

Exercícios - AOC

1a) $101010_2 = 42_{10}$

$$\begin{aligned} & 2^0 = 0 \\ & 2^1 = 2 \\ & 2^2 = 0 \\ & 2^3 = 8 \\ & 2^4 = 0 \\ & 2^5 = 32 \end{aligned}$$

$$32 + 8 + 2 = 42$$

b) $1010_3 = 30_{10}$

$$\begin{aligned} & 3^0 \times 0 = 0 \\ & 3^1 \times 1 = 3 \\ & 3^2 \times 0 = 0 \\ & 3^3 \times 1 = 27 \end{aligned}$$

c) $1021_4 = 81_{10}$

$$\begin{aligned} & 4^0 \times 1 = 1 \\ & 4^1 \times 2 = 8 \\ & 4^2 \times 0 = 0 \\ & 4^3 \times 1 = 64 \end{aligned}$$

d) $1025_6 = 233_{10}$

$$\begin{aligned} & 6^0 \times 5 = 5 \\ & 6^1 \times 2 = 12 \\ & 6^2 \times 0 = 0 \\ & 6^3 \times 1 = 216 \end{aligned}$$

e) $2165_8 = 1141_{10}$

$$\begin{aligned} & 8^0 \times 5 = 5 \\ & 8^1 \times 6 = 48 \\ & 8^2 \times 1 = 64 \\ & 8^3 \times 2 = 1024 \end{aligned}$$

f) $1FA2_{16} = 8098_{10}$

$$\begin{aligned} & 16^0 \times 2 = 2 \\ & 16^1 \times 10 = 160 \\ & 16^2 \times 15 = 3840 \\ & 16^3 \times 1 = 4096 \end{aligned}$$

g) $E1A_{16} = 3610_{10}$

$$\begin{aligned} & 16^0 \times 10 = 10 \\ & 16^1 \times 1 = 16 \\ & 16^2 \times 14 = 3584 \end{aligned}$$

h) $707_8 = 455_{10}$

$$\begin{aligned} & 8^0 \times 7 = 7 \\ & 8^1 \times 0 = 0 \\ & 8^2 \times 7 = 448 \end{aligned}$$

$$20, 72_{10} = 1001\ 0000_2$$

$$\begin{array}{r} 72 \cancel{12} \\ 72 \ 36 \cancel{12} \\ 0 \ 36 \ 18 \cancel{12} \\ 0 \ 18 \ 9 \cancel{12} \\ 0 \ 9 \ 4 \cancel{12} \\ 1 \ 4 \ 2 \cancel{12} \\ 0 \ 2 \ 1 \\ 0 \end{array}$$

$$61, 127_{10} = 111\ 1110_2$$

$$\begin{array}{r} 127 \cancel{12} \\ 126 \ 63 \cancel{12} \\ 1 \ 62 \ 31 \cancel{12} \\ 1 \ 30 \ 15 \cancel{12} \\ 1 \ 14 \ 7 \cancel{12} \\ 1 \ 6 \ 3 \cancel{12} \\ 1 \ 2 \ 1 \\ 1 \end{array}$$

$$c1\ 35_{10} = 1000\ 1100_2$$

$$\begin{array}{r} 35 \cancel{12} \\ - 34 \ 11 \cancel{12} \\ 01 \ 11 \ 8 \cancel{12} \\ 1 \ 8 \ 4 \cancel{12} \\ 0 \ 4 \ 2 \cancel{12} \\ 0 \ 2 \ 1 \\ 0 \end{array}$$

$$d1\ 23_{10} = 1011\ 1000_2$$

$$\begin{array}{r} 23 \cancel{12} \\ - 22 \ 11 \cancel{12} \\ 1 \ 10 \ 5 \cancel{12} \\ 1 \ 4 \ 2 \cancel{12} \\ 1 \ 2 \ 1 \\ 0 \end{array}$$

$$e1\ 165_{10} = 1010\ 0101_2$$

$$\begin{array}{r} 165 \cancel{12} \\ 164 \ 82 \cancel{12} \\ 1 \ 82 \ 41 \cancel{12} \\ 0 \ 40 \ 20 \cancel{12} \\ 1 \ 20 \ 10 \cancel{12} \\ 0 \ 10 \ 5 \cancel{12} \\ 0 \ 4 \ 2 \cancel{12} \\ 1 \ 2 \ 1 \\ 0 \end{array}$$

$$f1\ 40_{10} = 1010\ 0000_2$$

$$\begin{array}{r} 40 \cancel{12} \\ 40 \ 20 \cancel{12} \\ 0 \ 20 \ 10 \cancel{12} \\ 0 \ 10 \ 5 \cancel{12} \\ 0 \ 4 \ 2 \cancel{12} \\ 1 \ 2 \ 1 \\ 0 \end{array}$$

$$g) 22_{10} = 10110000_2$$

$$h) 8_{10} = 1000_2$$

$$\begin{array}{r} 22 \overline{) 10110000} \\ \underline{0} 10110000 \\ \underline{10110000} \\ 0 \end{array}$$

$$\begin{array}{r} 8 \overline{) 1000} \\ \underline{1000} \\ 0 \end{array}$$

$$3) 81 \quad 1000001_2 = 33_{10}$$

$$\begin{array}{l} 2^0 \times 1 = 1 \\ 2^1 \times 0 = 0 \\ 2^2 \times 0 = 0 \\ 2^3 \times 0 = 0 \\ 2^4 \times 0 = 0 \\ 2^5 \times 1 = 32 \end{array}$$

$$6) 11011_2 = 27_{10}$$

$$\begin{array}{l} 2^0 \times 1 = 1 \\ 2^1 \times 1 = 2 \\ 2^2 \times 0 = 0 \\ 2^3 \times 1 = 8 \\ 2^4 \times 1 = 16 \end{array}$$

$$c) 1100100_2 = 18_{10}$$

$$\begin{array}{l} 2^0 \times 0 = 0 \\ 2^1 \times 0 = 0 \\ 2^2 \times 1 = 4 \\ 2^3 \times 0 = 0 \\ 2^4 \times 0 = 0 \\ 2^5 \times 1 = 32 \\ 2^6 \times 1 = 64 \end{array}$$

$$d) 10000000_2 = 128_{10}$$

$$\begin{array}{l} 2^0 \times 0 = 0 \\ 2^1 \times 0 = 0 \\ 2^2 \times 0 = 0 \\ 2^3 \times 0 = 0 \\ 2^4 \times 0 = 0 \\ 2^5 \times 0 = 0 \\ 2^6 \times 0 = 0 \\ 2^7 \times 1 = 128 \end{array}$$

$$e) 11001011_2 = 33_{10}$$

$$\begin{array}{l} 2^0 \times 1 = 1 \\ 2^1 \times 1 = 2 \\ 2^2 \times 0 = 0 \\ 2^3 \times 1 = 8 \\ 2^4 \times 0 = 0 \\ 2^5 \times 1 = 32 \end{array}$$

$$f) 10110001_2 = 178_{10}$$

$$\begin{array}{l} 2^0 \times 1 = 1 \\ 2^1 \times 0 = 0 \\ 2^2 \times 1 = 4 \\ 2^3 \times 1 = 8 \\ 2^4 \times 1 = 16 \\ 2^5 \times 0 = 0 \\ 2^6 \times 0 = 0 \\ 2^7 \times 1 = 128 \end{array}$$

$$g) 10110001_2 = 177_{10}$$

$$\begin{aligned} & 2^0 \times 1 = 1 \\ & 2^1 \times 0 = 0 \\ & 2^2 \times 0 = 0 \\ & 2^3 \times 0 = 0 \\ & 2^4 \times 1 = 16 \\ & 2^5 \times 0 = 0 \\ & 2^6 \times 0 = 0 \\ & 2^7 \times 1 = 128 \end{aligned}$$

$$h) 100110000_2 = 300_{10}$$

$$\begin{aligned} & 2^4 \times 1 = 16 \\ & 2^5 \times 1 = 32 \\ & 2^8 \times 1 = 256 \end{aligned}$$

$$4) 567_8 = 375_{10}$$

$$\begin{aligned} & 8^0 \times 7 = 7 \\ & 8^1 \times 6 = 48 \\ & 8^2 \times 5 = 320 \end{aligned}$$

$$b) 983_8 = 643_{10}$$

$$\begin{aligned} & 8^0 \times 3 = 3 \\ & 8^1 \times 8 = 64 \\ & 8^2 \times 9 = 576 \end{aligned}$$

$$c) 1020_8 = 528_{10}$$

$$\begin{aligned} & 8^0 \times 0 = 0 \\ & 8^1 \times 2 = 16 \\ & 8^2 \times 0 = 0 \\ & 8^3 \times 1 = 512 \end{aligned}$$

$$d) 65_8 = 53_{10}$$

$$\begin{aligned} & 8^0 \times 5 = 5 \\ & 8^1 \times 6 = 48 \end{aligned}$$

$$e) 680_8 = 448_{10}$$

$$\begin{aligned} & 8^0 \times 0 = 0 \\ & 8^1 \times 8 = 64 \\ & 8^2 \times 6 = 384 \end{aligned}$$

$$f) 105_8 = 69_{10}$$

$$\begin{aligned} & 8^0 \times 5 = 5 \\ & 8^1 \times 0 = 0 \\ & 8^2 \times 1 = 64 \end{aligned}$$

$$g) 294_8 = 204_{10}$$

$$\begin{aligned} & 8^0 \times 4 = 4 \\ & 8^1 \times 9 = 72 \\ & 8^2 \times 2 = 128 \end{aligned}$$

$$h) 679_8 = 153_{10}$$

$$\begin{aligned} & 8^0 \times 9 = 9 \\ & 8^1 \times 7 = 56 \\ & 8^2 \times 6 = 384 \end{aligned}$$

$$5. \quad 867_{10} = 287_{16}$$

$$\left. \begin{array}{l} 16^0 \times 7 = 7 \\ 16^1 \times 6 = 96 \\ 16^2 \times 5 = 1280 \end{array} \right\} 1287$$

$$b) \quad 983_{10} = 2435_{16}$$

$$\left. \begin{array}{l} 16^0 \times 3 = 3 \\ 16^1 \times 8 = 128 \\ 16^2 \times 9 = 2304 \end{array} \right\} 2435$$

$$c) \quad 1020_{10} = 409_{16}$$

$$\left. \begin{array}{l} 16^0 \times 0 = 0 \\ 16^1 \times 2 = 32 \\ 16^2 \times 0 = 0 \\ 16^3 \times 4 = 4096 \end{array} \right\} 4128$$

$$d) \quad 65_{10} = A1_{16}$$

$$\left. \begin{array}{l} 16^0 \times 5 = 5 \\ 16^1 \times 6 = 96 \end{array} \right\} 101$$

$$e) \quad 680_{10} = 264_{16}$$

$$\left. \begin{array}{l} 16^0 \times 0 = 0 \\ 16^1 \times 8 = 128 \\ 16^2 \times 6 = 1536 \end{array} \right\} 1664$$

$$f) \quad 105_{10} = 261_{16}$$

$$\left. \begin{array}{l} 16^0 \times 5 = 5 \\ 16^1 \times 0 = 0 \\ 16^2 \times 1 = 256 \end{array} \right\} 261$$

$$g) \quad 294_{10} = 660_{16}$$

$$\left. \begin{array}{l} 16^0 \times 4 = 4 \\ 16^1 \times 9 = 144 \\ 16^2 \times 2 = 512 \end{array} \right\} 660$$

$$h) \quad 679_{10} = 657_{16}$$

$$\left. \begin{array}{l} 16^0 \times 7 = 7 \\ 16^1 \times 7 = 112 \\ 16^2 \times 6 = 1536 \end{array} \right\} 1657$$

$$a) \quad 3365_{10} =$$

$$\left. \begin{array}{l} 8 \\ 101 \\ 110 \\ 011 \\ 011 \end{array} \right\}$$

$$011 \ 011 \ 110 \ 101_2$$

$$b) \quad 452_{10} = 011101010010_2$$

$$\left. \begin{array}{l} 8 \\ 010 \\ 101 \\ 111 \end{array} \right\}$$

c) $625_8 = 0110\ 0010\ 0101_2$ d) $13793_8 = 00101111000011_2$

$\begin{array}{l} \swarrow 101 \\ \rightarrow 010 \\ \searrow 110 \end{array}$

e) $69103_8 = 110\ 111001000101_2$ f) $12004_8 = 01000000100_2$

g) $321_8 = 001010001$ h) $7654_8 = 11110101100_2$

i) $7081110101_2 = 105_8$ b) $011110011_2 = 303_8$

$001 = 1$

$011 = 3$

$110 = 6$

$110 = 6$

$101 = 5$

$011 = 3$

c) $\begin{array}{cccccccc} 101 & 001 & 110 & 010 & 111 & 011 & 100 & 000 \\ \hline 5 & 1 & 6 & 2 & 7 & 3 & 4 & 0 \end{array} = 51627340_8$

d) $\begin{array}{ccccccc} 111 & 011 & 010 & 001 & 000 & 001 & 000 \\ \hline 7 & 3 & 2 & 1 & 0 & 1 & 0 \end{array} = 732101_8$

e) $100\ 110\ 101$

$$d) \frac{111}{4} \frac{101}{5} \frac{111}{7} \frac{000}{0} = 7570_8$$

$$e) \frac{101}{5} \frac{010}{2} \frac{101}{5} \frac{010}{2} \frac{010}{2} = 52522_8$$

$$f) \frac{111}{4} \frac{100}{5} \frac{001}{1} \frac{010}{2} = 7512_8$$

$$g) \frac{110}{6} \frac{100}{5} \frac{010}{2} = 652_8$$

$$h) \frac{101}{5} \frac{111}{7} \frac{100}{5} \frac{011}{3} = 5753_8$$

$$9a) FS_{16} = 01111 \ 0101_2 = 363_8$$

$$b) AB7_{16} = 1010 \ 1011 \ 0111_2 = 5267_8$$

$$c) 9BA_{16} = 1001 \ 1000 \ 1010_2 = 4612_8$$

$$d) F1E2_{16} = 001111 \ 0001 \ 1110 \ 0010_2 = 170702_8$$

$$e) E229_{16} = 001110 \ 0010 \ 0010 \ 1001 = 161051_8$$

$$f) 135_{16} = 0001 \ 0011 \ 0101_2 = 0465_8$$

$$g) 71D_{16} = 000111 \ 0001 \ 0000_2 = 07040_8$$

$$h) CE1_{16} = 1100 \ 1110 \ 0001_2 = 6361_8$$

$$10a) 2KB: 2048 \text{ bytes} = 16384 \text{ bits} \quad c) 2^{16}$$

$$b) 32GB: 32 \cdot 10^9 \text{ mb} = 33.584.432 \text{ Kb} = 39.359.732 \text{ bits}$$