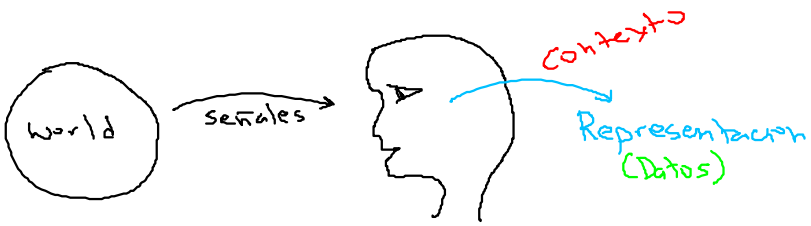
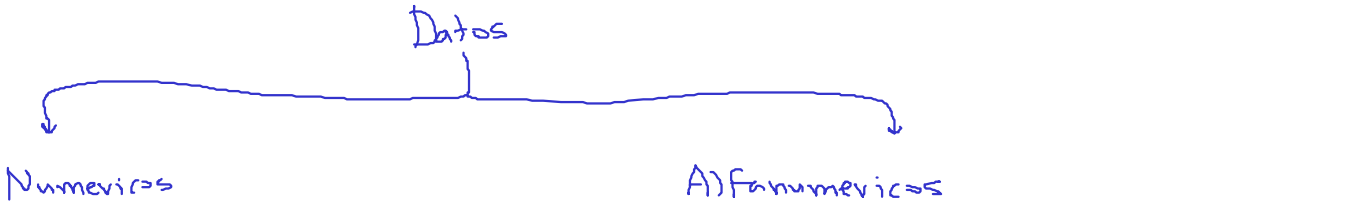
11/07/2025 - Matematicas Discretas ↑ (Ude@|w14-16)

1. Introducción:

2. Informacion

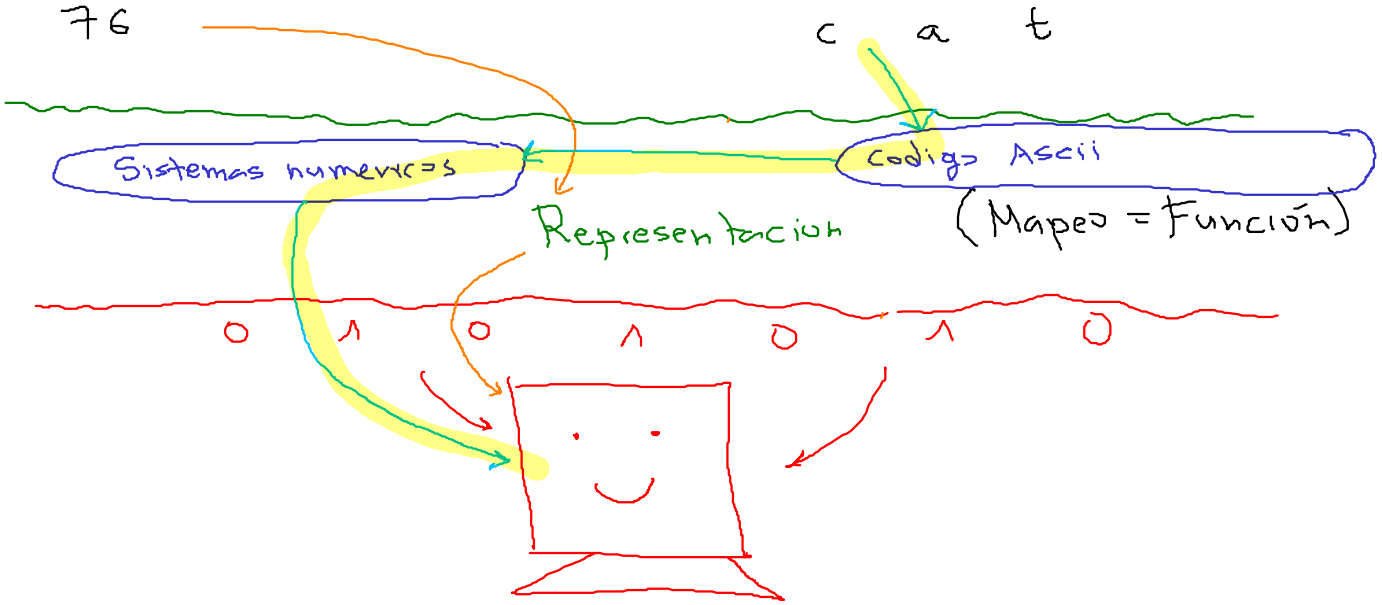
Claude Shannon





23.8

76



3. Sistemas numericos.

Sistemas numericos posicionales

2

D U
23

8.35

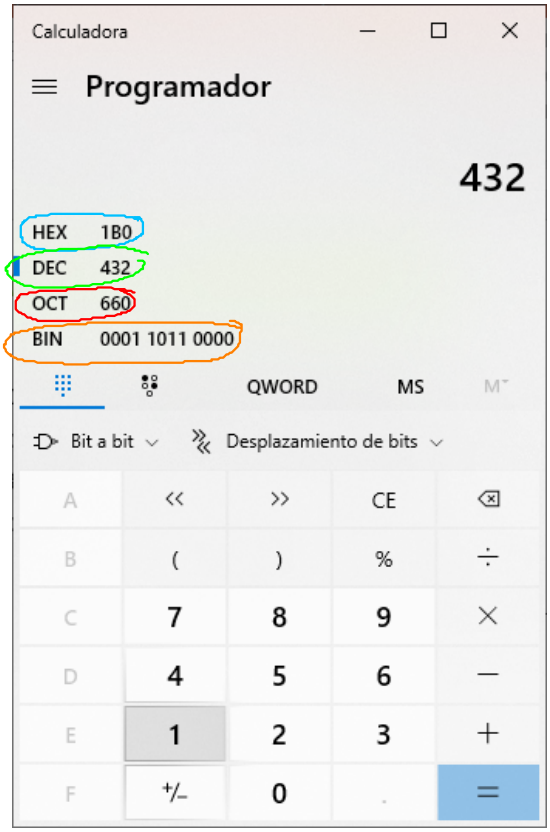
1'000000

Numero : N

D U
23 = 2 × 10 + 3 × 1
$d_1 d_0 = d_1 \times 10^1 + d_0 \times 10^0$

$$N = d_n \ldots d_1 d_0 . d_{-1} d_{-2} \ldots d_{-m}$$

$$N_b = \sum_{i=-m}^{n} d_i \times b^i$$



$N = 432$

432_{10}

$b = 2$

$0001\ 1011\ 0000_2$

$b = 8$

660_8

$b = 16$

$1B0_{16}$

$$25.4_6 = 2(6^1) + 5(6^0) + 4(6^{-1})$$

$6^{-1} = \frac{1}{6} =$

$b = 6$

$$= 2(6) + 5(1) + 4(0.17)$$

$$= 12 + 5 + 0.68$$

$$= 17.68_{10}$$

Base m → (Expansión) → Base 10

3. Sistemas numericos — Decimal, binario, octal y hexadecimal

Decimal: b=10

Binario: b=2

Octal: b=8

Hexadecimal: b=16

Decimal:

- base: b = 10
- Digitos: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
- Ejemplos: 23.6_{10}

123_{10}

666

-7

Binario:

- base: b=2
- Digitos: 0, 1

~~$0 1 2 3_2$~~

01100001_2

11.01_2

Octal:

- base: b=8
- Digitos: 0, 1, 2, 3, 4, 5, 6, 7

1203_8

~~18_8~~

Hexadecimal:

- base: b=16
- Digitos: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A (10), B (11), C (12), D (13), E (14), F (15)

$12E_{16}$

~~$A3_{16}$~~

$12FF_{16}$

$1AD_{16} = 1(16^2) + A(16^1) + D(16^0)$

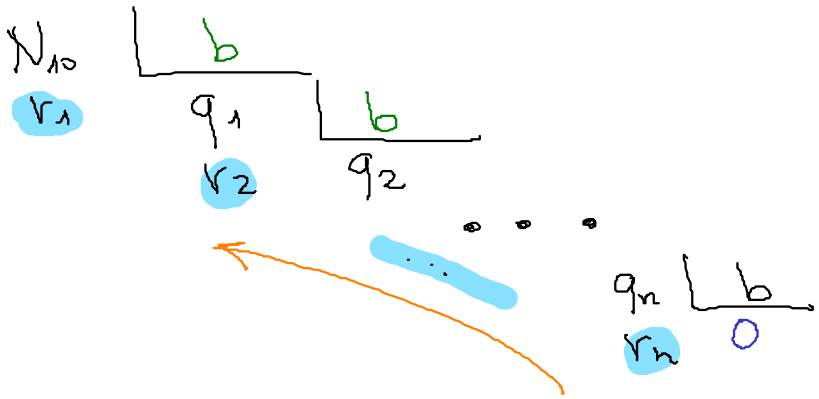
$= 1(16^2) + 10(16^1) + 13(16^0)$

$= 1(256) + 10(16) + 13(1)$

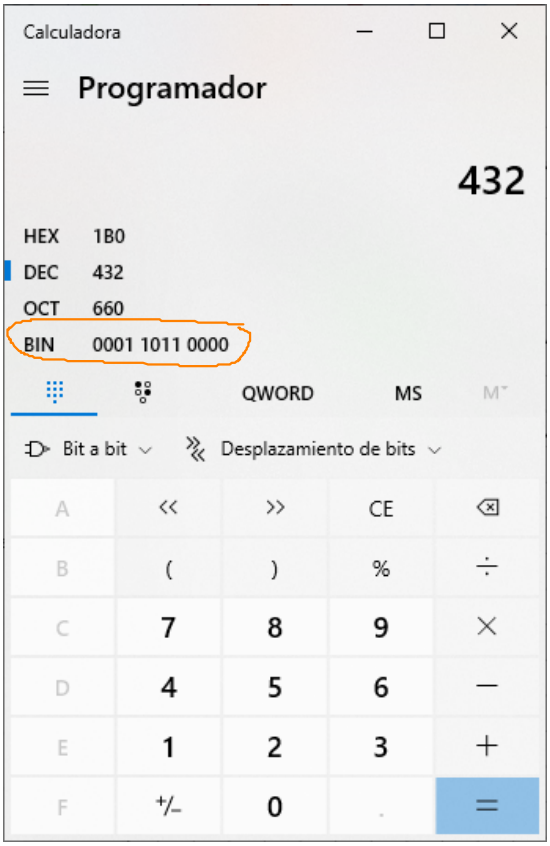
$= 429_{10}$

b = 16

4. Divisiones sucesivas



$N_b = r_n r_{n-1} \ldots r_1$



$N = 432_{10}$

1. $N_2 = ?$

✓ $N_2 = 110110000$

2. $N_8 = ?$

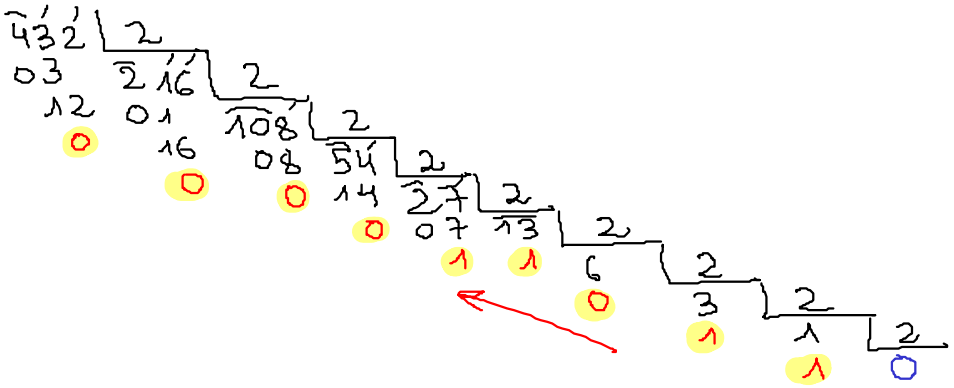
$N_8 = 660_8$

2. $N_{16} = ?$

$N_{16} = 1B0_{16}$

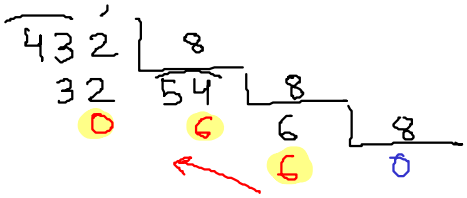
$N_{10} = 432 = 432_{10} \longrightarrow N_2 = ?$

$b = 2$



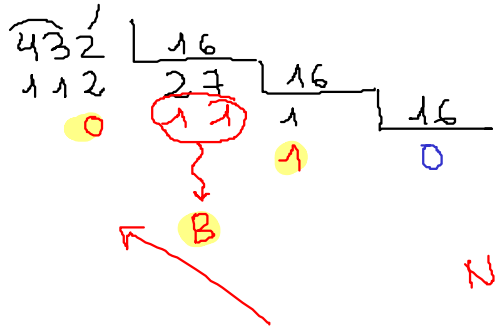
$N_2 = 110110000_2$

$N_{10} = 432 = 432_{10} \longrightarrow N_8 = ?$



$N_8 = 660_8$

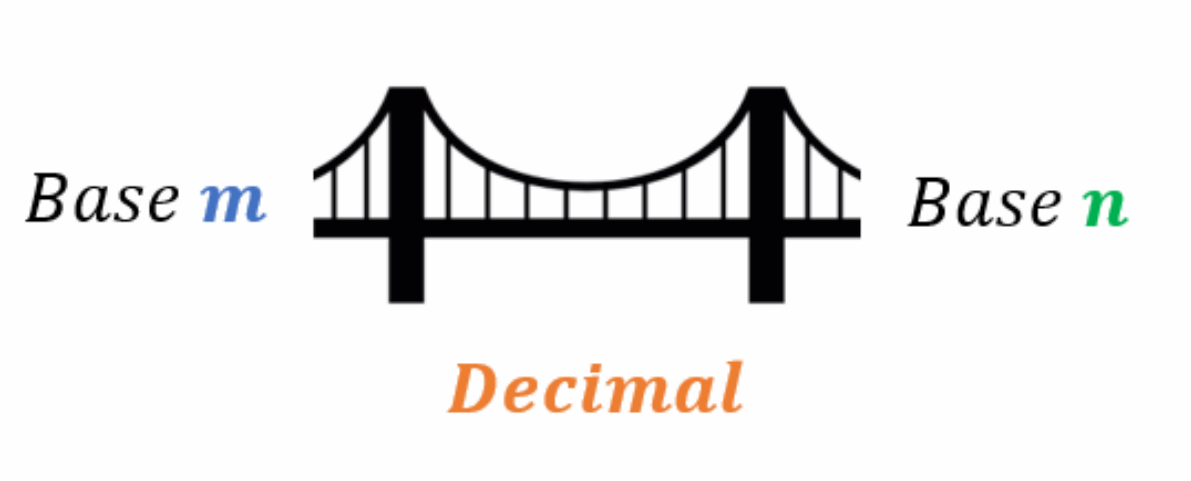
$N_{10} = 432 = 432_{10} \longrightarrow N_{16} = ?$

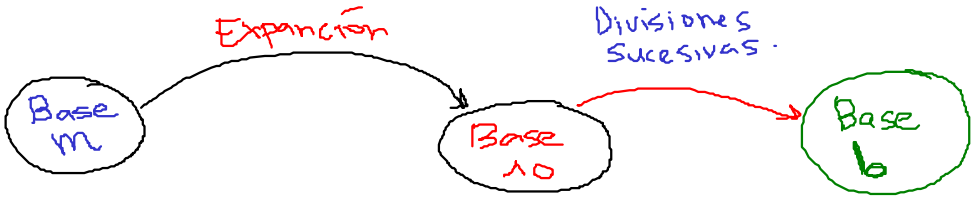


$N_{16} = 1B0_{16}$

$m \neq 10$
$n \neq 10$

5. Método del Puente





Ejemplo: $42_5 \longrightarrow N_9 = ?$

P1. $42_5 \longrightarrow N_{10}$:

$$42_5 = 4(5^1) + 2(5^0)$$
$$= 4(5) + 2(1)$$
$$= 20 + 2$$
$$= 22$$

$42_5 = 22_{10}$

P2. $22_{10} \longrightarrow N_9 = ?$

22 | 9
4 | 2 | 9
2 | 0

$22_{10} = 24_9$

$42_5 = 24_9$

6. Método Directo (Binaria , octal , Hexadecimal)

$b=2$ $\quad b=8=2^3$ $\quad b=16=2^4$

7 | 2
1 | 3 | 2
1 | 1 | 2
1 | 0

$7 = 111_2$

12 | 2
0 | 6 | 2
0 | 3 | 2
1 | 1 | 2
1 | 0

$12 = 1100_2$

Octal	Binario
0	000
1	001
2	010
3	011
4	100
5	101
6	110
7	111

Hexadecimal	Binario
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A(10)	1010
B(11)	1011
C(12)	1100
D(13)	1101
E(14)	1110
F(15)	1111

Ejemplo:

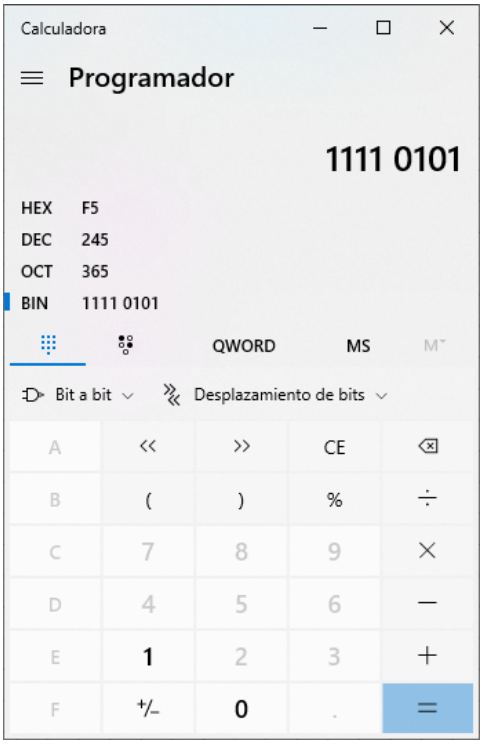
$175_8 \longrightarrow N_2 = ?$

$175_8 = \underbrace{1}_{001}\ \underbrace{7}_{111}\ \underbrace{5}_{101} = \underbrace{001}_{1}\ \underbrace{111}_{7}\ \underbrace{101}_{5}{}_2$

$000111101012 = N_{16} = ?$

b=8 $\underbrace{000}_{0}\underbrace{111}_{7}\underbrace{101}_{5} = 365_8$

b=16 $\underbrace{0000}_{0}\underbrace{1111}_{F}\underbrace{0101}_{5} = F5_{16}$



$1A_{16} \longrightarrow N_8 = ?$

P1. $1A_{16} \longrightarrow N_2$

$1A_{16} = \underbrace{1}_{0001}\ \underbrace{A}_{1010} = 00011010_2 = 11010_2$

P2 . $N_2 \longrightarrow N_8$

$b=8 \quad \underbrace{011}_{3}\underbrace{010}_{2} = 32_8$

$1A_{16} = 32_8$