

1) CONVERSÃO PARA DECIMAL

(A) $(1010)_2$

$$1 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 0 \cdot 2^0 = \\ = 8 + 0 + 2 + 0 = 11$$

(B) $(10110010)_2$

$$1 \cdot 2^7 + 0 \cdot 2^6 + 1 \cdot 2^5 + 1 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 0 \cdot 2^0 = \\ = 128 + 0 + 32 + 16 + 0 + 0 + 2 + 0 = \\ = 178$$

(C) $(111110)_3$

$$1 \cdot 3^5 + 1 \cdot 3^4 + 1 \cdot 3^3 + 1 \cdot 3^2 + 1 \cdot 3^1 + 0 \cdot 3^0 = \\ = 243 + 81 + 27 + 9 + 3 + 0 =$$

363

(D) $(2075)_8$

$$2 \cdot 8^3 + 0 \cdot 8^2 + 7 \cdot 8^1 + 5 \cdot 8^0 = \\ = 1024 + 0 + 56 + 5 =$$

1085

1)

e) $(2A:3)_{16}$

$$2 \cdot 16^2 + A \cdot 16^1 + 3 \cdot 16^0 =$$

$$512 + A \cdot 16 + 3 =$$

$$512 + 16A + 3 =$$

$$\boxed{675},$$

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2) CONVERSÃO DE DECIMAL PARA BINÁRIO

(A) $9 \rightarrow 1001$

$$\begin{array}{r} 4 \ 9 \ | 2 \\ 1 \ 4 \ | 2 \\ \swarrow \quad \downarrow \\ 0 \ 3 \ | 2 \\ \quad \quad \quad \downarrow \\ \quad \quad \quad 0 \end{array}$$

(B) $247 = 11110111$

$$\begin{array}{r} 247 \ | 2 \\ 1 \ 123 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 61 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 30 \ | 2 \\ \downarrow \quad \downarrow \\ 0 \ 15 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 7 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 3 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 1 \end{array}$$

(C) $579 = 111011111$

$$\begin{array}{r} 579 \ | 2 \\ 1 \ 289 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 143 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 59 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 29 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 19 \ | 2 \\ \downarrow \quad \downarrow \\ 0 \ 7 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 3 \ | 2 \\ \downarrow \quad \downarrow \\ 1 \ 1 \end{array}$$

(D) 1025

$$\begin{array}{r} 1025 \ | 2 \\ 1 \ 512 \ | 2 \\ 0 \ 256 \ | 2 \\ 0 \ 128 \ | 2 \\ 0 \ 64 \ | 2 \\ 0 \ 32 \ | 2 \\ 0 \ 16 \ | 2 \\ 0 \ 8 \ | 2 \\ 0 \ 4 \ | 2 \\ 0 \ 2 \ | 2 \\ 0 \ 1 \end{array}$$

R: 10000000001

2) CONVERSÃO PARA OCTAL

(A) $9 \begin{array}{r} \\ \swarrow \\ 1 \end{array} \begin{array}{r} 8 \\ | \end{array}$
 $R: 9 \rightarrow \boxed{11}$

(B) $247 \begin{array}{r} \\ \swarrow \\ 7 \end{array} \begin{array}{r} 8 \\ | \end{array}$
 $30 \begin{array}{r} \\ \swarrow \\ 6 \end{array} \begin{array}{r} 8 \\ | \end{array}$
 $3 \begin{array}{r} \\ \swarrow \\ 3 \end{array} \begin{array}{r} 8 \\ | \end{array}$
 0
 $R: 247 \rightarrow \boxed{367}$

(C) $479 \begin{array}{r} 8 \\ + 59 \begin{array}{r} 8 \\ + 37 \begin{array}{r} 8 \\ + 70 \end{array} \end{array} \end{array}$

$R: 247 \rightarrow \boxed{737}$

(D) $1025 \begin{array}{r} 8 \\ + 128 \begin{array}{r} 8 \\ + 16 \begin{array}{r} 8 \\ + 2 \begin{array}{r} 8 \\ + 0 \end{array} \end{array} \end{array}$

$R: 2001 \rightarrow \boxed{1025}$

3) CONVERSÃO PARA HEXADECIMAL

(A) $9 \begin{array}{r} 16 \\ + 0 \end{array}$
 $R: \boxed{9}$

(B) $247 \begin{array}{r} 16 \\ + 15 \begin{array}{r} 16 \\ + 15 \begin{array}{r} 16 \\ + 0 \end{array} \end{array}$
 $R: \boxed{F7}$

(C) $479 \begin{array}{r} 16 \\ + 29 \begin{array}{r} 16 \\ + 13 \begin{array}{r} 16 \\ + 1 \begin{array}{r} 16 \\ + 0 \end{array} \end{array} \end{array}$
 $R: \boxed{1DF}$

(D) $1025 \begin{array}{r} 16 \\ + 64 \begin{array}{r} 16 \\ + 0 \begin{array}{r} 16 \\ + 9 \begin{array}{r} 16 \\ + 0 \end{array} \end{array} \end{array}$
 $R: 401$

b) Para representar números:

0 a $2^n - 1$.

Para representar de 0 a 5000₁₀

se converter (5000)₁₀ para binário:

5000₁₀

0 2500₁₀

0 1250₁₀

0 625₁₀

1 125₁₀

0 125₁₀

125₁₀

125₁₀

125₁₀

125₁₀

125₁₀

125₁₀

$$(5000)_{10} = (1001110001000)_2$$

$$2^n - 1 = 5000$$

$$2^n = 5000 + 1 \Rightarrow 2^n = 5001$$

$$2^n = 5001 \Rightarrow n = \frac{\ln(5001)}{\ln(2)} = 12,28800089 \Rightarrow$$

\Rightarrow 13-bits necessários para representar
números de 0 a 5000

Para representar números binários cada vez
mais é necessário um número maior de
algarismos em qualquer sistema numérico.
Nesse caso, em binário, 5001 demanda
13 caracteres (bits) para ser representado.

(7)

(A) 00000

■ Sem SINAL: ■ comp de 1:

$$00000 \Rightarrow 0_{(10)}$$

$$\begin{aligned} 0 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0 &= 0 \\ + 0 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0 &= \\ = 0_{(10)} \end{aligned}$$

■ comp. de 2:

$$00000_2 = 0_{(10)}$$

(B) 00101

■ Sem SINAL:

$$\begin{aligned} 0 \cdot 2^4 + 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 &= 00101 \\ &\downarrow \\ &+ 5_{(10)} \\ = 0 + 0 + 4 + 0 + 1 &= \\ = 5_{(10)} \end{aligned}$$

■ comp. de 1:

$$\begin{array}{r} 00101 \\ \downarrow \\ + 111 \end{array}$$

■ comp. de 2:

$$\begin{array}{r} 00101 \\ \downarrow \\ + 111 \end{array}$$

(C)

10010

■ Sem SINAL:

$$\begin{aligned} 1 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 1 \cdot 2^1 + 0 \cdot 2^0 &= 10010 \\ = 16 + 0 + 0 + 2 + 0 &= \\ = 18_{(10)} & \\ \text{pois } (10010)_2 &= \\ &= (18)_{10} \end{aligned}$$

■ comp. de 1:

$$\begin{array}{r} 10010 \\ \downarrow \\ - 00101 \end{array}$$

■ comp. de 2:

$$\begin{array}{r} 10010 \\ \downarrow \\ - 00101 \\ = 11101 \end{array}$$

pois
 $(10010)_2 = (18)_{10}$

Q) 11111 sem sinal

$$\begin{aligned} & 1 \cdot 2^4 + 1 \cdot 2^3 + 1 \cdot 2^2 + 1 \cdot 2^1 + 1 \cdot 2^0 \\ = & 16 + 8 + 4 + 2 + 1 = \\ = & 31 \end{aligned}$$

complemento de 1:

$$\begin{array}{r} 11111 \\ \hline (1111)_2 = \\ = 0000 \\ 1 \Rightarrow \\ \boxed{-0} \rightarrow -0 \end{array}$$

complemento de 2:

$$\begin{array}{r} 11111 = -1 \\ \hline (0000)_2 \\ + \quad \downarrow \\ \begin{array}{r} 0000 \\ + 0001 \\ \hline 0001 \end{array} \\ \text{Logo } \boxed{-1} \text{ (10)} \end{array}$$