

1

Binário	Decimal	Octal	Hexadecimal
0 0 0	0	0	0
0 0 1	1	1	1
0 1 0	2	2	2
0 1 1	3	3	3
1 0 0	4	4	4
1 0 1	5	5	5
1 1 0	6	6	6
1 1 1	7	7	7

0 0 0 0	0	0	0
0 0 0 1	1	1	1
0 0 1 0	2	2	2
0 0 1 1	3	3	3
0 1 0 0	4	4	4
0 1 0 1	5	5	5
0 1 1 0	6	6	6
0 1 1 1	7	7	7
1 0 0 0	8	10	8
1 0 0 1	9	11	9
1 0 1 0	10	12	A
1 0 1 1	11	13	B
1 1 0 0	12	14	C
1 1 0 1	13	15	D
1 1 1 0	14	16	E
1 1 1 1	15	17	F

2

$$00001111_2 = 2^3 + 2^2 + 2 + 1 = 15$$

$$1348_8 = 1 \times 8^3 + 3 \times 8^2 + 4 \times 8 + 8 = 512 + 192 + 32 + 8 = 704 + 40 = 744$$

$$DF5_{16} = 13 \times 16^2 + 15 \times 16 + 5 = 3328 + 240 + 5 = 3573$$

$$10100011 = 2^7 + 2^5 + 2 + 1 = 128 + 32 + 2 + 1 = 163$$

$$7751_8 = 7 \times 8^3 + 7 \times 8^2 + 5 \times 8 + 1 = 3584 + 448 + 40 + 1 = 4073$$

$$A7A2_{16} = 10 \times 16^3 + 7 \times 16^2 + 10 \times 16 + 2 = 40960 + 1792 + 162 = 42914$$

$$11111111 = 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2 + 1 = 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 192 + 48 + 15 = 240 + 15 = 255$$

$$2013_8 = 2 \times 8^3 + 8 + 3 = 512 + 8 + 3 = 523$$

$$40FF_{16} = 4 \times 16^3 + 15 \times 16 + 15 = 4096 + 240 + 15 = 4351$$

3

$$\begin{array}{r} 1036_{10} = \dots_8 \\ = 2014_8 \end{array}$$

$$\begin{array}{r} 1036 \Big| \begin{array}{|c|c|c|c|c|c|c|c|} \hline & & 8 & & & & & \\ \hline 1032 & \Big| & 129 & \Big| & 8 & & & \\ \hline 4 & & 128 & & 16 & & & \\ \hline & & 1 & & 16 & \Big| & 8 & \\ \hline & & 0 & & 0 & \Big| & 0 & \\ \hline & & & & & 0 & & \\ \hline & & & & & 2 & & \\ \hline \end{array} \end{array}$$

$$\begin{array}{r} 1036_{10} = \dots_{16} \\ = 4012 \end{array}$$

$$\begin{array}{r} 1036 \Big| \begin{array}{|c|c|c|c|c|c|c|c|} \hline & & 16 & & & & & \\ \hline 1024 & \Big| & 64 & \Big| & 16 & & & \\ \hline 12 & \Big| & 64 & \Big| & 16 & & & \\ \hline & \Big| & 0 & \Big| & 0 & & & \\ \hline & & 0 & & 0 & & & \\ \hline & & & & 0 & & & \\ \hline & & & & 4 & & & \\ \hline \end{array} \end{array}$$

$$\begin{array}{r} 1036_{10} = \dots_2 \\ = 100100 \end{array}$$

$$\begin{array}{r} 1036 \Big| \begin{array}{|c|c|c|c|c|c|c|c|} \hline & & 2 & & & & & \\ \hline 1036 & \Big| & 18 & \Big| & 2 & & & \\ \hline 0 & \Big| & 18 & \Big| & 2 & & & \\ \hline & \Big| & 0 & \Big| & 2 & & & \\ \hline & & 1 & \Big| & 2 & & & \\ \hline & & 0 & \Big| & 2 & & & \\ \hline & & 1 & \Big| & 2 & & & \\ \hline & & 0 & \Big| & 2 & & & \\ \hline & & 1 & \Big| & 2 & & & \\ \hline & & 0 & \Big| & 2 & & & \\ \hline & & 1 & & 2 & & & \\ \hline \end{array} \end{array}$$

Acabon!

4

$$110110 \cdot 1101001_2 = \dots_{10}$$

$$\begin{aligned} & 2^5 + 2^4 + 2^2 + 2 + 0 + \frac{1}{2} + \frac{1}{4} + \frac{1}{16} + \frac{1}{128} \\ & = 32 + 16 + 4 + 2 + 0 + 0,5 + 0,25 + 0,125 + 0,0625 \\ & = 54,9375 \\ & = 54,94 \end{aligned}$$

$$m_2 = \lfloor n_1 \times \log_{n_2} n_1 \rfloor$$

$$m_2 = \lfloor 7 \times \log_{10} 2 \rfloor$$

$$= \lfloor 7 \times 0,3 \rfloor = \lfloor 2,1 \rfloor = 2$$

$$\begin{aligned}
 127.444_8 &= 1 \times 8^2 + 2 \times 8 + 7 + 4 \times 8^{-1} + 4 \times 8^{-2} + 4 \times 8^{-3} \\
 &= 64 + 16 + 7 + \underbrace{4 \times 0,125}_{0,5} + \underbrace{4 \times 0,015625}_{0,0625} + \underbrace{4 \times 0,001953125}_{0,0078125} \\
 &= 87 + 0,5 + 0,0625 + 0,0078125 \\
 &= 87,5703125 \\
 &= 87,57
 \end{aligned}$$

$$m_2 = \lfloor 3 \times \log_{10} 8 \rfloor = 2$$

$$\begin{aligned}
 20.8_{16} &= 2 \times 16 + 13 + 8 \times \frac{1}{16} \\
 &= 32 + 13 + 0,5 \\
 &= 45,5
 \end{aligned}$$

5

$$\underline{33}, 47_{10} = \dots_8$$

$$\begin{array}{r}
 0,47 \times 8 = 3,76 \\
 0,76 \times 8 = 6,08
 \end{array}$$

$$\begin{array}{r}
 33|8 \\
 32|4 \\
 \hline
 1|0|0 \\
 \hline
 4
 \end{array}$$

$$33 = 41$$

$$\frac{1}{10}, \frac{1}{100}$$

$$\frac{1}{8}, \frac{1}{64}, \frac{1}{128}$$

$$= \boxed{41,36}_8$$

$$\underline{33}, 47_{10} = \dots_{16}$$

$$0,47 \times 16 = 7,52$$

$$\begin{array}{r}
 33|16 \\
 32|2 \\
 \hline
 1|0|0 \\
 \hline
 2
 \end{array}$$

$$\frac{1}{10}, \frac{1}{100}$$

$$\frac{1}{16}, \frac{1}{256}$$

$$\begin{array}{r}
 4 \\
 \times 16 \\
 \hline
 282 \\
 47 \\
 \hline
 752
 \end{array}$$

$$33_{10} = 21_{16}$$

$$0,47_{10} = 0,78_{16}$$

$$33,47_{10} = 21,7_{16}$$

$$\underline{33}, 47_{10} = \dots_2$$

$$\begin{array}{r}
 33|2 \\
 32|16 \\
 \hline
 1|16|2 \\
 1|16|2 \\
 \hline
 0|0|2 \\
 0|0|2 \\
 \hline
 0|0|0 \\
 \hline
 1
 \end{array}$$

$$0,47 \times 2 = 0,94$$

$$0,94 \times 2 = 1,88$$

$$0,88 \times 2 = 1,76$$

$$0,76 \times 2 = 1,52$$

$$0,52 \times 2 = 1,04$$

$$0,04 \times 2 = 0,08$$

$$\begin{array}{r}
 6 \text{ casas decimais} \\
 \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}
 \end{array}$$

$$33_{10} = 100001_2$$

$$0,47_{10} = 0,011110_2$$

$$33,47 = 100001,011110_2$$

[7]

$$\begin{array}{r} \overset{1}{1} \overset{1}{1} \overset{1}{1} \overset{1}{1} \\ 10101110 \\ - 00011111 \\ \hline 10001111 \end{array}$$

$$\begin{array}{r} \overset{1}{1} \\ 125 \\ - 17 \\ \hline 106 \end{array}$$

$$5+8=13$$

$$\begin{array}{r} \overset{1}{1} \\ 107 \\ DC \\ \hline 028 \end{array}$$

$$\begin{array}{r} \overset{1}{1} \\ 7+16=23 \\ - 12 \\ \hline 11 \end{array}$$

$$\overbrace{00111}^{3} \overbrace{011}^{11} = 3B$$

$$\begin{aligned} 2^5 + 2^4 + 2^3 + 2 + 1 &= 32 + 16 + 8 + 2 + 1 = \\ &\approx 48 + 2 + 8 + 1 \\ &= 59 \end{aligned}$$

$$\begin{array}{c|cc} 59 & 16 \\ \hline 48 & 3 & 16 \\ \hline 11 & 0 & 0 \\ & 3 \end{array}$$

$$59_{10} = 3B$$

[8]

$$\cancel{1111} \quad \cancel{111}0_2 = -2$$

$$0000 \quad 0000_2 = 0$$

$$1111 \quad 1111_2 = -1$$

$$0011 \quad 0011_2 = 2^5 + 2^4 + 2 + 1 = 32 + 16 + 2 + 1 = 49$$

[9]

$$\cancel{1111} \quad 1110 = 1110$$

$$\cancel{0000} \quad 0110 = 0110$$

$$\cancel{1111} \quad 1111 = 1111$$

$$\underline{0011} \quad \underline{0011}$$

Não dá!

10

$$1110 = 1111 \quad 1110$$

$$0110 = 0000 \quad 0110$$

$$1000 = 1111 \quad 1000$$

$$0001 = 0000 \quad 0001$$

11

$$765_{10}$$

two's comp.

$$\begin{array}{r} 111 \quad 110 \quad 101 \quad 000 \\ 000 \quad 001 \quad \underline{011} \quad 000 \end{array} = -2^6 + 2^4 + 2^3 = -64 + 16 + 8 = -40$$

12

$$-2^7 \leq x \leq 2^7 - 1$$

$$(-128 \leq x < 127)$$

$$\Leftrightarrow x \in [-128, 127]$$

$$\begin{array}{r} 95_{10} \\ 44 \\ \hline 1 \end{array} \left| \begin{array}{r} 2 \\ 22 | 2 \\ 22 | 11 | 2 \\ 0 | 10 | 5 | 2 \\ 1 | 4 | 2 | 2 \\ 1 | 1 | 2 | 1 | 2 \\ 0 | 0 | 0 | 0 | 0 \\ 1 \end{array} \right.$$

$$95_{10} = 101101$$

$$-13_8 = -1 \times 8 - 3 = -8 - 3 = -11_{10}$$

$$\begin{array}{r} 11_{10} \\ 10 \\ \hline 1 \end{array} \left| \begin{array}{r} 2 \\ 4 | 2 \\ 4 | 2 \\ 1 | 1 | 2 \\ 1 | 0 | 0 | 0 \\ 1 \end{array} \right.$$

$$\begin{aligned} -11_{10} &= 1010 \\ &= 1111 \quad 1010 \end{aligned}$$

$$\begin{array}{r} 15 \\ -F1_{16} \\ \hline 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 1 \quad -F1_{16} \\ 0 \quad 0 \quad 0 \quad 0 \quad 1 \quad 1 \quad 1 \quad 1 \end{array}$$

$$\begin{array}{r} 130 \\ 130 \\ \hline 0 \end{array} \left| \begin{array}{r} 2 \\ 65 | 2 \\ 64 | 32 | 2 \\ 1 | 16 | 8 | 2 \\ 0 | 8 | 4 | 2 \\ 0 | 4 | 2 | 2 \\ 0 | 2 | 1 | 2 \\ 0 | 0 | 0 | 0 \\ 1 \end{array} \right.$$

$$\begin{aligned} 130_{10} &\neq 0100000010_2 \\ \Leftrightarrow 130 &\notin [-128, 127] \end{aligned}$$

13

$$\begin{array}{r}
 1-11111 \quad 111 \\
 11111 \quad 11111 \\
 +00111 \quad \hline
 00111 \quad 11110 \\
 1-11111 \quad 111
 \end{array}$$

$$\begin{array}{r}
 63 \Big| 2 \\
 62 \Big| 31 \Big| 2 \\
 1 \Big| 30 \Big| 15 \Big| 2 \\
 1 \Big| 14 \Big| 7 \Big| 2 \\
 1 \Big| 6 \Big| 3 \Big| 2 \\
 1 \Big| 2 \Big| 1 \Big| 2 \\
 1 \Big| 0 \Big| 0 \\
 1
 \end{array}$$

$$\begin{array}{r}
 11111 \quad 11111 \\
 +11111 \quad 0101 \\
 \hline
 11111 \quad 0100
 \end{array}$$

$$\begin{array}{r}
 11 \Big| 2 \\
 10 \Big| 5 \Big| 2 \\
 1 \Big| 4 \Big| 2 \Big| 3 \\
 1 \Big| 2 \Big| 1 \Big| 2 \\
 0 \Big| 0 \Big| 0 \\
 1
 \end{array}$$

1011

$$\begin{array}{l}
 -2^7 < x < 2^7 - 1 \quad 61 - 128 < x < 127 \\
 -11 - 123 \\
 11 +
 \end{array}$$

$$\begin{array}{l}
 11_{10} = 0000\ 1011 \\
 -11_{10} = 1111\ 0101
 \end{array}$$

$$\begin{array}{r}
 011 \quad 111 \quad 011 \\
 11 + 123: \quad 0000 \quad 1011 \\
 + C \quad 111 \quad 1011 \\
 \hline
 10000 \quad 0110
 \end{array}$$

Overflow

$$\begin{array}{r}
 123 \Big| 2 \\
 122 \Big| 61 \Big| 2 \\
 1 \Big| 60 \Big| 30 \Big| 2 \\
 1 \Big| 30 \Big| 15 \Big| 2 \\
 0 \Big| 15 \Big| 7 \Big| 2 \\
 1 \Big| 6 \Big| 3 \Big| 2 \\
 1 \Big| 2 \Big| 1 \Big| 2 \\
 1 \Big| 0 \Big| 0 \\
 1
 \end{array}$$

$$123_{10} = 0111\ 1011$$

$$-123_{10} = 1000\ 0101$$

15

$$\lceil \log_3 6 \rceil = 3$$

16

$$111_{10} = ???_{BCD}$$

$$= 0001\ 0001\ 0001_{BCD}$$

$$125_8 = 64 + 8 \times 2 + 5 = 85_{10} = 1000\ 0101$$

$$\begin{aligned}
 ABC_{16} &= 10 \times 16^2 + 11 \times 16 + 12 = 2560 + 176 + 12 \\
 &\quad = 2560 + 188 \\
 &\quad = 2748_{10}
 \end{aligned}$$

$$2748_{10} = 0010\ 0111\ 0100\ 1000_{BCD}$$

17

<u>0</u>	<u>00</u>	<u>000</u>	<u>0000</u>	<u>00000</u>
<u>1</u>	<u>01</u>	<u>001</u>	<u>0001</u>	<u>00001</u>
	<u>11</u>	<u>011</u>	<u>0011</u>	<u>00011</u>
	<u>10</u>	<u>010</u>	<u>0010</u>	<u>00010</u>
		<u>110</u>	<u>0110</u>	
			<u>111</u>	<u>0111</u>
			<u>101</u>	<u>0101</u>
			<u>100</u>	<u>0100</u>
				<u>1000</u>
				<u>10000</u>
				:
				<u>10010</u>
				<u>10011</u>
				<u>10001</u>
				<u>10000</u>

18

000001111,
 {
000001000_{Gray}

010011001,
 {
11010101_{Gray}

011111111,
 {
10000000_{Gray}