

Ejercicios I. Sistemas de Numeración

①

a) $75_{10} \rightarrow 1001011_2$

b) $129_{10} \rightarrow 11000001_2$

c) $325_{10} \rightarrow 101000101_2$

d) $1590_{10} \rightarrow 11000110110_2$

a) $75_{10} \div 2$

75	2	37	2	18	2	9	2	4	2	2	2	1
	1		1		0		1		0		0	1

b) $129_{10} \div 2$

129	2	64	2	32	2	16	2	8	2	4	2	2	2	1
	1		0		0		0		0		1		1	

c) $325_{10} \div 2$

325	2	162	2	81	2	40	2	20	2	10	2	5	2	2	2	1
	1		0		1		0		0		1		0		1	

d) $1590_{10} \div 2$

1590	2	795	2	397	2	198	2	99	2	49	2	24	2	12	2	6	2	3
	0		1		1		0		1		1		0		0		1	

$3 \div 2$

3	2	1	1
	1	1	

②

 $< 2^{-6}$

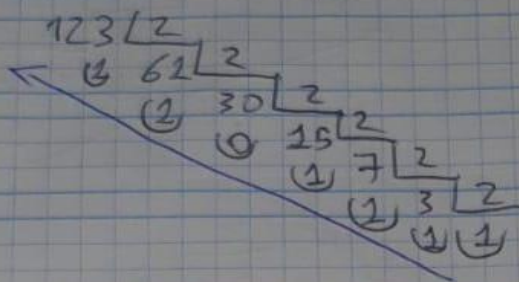
a) $123,75_{10} \rightarrow 1111011,11_{12}$

b) $7,33_{10} \rightarrow 111,010101_{12}$

c) $4,234_{10} \rightarrow 100,001110_{12}$

d) $15,91_{10} \rightarrow 1111,111010_{12}$

a) $123,75_{10}$

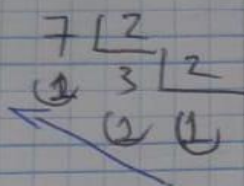


$$0,75 \times 2 = 1,50 \rightarrow 1$$

$$0,50 \times 2 = 1 \rightarrow 1$$

$1111011,11$

b) $7,33_{10}$



$0,33 \times 2 = 0 + 0,66$

$0,66 \times 2 = 1 + 0,32$

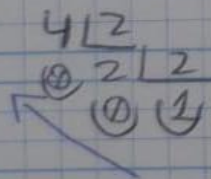
$0,32 \times 2 = 0 + 0,64$

$0,64 \times 2 = 1 + 0,28$

$0,28 \times 2 = 0 + 0,56$

$0,56 \times 2 = 1 + 0,12$

c) $4,234_{10}$



$0,234 \times 2 = 0 + 0,468$

$0,468 \times 2 = 0 + 0,936$

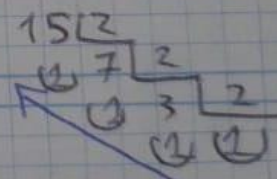
$0,936 \times 2 = 1 + 0,872$

$0,872 \times 2 = 1 + 0,744$

$0,744 \times 2 = 1 + 0,488$

$0,488 \times 2 = 0 + 0,976$

d) $15,91_{10}$



$0,91 \times 2 = 1 + 0,82$

$0,82 \times 2 = 1 + 0,64$

$0,64 \times 2 = 1 + 0,28$

$0,28 \times 2 = 0 + 0,56$

$0,56 \times 2 = 1 + 0,12$

$0,12 \times 2 = 0 + 0,24$

③

$$a) 111,011_2 \rightarrow 7,375_{10}$$

$$b) 11100,101_2 \rightarrow 28,625_{10}$$

$$c) 110110,11001_2 \rightarrow$$

$$a) 111,011_2$$

$$\begin{aligned} & 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3} \rightarrow \\ & \rightarrow 1 \times 4 + 1 \times 2 + 1 \times 1 + 0 \times 0,5 + 1 \times 0,25 + 1 \times 0,125 \rightarrow \\ & \rightarrow 4 + 2 + 1 + 0 + 0,25 + 0,125 \rightarrow \boxed{7,375} \end{aligned}$$

$$b) 11100,101_2$$

$$\begin{aligned} & 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0 + 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3} \rightarrow \\ & \rightarrow 1 \times 16 + 1 \times 8 + 1 \times 4 + 0 \times 2 + 0 \times 1 + 1 \times 0,5 + 0 \times 0,25 + 1 \times 0,125 \rightarrow \\ & \rightarrow 16 + 8 + 4 + 0 + 0 + 0,5 + 0 + 0,125 \rightarrow \boxed{28,625} \end{aligned}$$

$$c) 110110,11001_2$$

④

2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}
64	32	16	8	4	2	1	0,5	0,25	0,125	0,0625	0,03125
1	1	1	0	0	1	0	1	1	0	1	—
—	—	1	1	0	1	1	1	0	1	—	—
—	1	1	0	0	1	1	0	0	1	1	1

$\rightarrow 1110010,1101 \rightarrow 114,8125_{10}$
 $\rightarrow 11011,101 \rightarrow 27,625_{10}$
 $\rightarrow 110011,00111 \rightarrow 51,21875_{10}$

5

a) $25 + 21 \rightarrow 11001 + 10101$

b) $15,125 + 16,75 \rightarrow 1111,001 + 10000,11$

c) $47 + 15 \rightarrow 101111 + 1111$

a)

$$\begin{array}{r} 11001 \\ + 10101 \\ \hline 101110_2 \end{array}$$

b)

$$\begin{array}{r} 1111,001 \\ + 10000,110 \\ \hline 11111,111_2 \end{array}$$

c)

$$\begin{array}{r} 101111 \\ + 1111 \\ \hline 111110_2 \end{array}$$

⑥

c)
$$\begin{array}{r} 1100010100 \\ \quad \quad \quad 110101 \\ \hline 1011111111 \end{array} \quad (2)$$

b)
$$\begin{array}{r} 11010101 \\ - \quad \quad 10101010 \\ \hline 11000000, 10111010 \end{array}$$

c)

$$\begin{array}{r} 110110 \\ \times 10110 \\ \hline 000000 \\ 110110 \\ 000000 \\ 110110 \\ + 110110 \\ \hline 100011100 \end{array}$$

d)
$$\begin{array}{r} 100101 \\ - 1010 \\ \hline 001110 \\ - 1010 \\ \hline 010000 \\ - 000000 \\ \hline 10000 \\ - 1010 \\ \hline 00111 \end{array}$$

e)

$$\begin{array}{r} 10001000100 \mid 101010 \\ - 101010 \downarrow \\ \hline 00110000 \\ - 101010 \downarrow \\ \hline 0010101 \\ - 0000000 \downarrow \\ \hline 101010 \\ - 101010 \downarrow \\ \hline 0000000 \end{array}$$

\downarrow

$$\begin{array}{r} 101010 \\ \times 11010 \\ \hline 1000000 \\ 101010 \\ 0000000 \\ 101010 \\ + 101010 \\ \hline 10001000100 \end{array}$$

7

$$a) 123,6_{(8)} \rightarrow 83,75_{(10)}$$

$$1 \times 8^2 + 2 \times 8^1 + 3 \times 8^0 + 6 \times 8^{-1} \rightarrow$$

$$\rightarrow 64 + 16 + 3 + 0,75 \rightarrow 83,75_{(10)}$$

$$b) 27,34_{(8)} \rightarrow 23,4375_{(10)}$$

$$2 \times 8^1 + 7 \times 8^0 + 3 \times 8^{-1} + 4 \times 8^{-2} \rightarrow$$

$$\rightarrow 16 + 7 + 0,375 + 0,0625 \rightarrow 23,4375_{(10)}$$

$$c) 265,021_{(8)} \rightarrow 181,033203125_{(10)}$$

$$2 \times 8^2 + 6 \times 8^1 + 5 \times 8^0 + 0 \times 8^{-1} + 2 \times 8^{-2} + 1 \times 8^{-3} \rightarrow$$

$$\rightarrow 128 + 48 + 5 + 0 + 0,03125 + 0,001953125 \rightarrow$$

$$\rightarrow 181,033203125_{(10)}$$

8

$$a) 91,23_{(10)} \rightarrow 133,16560_{(8)}$$

$$b) 28,32_{(10)} \rightarrow 34,24365_{(8)}$$

$$c) 459,901_{(10)} \rightarrow 713,71528_{(8)}$$

$$a) 91/8 = 11 - 3 \uparrow$$

$$11/8 = 1 - 3 \uparrow$$

$$1/8 = 0 - 1 \uparrow$$

$$0,23 \times 8 = 1 + 0,84$$

$$0,84 \times 8 = 6 + 0,72$$

$$0,72 \times 8 = 5 + 0,76$$

$$0,76 \times 8 = 6 + 0,08$$

$$0,08 \times 8 = 0 + 0,64 \downarrow$$

$$b) 28/8 = 3 - 4 \uparrow$$

$$3/8 = 0 - 3 \uparrow$$

$$0,32 \times 8 = 2 + 0,56$$

$$0,56 \times 8 = 4 + 0,48$$

$$0,48 \times 8 = 3 + 0,84$$

$$0,84 \times 8 = 6 + 0,72$$

$$0,72 \times 8 = 5 + 0,76 \downarrow$$

$$c) 459/8 = 57 - 3 \uparrow$$

$$57/8 = 7 - 1 \uparrow$$

$$7/8 = 0 - 7 \uparrow$$

$$0,901 \times 8 = 7 + 0,208$$

$$0,208 \times 8 = 1 + 0,664$$

$$0,664 \times 8 = 5 + 0,312$$

$$0,312 \times 8 = 2 + 0,496$$

$$0,496 \times 8 = 3 + 0,968 \downarrow$$

9

$$a) F03, E_{16} \rightarrow 3843,875_{10}$$

$$F(15) \times 16^2 + 0 \times 16^1 + 3 \times 16^0 + E(14) \times 16^{-1} \rightarrow \\ \rightarrow 3840 + 0 + 3 + 0,875 \rightarrow 3843,875_{10}$$

$$b) 2F,3C_{16} \rightarrow 47,234375_{10}$$

$$2 \times 16^1 + F(15) \times 16^0 + 3 \times 16^{-1} + C(12) \times 16^{-2} \rightarrow \\ \rightarrow 32 + 15 + 0,1875 + 0,046875 \rightarrow 47,234375_{10}$$

$$c) 2C5,02A_{16} \rightarrow 709,01025390625_{10}$$

$$2 \times 16^2 + C(12) \times 16^1 + 5 \times 16^0 + 0 \times 16^{-1} + 2 \times 16^{-2} + A(10) \times 16^{-3} \rightarrow \\ \rightarrow 512 + 192 + 5 + 0 + 0,0078125 + 0,00244140625 \rightarrow \\ \rightarrow 709,01025390625_{10}$$

10

$$a) 123,8_{10} \rightarrow 7B,CCCC_{16}$$

$$b) 98,32_{10} \rightarrow 62,54E88_{16}$$

$$c) 978,105_{10} \rightarrow 3D2,1AE14_{16}$$

$$a) \begin{array}{l} 123/16 = 7 - 11(B) \uparrow \\ 7/16 = 0 - 7 \end{array}$$

$$b) \begin{array}{l} 98/16 = 6 - 2 \uparrow \\ 6/16 = 0 - 6 \end{array}$$

$$c) \begin{array}{l} 978/16 = 61 - 2 \uparrow \\ 61/16 = 3 - 13(D) \uparrow \\ 3/16 = 0 - 3 \end{array}$$

$$0,8 \times 16 = 12(C) + 0,8$$

$$0,8 \times 16 = 12(C) + 0,8$$

$$0,8 \times 16 = 12(C) + 0,8$$

$$0,8 \times 16 = 12(C) + 0,8$$

$$0,8 \times 16 = 12(C) + 0,8 \downarrow$$

$$0,32 \times 16 = 5 + 0,12$$

$$0,12 \times 16 = 1 + 0,92$$

$$0,92 \times 16 = 14(E) + 0,72$$

$$0,72 \times 16 = 11(B) + 0,52$$

$$0,52 \times 16 = 8 + 0,32 \downarrow$$

$$0,105 \times 16 = 1 + 0,68$$

$$0,68 \times 16 = 10(A) + 0,88$$

$$0,88 \times 16 = 14(E) + 0,0799$$

$$0,0799 \times 16 = 1 + 0,279$$

$$0,279 \times 16 = 4 + 0,479 \downarrow$$

11

Decimal	Binario	Hexadecimal	Octal
125	1111101	7D	175
231	11100111	E7	347
151	010010111	97	227
162	01010010	A2	242
209	011010001	D1	321
204	011001100	CC	314
222	11011110	DE	336
529	001000010001	211	1021
211	11010011	D3	323

12

GigaBytes	MegaBytes	KiloBytes	Bytes	Bits
2	2048	2097152	2147483648	17179869184
-	512	524288	536870912	4294967296
-	-	256	262144	2097152
-	-	640	655360	5242880
-	384	393216	402653184	3221225472

1024 ↔ 1024 ↔ 1024 ↔ 1024 ↔ 8