

Laborator Proiectare Logică 2

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Exerciții schimbare bază de numerație

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

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

$$27_{(10)} = 33_{(8)}$$

$$33_{(10)} = 100001_{(2)}$$

$$1859_{(10)} = 3503_{(8)}$$

$$\begin{array}{c|c} 8 & \\ \hline 27 & 3 \\ 3 & 3 \\ 0 & \end{array} \quad \uparrow \text{MSB}$$

$$\begin{array}{c|c} 2 & \\ \hline 33 & 1 \\ 16 & 0 \\ 8 & 0 \\ 4 & 0 \\ 2 & 0 \\ 1 & 1 \\ 0 & \end{array} \quad \uparrow \text{MSB}$$

$$\begin{array}{c|c} 2 & \\ \hline 1859 & 3 \\ 232 & 0 \\ 29 & 5 \\ 3 & 3 \\ 0 & \end{array} \quad \uparrow \text{MSB}$$

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

$$n_{(10)} = b_n b_{n-1} \dots b_1 b_0_{(2)} = \sum_{i=0}^n b_i a^i \quad (a) \quad (2)$$

$$\begin{aligned}
6D_{(16)} &= 1101101_{(2)} = 1231_{(4)} = 155_{(8)} = 109_{(10)} \\
743_{(16)} &= 11101000011_{(2)} = 131003_{(4)} = 3503_{(8)} = 7 \times 16^2 + 4 \times 16^1 + 3 \times 16^0 = 1859_{(10)} \\
37FD_{(16)} &= 11011111111101_{(2)} = 11211_{(4)} = 545_{(8)} = 14333_{(10)} \\
165_{(16)} &= 101100101_{(2)} = 11211_{(4)} = 545_{(8)} = 357_{(10)} \\
ABCD_{(16)} &= 1010101111001101_{(2)} = 22233031_{(4)} = 125715_{(8)} = 43981_{(10)} \\
7FF_{(16)} &= 1111111111_{(2)} = 133333_{(4)} = 3777_{(8)} = 2047_{(10)} \\
E71_{(16)} &= 111001110001_{(2)} = 321302_{(4)} = 7161_{(8)} = 3697_{(10)}
\end{aligned}$$