

Vježbe I

Brojni sistemi; konverzija iz jednog u drugi brojni sistem

Dekadni brojni sistem: osnova 10, cifre {0, 1, 2, ..., 9}

$$\text{npr. } 136_{(10)} = 1 \times 10^2 + 3 \times 10^1 + 6 \times 10^0$$

Binarni brojni sistem: osnova 2, cifre {0, 1}

$$\text{npr. } 1011_{(2)} = 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0$$

Oktalni brojni sistem: osnova 8, cifre {0, 1, 2, 3, 4, 5, 6, 7}

$$\text{npr. } 256_{(8)} = 2 \times 8^2 + 5 \times 8^1 + 6 \times 8^0$$

Heksadecimalni brojni sistem: osnova 16, cifre {0, 1, 2, ..., 8, 9, A, B, C, D, E, F}

$$\text{npr. } AC23_{(16)} = 10 \times 16^3 + 12 \times 16^2 + 2 \times 16^1 + 3 \times 16^0$$

1. Dat je broj 1044.75 u dekadnom brojnom sistemu. Pretvoriti ga u binarni brojni sistem.

		ostatak		cijeli dio			
1044	: 2 =	522	0	0.75	× 2 = 1.5	1	↓
522	: 2 =	261	0	0.5	× 2 = 1.0	1	
261	: 2 =	130	1				
130	: 2 =	65	0				
65	: 2 =	32	1				
32	: 2 =	16	0				
16	: 2 =	8	0				
8	: 2 =	4	0				
4	: 2 =	2	0				
2	: 2 =	1	0				
1	: 2 =	0	1				

$$1044_{(10)} = 10000010100_{(2)}, 0.75_{(10)} = 0.11_{(2)} \Rightarrow 1044.75_{(10)} = 10000010100.11_{(2)}$$

*** konverzija sa zadatom tačnošću

npr. 5 decimala

		cijeli dio	
0.075	× 2 =	0.150	0
0.150	× 2 =	0.3	0
0.3	× 2 =	0.6	0
0.6	× 2 =	1.2	1
0.2	× 2 =	0.4	0 ...

0.075₍₁₀₎ = 0.00010...₍₂₎

2. Dat je broj 10001011.1101 u binarnom brojnom sistemu. Pretvoriti ga u dekadni brojni sistem.

$$10001011.1101_{(2)} = 1 \times 2^7 + 0 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 1 \times 2^{-2} + 0 \times 2^{-3} + 1 \times 2^{-4} = 2^7 + 2^3 + 2^1 + 2^0 + 2^{-1} + 2^{-2} + 2^{-4} = 128 + 8 + 2 + 1 + 0.5 + 0.25 + 0.0625 = 139.8125_{(10)}$$

$$\begin{aligned} &= 2^{15} + 2^{13} + 2^{11} + 2^{10} + 2^9 + 2^8 + 2^2 + 2 + 2^{-3} + 2^{-4} + 2^{-5} + 2^{-6} + 2^{-7} + 2^{-8} = \\ &= 44818.24609_{(10)} \end{aligned}$$

ili

$$\text{AF12.3F}_{(16)} = 10 \times 16^3 + 15 \times 16^2 + 1 \times 16^1 + 2 \times 16^0 + 3 \times 16^{-1} + 15 \times 16^{-2} = 44818.24609_{(10)}$$

ili

$$127422.176_{(8)} = 1 \times 8^5 + 2 \times 8^4 + 7 \times 8^3 + 4 \times 8^2 + 2 \times 8^1 + 2 \times 8^0 + 1 \times 8^{-1} + 7 \times 8^{-2} + 6 \times 8^{-3} = 44818.24609_{(10)}$$