathbb{Z}^+, a < b, b < 1 \tag{1}$$

$10110_{(2)} = 112_{(4)} = 26_{(8)} = 16_{(16)} = 2^1 + 2^2 + 2^4 = 22_{(10)}$
$10010101_{(2)} = 2111_{(4)} = 225_{(8)} = 95_{(16)} = 2^0 + 2^2 + 2^4 + 2^7 = 149_{(10)}$
$100100001001_{(2)} = 21021_{(4)} = 4411_{(8)} = 909_{(16)} = 2^0 + 2^3 + 2^8 + 2^{11} = 2313_{(10)}$
$10010_{(2)} = 102_{(4)} = 22_{(8)} = 12_{(16)} = 2^1 + 2^4 = 18_{(10)}$
$111011_{(2)} = 323_{(4)} = 73_{(8)} = 3B_{(16)} = 2^0 + 2^1 + 2^3 + 2^4 + 2^5 = 59_{(10)}$
$11111111_{(2)} = 3333_{(4)} = 377_{(8)} = FF_{(16)} = 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7 = 255_{(10)}$

$27_{(10)} = 33_{(8)}$ $\qquad$ $33_{(10)} = 100001_{(2)}$ $\qquad$ $1859_{(10)} = 3503_{(8)}$

$$\begin{array}{r|l} \multicolumn{2}{c}{8} \\ 27 & 3 \\ 3 & 3 \\ 0 & \end{array} \uparrow \text{MSB} \qquad \begin{array}{r|l} \multicolumn{2}{c}{2} \\ 33 & 1 \\ 16 & 0 \\ 8 & 0 \\ 4 & 0 \\ 2 & 0 \\ 1 & 1 \\ 0 & \end{array} \uparrow \text{MSB} \qquad \begin{array}{r|l} \multicolumn{2}{c}{2} \\ 1859 & 3 \\ 232 & 0 \\ 29 & 5 \\ 3 & 3 \\ 0 & \end{array} \uparrow \text{MSB}$$

Problemă : Câte numere există între $175_{(8)}$ și $200_{(8)}$.
Există 2 numere : $175_{(8)}, 176_{(8)}, 177_{(8)}, 200_{(8)}$.

$$n_{(10)} = b_n b_{n-1} ... b_1 b_{0(2)} = \sum_{i=0}^{n} b_i a^i{}_{(a)} \tag{2}$$

$6D_{(16)} = 1101101_{(2)} = 1231_{(4)} = 155_{(8)} = 109_{(10)}$
$743_{(16)} = 11101000011_{(2)} = 131003_{(4)} = 3503_{(8)} = 7 \times 16^2 + 4 \times 16^1 + 3 \times 16^0 = 1859_{(10)}$
$37FD_{(16)} = 11011111111101_{(2)} = 11211_{(4)} = 545_{(8)} = 14333_{(10)}$
$165_{(16)} = 101100101_{(2)} = 11211_{(4)} = 545_{(8)} = 357_{(10)}$
$ABCD_{(16)} = 1010101111001101_{(2)} = 22233031_{(4)} = 125715_{(8)} = 43981_{(10)}$
$7FF_{(16)} = 11111111111_{(2)} = 133333_{(4)} = 3777_{(8)} = 2047_{(10)}$
$E71_{(16)} = 111001110001_{(2)} = 321302_{(4)} = 7161_{(8)} = 3697_{(10)}$

$0,0000011001 = 2^{-6} + 2^{-7} + 2^{-10} = 2^{-6}(1 + 2^{-1} + 2^{4})$
$= 2^{-6}(1 + 2^{-1} + 2^{-4})$primul bit se ignoră este standard
$0|0111111001|10010......|$
$e_{\uparrow(10)} = \dfrac{[log_{10}|10|]}{log_{10}2}_{\uparrow}$
$m_{(10)} = \dfrac{|10|}{2^{e_\uparrow}} - 1$
$D4EA,71_{(16)} = 1101010011101010011110001$
$= 2^{15} + 2^{14} + 2^{12} + 2^{10} + 2^{7} + 2^{6} + 2^{5} + 2^{3} + 2^{1} + 2^{-2} + 2^{-3} + 2^{-4} + 2^{-8}$
$= 2^{15}(1 + 2^{-1} + 2^{-3} + 2^{-5} + 2^{-8} + 2^{-9} + 2^{-10} + 2^{-12} + 2^{-14} + 2^{-17} + 2^{-18} + 2^{-19} + 2^{-23})$
$e_\uparrow = 15$
$k = 11$
$exp = 1023 + 15 = 2^{1}0 + 2^{3} + 2^{2} + 2^{1}$
$0|10000001110|101010011101010011110......|$