

SEL0414 - Sistemas Digitais
Resolução Lista 6 - Sistemas de Numeração

01

a.

$$(101110)_b = 2^4 + 2^2 + 2^1 = 22$$

b.

$$(1001000001001)_b = 2^{12} + 2^9 + 2^3 + 2^0 = 4617$$

c.

$$(11111111)_b = 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = 2^8 - 1 = 255$$

d.

$$(1001110)_b = 2^5 + 2^2 + 2^1 = 38$$

e.

$$(1111010111)_b = 2^9 + 2^8 + 2^7 + 2^6 + 2^4 + 2^2 + 2^1 + 2^0 = 983$$

02

a.

$$37 = 2 \cdot 18 + 1 = 2^2 \cdot 9 + 1 = 2^2 \cdot (2 \cdot 4 + 1) + 1 = 2^5 + 2^2 + 2^0 = (100101)_b$$

b.

$$\begin{aligned} 189 &= 2 \cdot 94 + 1 = 2^2 \cdot 47 + 1 = 2^2 (2 \cdot 23 + 1) + 1 = 2^3 \cdot 23 + 2^2 + 1 = 2^3 (11 \cdot 2 + 1) + 2^2 + 1 = \\ &2^4 \cdot 11 + 2^3 + 2^2 + 1 = 2^4 (2 \cdot 5 + 1) + 2^3 + 2^2 + 1 = 2^5 \cdot 5 + 2^4 + 2^3 + 2^2 + 1 = 2^5 (2 \cdot 2 + 1) + 2^4 + 2^3 + 2^2 + 1 = \\ &2^7 + 2^5 + 2^4 + 2^3 + 2^2 + 2^0 = (10111101)_b \end{aligned}$$

c.

$$77 = 2 \cdot 38 + 1 = 2^2 \cdot 19 + 1 = 2^2 \cdot (2 \cdot 9 + 1) + 1 = 2^3 \cdot 9 + 2^2 + 1 = 2^3 \cdot (2 \cdot 4 + 1) + 2^2 + 1 = 2^6 + 2^3 + 2^2 + 2^0 = (1001101)_b$$

d.

$$\begin{aligned} 205 &= 2 \cdot 102 + 1 = 2^2 \cdot 51 + 1 = 2^2 \cdot (2 \cdot 25 + 1) + 1 = 2^3 \cdot 25 + 2^2 + 1 = 2^3 \cdot (2 \cdot 12 + 1) + 2^2 + 1 = \\ &2^4 \cdot 12 + 2^3 + 2^2 + 1 = 2^5 \cdot 6 + 2^3 + 2^2 + 1 = 2^6 \cdot 3 + 2^3 + 2^2 + 1 = 2^7 + 2^6 + 2^3 + 2^2 + 2^0 = (11001101)_b \end{aligned}$$

e.

$$511 = 512 - 1 = 2^9 - 1 = 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 = (11111111)_b$$

03

a.

$$(B0B0)_h = 11 \cdot 16^3 + 11 \cdot 16^1 = 45232$$

b.

$$(37FD)_h = 3 \cdot 16^3 + 7 \cdot 16^2 + 15 \cdot 16^1 + 13 = 14333$$

c.

$$(FE10)_h = 15 \cdot 16^3 + 14 \cdot 16^2 + 1 \cdot 16^1 = 65040$$

d.

$$(7FF)_h = 7 \cdot 16^2 + 15 \cdot 16^1 + 15 = 2047$$

04

a.

$$59 = 3 \cdot 16 + 11 = (3B)_h$$

b.

$$919 = 57 \cdot 16 + 7 = (3 \cdot 16 + 9) \cdot 16 + 7 = 3 \cdot 16^2 + 9 \cdot 16 + 7 = (397)_h$$

c.

$$771 = 48 \cdot 16 + 3 = 3 \cdot 16^2 + 3 = (303)_h$$

05

a. $(B0B0)_h = (1011\ 0000\ 1011\ 0000)_b$

b. $(37FD)_h = (0011\ 0111\ 1111\ 1101)_b$

c. $(FE10)_h = (1111\ 1110\ 0001\ 0000)_b$

d. $(7FF)_h = (0111\ 1111\ 1111)_b$

06

a. $(0001\ 0110)_b = (16)_h$

b. $(0001\ 0010\ 0000\ 1001)_b = (1209)_h$

c. $(1111\ 1111)_b = (FF)_h$

d. $(0010\ 0110)_b = (26)_h$

e. $(0011\ 1101\ 0111)_b = (3D7)_h$

07

a.

$$(5432)_8 = 5 \cdot 8^3 + 4 \cdot 8^2 + 3 \cdot 8^1 + 2 \cdot 8^0 = 2842$$

b.

$$(1322)_4 = 1 \cdot 4^3 + 3 \cdot 4^2 + 2 \cdot 4^1 + 2 \cdot 4^0 = 122$$

c.

$$(2435)_5 = 2 \cdot 5^3 + 4 \cdot 5^2 + 3 \cdot 5^1 + 5 \cdot 5^0 = 370$$

d.

$$(2110)_3 = 2 \cdot 3^3 + 1 \cdot 3^2 + 1 \cdot 3^1 + 0 \cdot 3^0 = 66$$

08

a.

$$47 = (0100\ 0111)_{BCD}$$

b.

$$187 = (0001\ 1000\ 0111)_{BCD}$$

c.

$$13 = (0001\ 0011)_{BCD}$$

d.

$$89627 = (1000\ 1001\ 0110\ 0010\ 0111)_{BCD}$$

e.

$$72 = (0111\ 0010)_{BCD}$$