

fecha 11.08.21

D S T O Q S S
D L M M J V S

ARQUITETURA DE COMPUTADORES

JORGE NAMI HARBES

SIST. DE INFORMAÇÃO 2021-2

TRABALHO 1

I-

a) $100110_2 =$

$$1 \times 2^5 + 0 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 =$$

$$32 + 4 + 2 = 38$$

b) $101110_2 =$

$$0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 =$$

$$16 + 8 + 4 + 2 = 30$$

c) $111011_2 =$

$$1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 =$$

$$32 + 16 + 8 + 2 + 1 = 59$$

d) $1010000_2 =$

$$1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 =$$

$$64 + 16 + 0 = 80$$

e) $11000101_2 =$

$$1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 =$$

$$128 + 64 + 4 + 1 = 197$$

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f) $1011001100110101_2 =$

$$\cancel{0 \times 2^4} + 1 \times 2^{13} + \cancel{1 \times 2^{12}} + \cancel{0 \times 2^{11}} + \cancel{0 \times 2^{10}} + 1 \times 2^9 + \cancel{1 \times 2^8} + \cancel{0 \times 2^7} + \cancel{0 \times 2^6} + \\ \cancel{1 \times 2^5} + \cancel{1 \times 2^4} + \cancel{0 \times 2^3} + \cancel{1 \times 2^2} + \cancel{0 \times 2^1} + \cancel{1 \times 2^0} =$$

$$8192 + 4096 + 512 + 256 + 32 + 16 + 4 + 1 = \\ 13109$$

g) $14_8 =$

$$1 \times 8^3 + 4 \times 8^0 = 8 + 4 = 12$$

h) $67_8 =$

$$6 \times 8^2 + 7 \times 8^0 = 48 + 7 = 55$$

i) $153_8 =$

$$1 \times 8^3 + 5 \times 8^2 + 3 \times 8^0 = 64 + 40 + 3 = 107$$

j) $1544_8 =$

$$1 \times 8^3 + 5 \times 8^2 + 4 \times 8^1 + 4 \times 8^0 = \\ 512 + 320 + 32 + 4 = 868$$

k) $2063_8 =$

$$2 \times 8^3 + \cancel{0 \times 8^2} + 6 \times 8^1 + 3 \times 8^0 = \\ 1024 + 48 + 3 = 1075$$

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D S T Q Q S S
D L M M J V S

l) $479_{16} =$

$$4 \times 16^2 + 7 \times 16^1 + 9 \times 16^0$$

$$1024 + 112 + 9 = 1145$$

m) $4AB_{16} =$

$$4 \times 16^2 + 10 \times 16^1 + 11 \times 16^0$$

$$1024 + 160 + 11 = 1195$$

n) $BDE_{16} =$

$$11 \times 16^2 + 13 \times 16^1 + 14 \times 16^0$$

$$2816 + 208 + 14 = 3038$$

o) $F\emptyset CA_{16} =$

$$15 \times 16^3 + 0 \times 16^2 + 12 \times 16^1 + 10 \times 16^0 =$$

$$61440 + 192 + 10 = 61642$$

p) $2D3F_{16} =$

$$2 \times 16^3 + 13 \times 16^2 + 3 \times 16^1 + 15 \times 16^0 =$$

$$8392 + 3378 + 48 + 15 = 11883$$

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D L M M J V S

2-

a) $78_{10} = \underline{78} \mid \underline{2}$

$\begin{array}{r} 0 \mid 39 \mid 2 \\ -1 \mid 19 \mid 2 \\ \hline 1 \mid 9 \mid 2 \\ -1 \mid 4 \mid 2 \\ \hline 0 \mid 2 \mid 2 \\ -0 \mid 1 \mid 2 \\ \hline 1 \end{array}$

1001110

b) $102_{10} = \underline{102} \mid \underline{2}$

$\begin{array}{r} 0 \mid 51 \mid 2 \\ -1 \mid 25 \mid 2 \\ \hline 1 \mid 12 \mid 2 \\ -0 \mid 6 \mid 2 \\ \hline 0 \mid 3 \mid 2 \\ -1 \mid 1 \mid 2 \\ \hline 1 \end{array}$

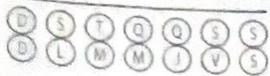
1100110

c) $215_{10} = \underline{215} \mid \underline{2}$

$\begin{array}{r} 1 \mid 107 \mid 2 \\ -1 \mid 53 \mid 2 \\ \hline 1 \mid 26 \mid 2 \\ -0 \mid 13 \mid 2 \\ \hline 1 \mid 6 \mid 2 \\ -0 \mid 3 \mid 2 \\ \hline 1 \end{array}$

11010111

data
fecha



$$d) 404_{10} = \underline{404} \underline{\underline{2}}$$

0 202 2

0 | 101 | 2

$$\begin{array}{r|rr} 1 & 50 & 2 \\ \hline & 0 & 25 \end{array}$$

1 12 2

0 6 2

0 | 3 | 2

12

110010100

0 | 3 | 2

12

e) 808_{10} = Utilizando do exercício anterior
basta incluir um zero no final:
 1100101000

1100101006

16383 | 2

1 | 8191

1 | 4095 | 2

1 | 2047 | 2

1 | 1023 | 2

L 511 2

122 | 2

1 | 255 | 2

1163 | 2

1 127

2 | 31 | 2

1 | 15 | 2

1712

132

1112

1

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D	S	T	Q	Q	S	S					
D	L	M	M	J	V	S					

y) $477_8 = \begin{array}{cccc} ④ & 2 & 2 & 4 \\ 4 & 7 & 7 & \\ \hline 100111111 \end{array}$

h) $1523_8 = \begin{array}{cccc} 4 & 2 & ① & ④ & 2 & ② & 4 & ② & 1 & 4 & ② & ① \\ 1 & 5 & 2 & 3 & \\ \hline 001101010011 \end{array}$

i) $4764_8 = \begin{array}{cccc} ④ & 2 & 1 & ④ & 2 & ① & ④ & 2 & 1 & ④ & 2 & ① \\ 4 & 7 & 6 & 4 & \\ \hline 100111110100 \end{array}$

j) $6740_8 = \begin{array}{cccc} ④ & ② & 1 & ④ & 2 & ① & ④ & 2 & 1 & 4 & 2 & 1 \\ 6 & 7 & 4 & 0 & \\ \hline 110111100000 \end{array}$

3-

a) $107_{10} = 107 \mid \underline{\underline{8}}$

$$\begin{array}{r|rr}
3 & 13 & 8 \\
\hline
5 & 1 & 8
\end{array} = (153)_8$$

b) $185_{10} \quad 185 \mid \underline{\underline{8}}$

$$\begin{array}{r|rr}
25 & 23 & 8 \\
\hline
\swarrow & 3 & 2 \mid 8
\end{array} = (231)_8$$

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D S T O O S S
D L M M J V S

c) $2048_{10} = 2048_8$

$$\begin{array}{r} 2048 \\ \hline 0 \quad 256 \quad 8 \\ \quad \quad 0 \quad 32 \quad 8 \\ \quad \quad \quad 0 \quad 4 \quad (4000)_8 \end{array}$$

d) $4097_{10} = 4097_8$

$$\begin{array}{r} 4097 \\ \hline 17 \quad 512 \quad 8 \\ \quad \quad 1 \quad 32 \quad 64 \quad 8 \\ \quad \quad \quad 0 \quad 0 \quad 8 \quad 8 \\ \quad \quad \quad \quad 0 \quad 1 \quad \\ (10001)_8 \end{array}$$

e) $5666_{10} = 5666_8$

$$\begin{array}{r} 5666 \\ \hline 66 \quad 708 \quad 8 \\ \quad 2 \quad 68 \quad 88 \quad 8 \\ \quad \quad 4 \quad 0 \quad 11 \quad 8 \\ \quad \quad \quad 3 \quad 1 \\ (13042)_8 \end{array}$$

f) $1011_2 =$

$$\begin{array}{r} 1 \quad 0 \quad 1 \quad 1 \\ 1 \quad 4 \quad 2 \quad 1 \\ 1 \quad 0+2+1 \\ 1 \quad 3 \quad (13)_8 \end{array}$$

data
fecha

D	S	T	Q	Q	S	S
D	L	M	M	J	V	S

g) $10011100_2 =$

$$\begin{array}{r}
 1 \quad 0 \quad | \quad 0 \quad 1 \quad 1 \quad | \quad 1 \quad 0 \quad 0 \\
 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \\
 2 + 0 \quad | \quad 0 + 2 + 1 \quad | \quad 4 + 0 + 0 \\
 \hline
 2 \quad \quad \quad 3 \quad \quad \quad 4
 \end{array}$$

$(234)_8$

h) $110101110_2 =$

$$\begin{array}{r}
 1 \quad 1 \quad 0 \quad | \quad 1 \quad 0 \quad 1 \quad | \quad 1 \quad 1 \quad 0 \\
 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \\
 4 + 2 + 0 \quad | \quad 4 + 0 + 1 \quad | \quad 4 + 2 + 0 \\
 \hline
 6 \quad \quad \quad 5 \quad \quad \quad 6
 \end{array}$$

$(656)_8$

i) $\underline{1000000000}_2 =$

$$\begin{array}{r}
 1 \quad | \quad 0 \quad 0 \quad 0 \quad | \quad 0 \quad 0 \quad 0 \quad | \quad 0 \quad 0 \quad 1 \\
 1 \quad | \quad 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \\
 0 \quad 0 \quad 0 \quad | \quad 0 \quad 0 \quad 0 \quad | \quad 0 + 0 + 1 \\
 \hline
 1 \quad \quad \quad 0 \quad \quad \quad 0 \quad \quad \quad 1
 \end{array}$$

$(1001)_8$

j) $\underline{1101000101}_2 =$

$$\begin{array}{r}
 1 \quad | \quad 1 \quad 0 \quad 1 \quad | \quad 0 \quad 0 \quad 0 \quad | \quad 1 \quad 0 \quad 1 \\
 1 \quad | \quad 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \quad | \quad 4 \quad 2 \quad 1 \\
 1 \quad | \quad 4 + 0 + 1 \quad | \quad 0 \quad \quad \quad | \quad 4 + 0 + 1 \\
 \hline
 1 \quad \quad \quad 5 \quad \quad \quad 0 \quad \quad \quad 5
 \end{array}$$

$(1505)_8$

data
fecha

B	S	T	Q	Q	S	S
D	L	M	M	J	V	S

4-

a) $10011_2 =$

1	0	0	1	1
1	8	4	2	1
1	0+0+2+1			
1	3			

(13)₁₆

b) $1110011100_2 =$

1	1	1	0	0	1	1	1	0	0
2	1	8	4	2	1	8	4	2	1
2+1	8+0+0+1					8+4+0+0			
3	9					12			

(39C)₁₆

c) $10011001100_2 =$

1	0	0	1	1	0	0	1	1
8	4	2	1	8	4	2	1	1
8+0+0+1	8+0+0+1				0+0+2+1			
9	9				3			

(993)₁₆

d) $11111011110010_2 =$

1	1	1	1	0	1	1	1	1	0
2	1	8	4	2	1	8	4	2	1
2+1	8+4+2+0				8+4+2+1	0+0+2+0			
3	14				15				2

(3EF2)₁₆

data
fecha

D	S	T	O	O	S	S
D	L	M	M	J	V	S

e) $1000000000000000_2 =$

1	0	0	0	0	0	0	0	1	0	0	0	1	0		
8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1
8 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 2 + 0	0 + 0 + 2 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 2 + 0	0 + 0 + 2 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	0 + 0 + 0 + 0	
8	0	2	2	0	0	2	2	0	0	0	0	0	0	0	

$$(8022)_{16}$$

f) $4B6_{10} = 486 \quad | 16$

6	30	16
54	1	

$$(1E6)_{16}$$

g) $2000_{10} = 2000 \quad | 16$

40	125	16
80	13	7
0		

$$(7D0)_{16}$$

h) $4096_{10} = 4096 \quad | 16$

89	256	16
96	96	16
0	0	1

$$(1000)_{16}$$

i) $5555_{10} = 5555 \quad | 16$

75	347	16
115	27	16
3	11	1

$$(15B3)_{16}$$

data
fecha

D S T Q Q S S
D L M M J V S

j) $35479_{10} = 35479 \frac{16}{16}$

$$\begin{array}{r|rrr} 34 & 22 & 17 & 16 \\ 27 & 61 & 138 & 16 \\ 19 & 137 & 8 & 8 \\ \hline & 9 & 10 & \end{array}$$

← $(BA97)_{16}$

5- Porque o algoritmo 8 não é utilizado na base 8, qualquer base acima de 9.

6- 01101111

$$0 \times 2^7 + 1 \times 2^6 + 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 =$$
$$64 + 32 + 8 + 4 + 2 + 1 = 111 + 1 = 112$$

$$\begin{array}{r|l} 112 & 2 \\ 12 & 56 \\ \hline 0 & 0 \end{array}$$

← $\begin{array}{r|l} 0 & 28 \\ 0 & 14 \\ \hline 0 & 7 \end{array}$

$$\begin{array}{r|l} 0 & 7 \\ \hline 1 & 3 \\ \hline 1 & \end{array}$$

1110000

7- 16 bits