10/07/2025 — Matematicas Discretas 1 (Ude@ | MJ 10-12)

1. Sistemas numericos

G. Boole → Logica Proposicional
C. Shannon → Circuitos Logicos
} Algebra Booleanas

C. Shannon → Teoria de la información

0: OFF — 0
1: ON — 1
} Variable binaria {0, 1} Bit

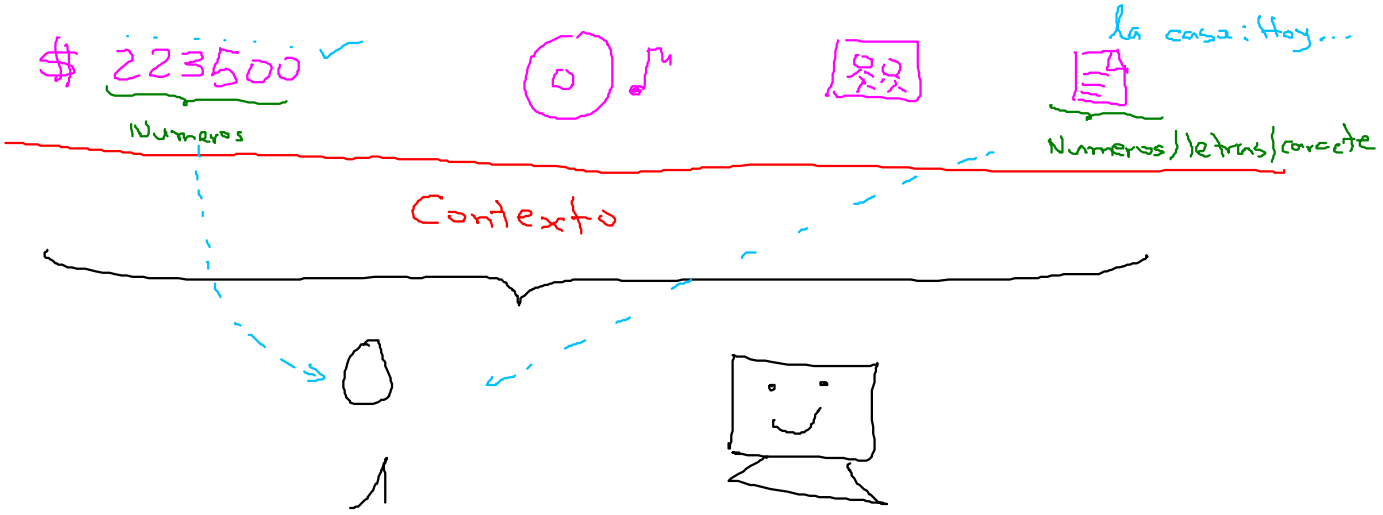
Datos (Almacenarlos, transmitirlos, procesarlos)

Electricidad

0 = 0V (F)

1 = 5V (V)

¿Como represento la Información?



- Codigo ascii (Datos tipo caracter)

@ = 64

'0' = 48

...

gato = 103 97 116 111
g a t o

Caracteres ASCII de control		
00	NULL	(carácter nulo)
01	SOH	(inicio encabezado)
02	STX	(inicio texto)
03	ETX	(fin de texto)
04	EOT	(fin transmisión)
05	ENQ	(consulta)
06	ACK	(reconocimiento)
07	BEL	(timbre)
08	BS	(retroceso)
09	HT	(tab horizontal)
10	LF	(nueva línea)
11	VT	(tab vertical)
12	FF	(nueva página)
13	CR	(retorno de carro)
14	SO	(desplaza afuera)
15	SI	(desplaza adentro)
16	DLE	(esc.vínculo datos)
17	DC1	(control disp. 1)
18	DC2	(control disp. 2)
19	DC3	(control disp. 3)
20	DC4	(control disp. 4)
21	NAK	(conf. negativa)
22	SYN	(inactividad sínc)
23	ETB	(fin bloque trans)
24	CAN	(cancelar)
25	EM	(fin del medio)
26	SUB	(sustitución)
27	ESC	(escape)
28	FS	(sep. archivos)
29	GS	(sep. grupos)
30	RS	(sep. registros)
31	US	(sep. unidades)
127	DEL	(suprimir)

Caracteres ASCII imprimibles					
32	espacio	64	@	96	`
33	!	65	A	97	a
34	"	66	B	98	b
35	#	67	C	99	c
36	$	68	D	100	d
37	%	69	E	101	e
38	&	70	F	102	f
39	'	71	G	103	g
40	(	72	H	104	h
41	)	73	I	105	i
42	*	74	J	106	j
43	+	75	K	107	k
44	,	76	L	108	l
45	-	77	M	109	m
46	.	78	N	110	n
47	/	79	O	111	o
48	0	80	P	112	p
49	1	81	Q	113	q
50	2	82	R	114	r
51	3	83	S	115	s
52	4	84	T	116	t
53	5	85	U	117	u
54	6	86	V	118	v
55	7	87	W	119	w
56	8	88	X	120	x
57	9	89	Y	121	y
58	:	90	Z	122	z
59	;	91	[	123	{
60	<	92	\	124	|
61	=	93	]	125	}
62	>	94	^	126	~
63	?	95	_		

ASCII extendido (Página de código 437)							
128	Ç	160	á	192	└	224	Ó
129	ü	161	í	193	┴	225	ß
130	é	162	ó	194	┬	226	Ô
131	â	163	ú	195	├	227	Ò
132	ä	164	ñ	196	─	228	õ
133	à	165	Ñ	197	┼	229	Õ
134	å	166	ª	198	ã	230	µ
135	ç	167	º	199	Ã	231	þ
136	ê	168	¿	200	╚	232	Þ
137	ë	169	®	201	╔	233	Ú
138	è	170	¬	202	╩	234	Û
139	ï	171	½	203	╦	235	Ù
140	î	172	¼	204	╠	236	ý
141	ì	173	¡	205	═	237	Ý
142	Ä	174	«	206	╬	238	¯
143	Å	175	»	207	¤	239	´
144	É	176	░	208	ð	240	≡
145	æ	177	▒	209	Ð	241	±
146	Æ	178	▓	210	Ê	242	‗
147	ô	179	│	211	Ë	243	¾
148	ö	180	┤	212	È	244	¶
149	ò	181	Á	213	ı	245	§
150	û	182	Â	214	Í	246	÷
151	ù	183	À	215	Î	247	¸
152	ÿ	184	©	216	Ï	248	°
153	Ö	185	╣	217	┘	249	¨
154	Ü	186	║	218	┌	250	·
155	ø	187	╗	219	█	251	¹
156	£	188	╝	220	▄	252	³
157	Ø	189	¢	221	¦	253	²
158	×	190	¥	222	Ì	254	■
159	ƒ	191	┐	223	▀	255	nbsp

Sistemas numericos

123 → Representacion decimal (10)
C D U

0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Peso

Notacion Posicional

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

$$N_b = d_n \ldots d_2 d_1 d_0 . d_{-1} d_{-2} \ldots d_{-m}$$

b: Base
d: Digito
i: posicion
N: Numero

$d_1 d_0 . d_{-1}$

$25.4 = 25.4_{10} = 2(10^1) + 5(10^0) + 4(10^{-1})$

$10^{-1} = \frac{1}{10} = 0.1$

b = 10

$= 2(10) + 5(1) + 4(0.1)$

Peso

$= 20 + 5 + 0.4$

$= 25.4$

$d_2 d_1 d_0$

$123 = 123_{10} = 1(10^2) + 2(10^1) + 3(10^0)$

$= 1(100) + 2(10) + 3(1)$

$= 100 + 20 + 3$

$= 123$

$\overset{2}{2}\overset{1}{4}\overset{0}{1}_5 = 2(5^2) + 4(5^1) + 1(5^0) = 2(25) + 4(5) + 1(1)$

$b=5$

$= 50 + 20 + 1$

$= 71_{10}$

2. Sistemas Numericos posicionales

a. Decimal: - Base = 10
- Digitos: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

$253 = 253_{10}$

b. Binario: - Base = 2
- Digitos: 0, 1

10_2

1010001_2 $\quad$ ~~0103_2~~

c. Octal - Base = 8
- Digitos: 0, 1, 2, 3, 4, 5, 6, 7

73_8

~~18_8~~

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

123_{16}

$A581_{16}$

Notacion posicional:

$b=10: 123_{10} = 1(10^2) + 2(10^1) + 3(10^0) =$

$= 1(100) + 2(10) + 3(1)$

$= 100 + 20 + 3$

$= 123_{10}$

~~123_2~~

$b=8: 123_8 = 1(8^2) + 2(8^1) + 3(8^0) =$

$= 1(64) + 2(8) + 3(1)$

$= 64 + 16 + 3$

$= 83_{10}$

$b=16: 123_{16} = 1(16^2) + 2(16^1) + 3(16^0) =$

$= 1(256) + 2(16) + 3(1)$

$= 256 + 32 + 3$

$= 291_{10}$

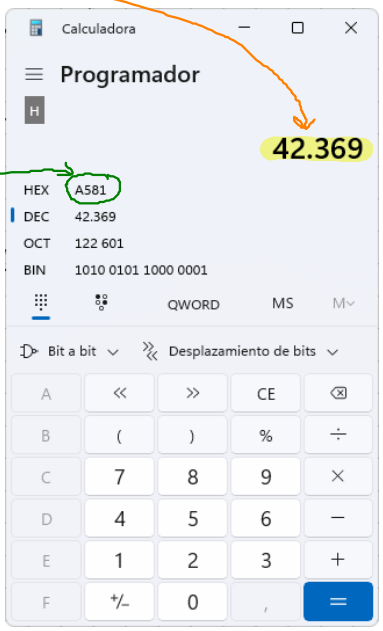
Como quedaria en notacion posicional el $A581_{16}$

$A581_{16} = A(16^3) + 5(16^2) + 8(16^1) + 1(16^0)$

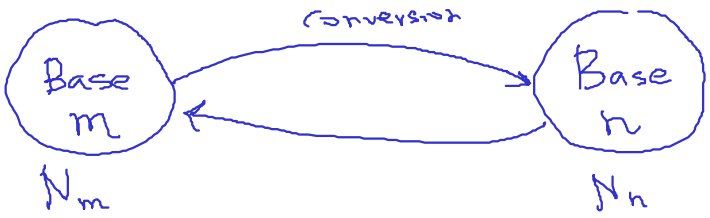
$= 10(16^3) + 5(16^2) + 8(16^1) + 1(16^0)$

$= 10(4096) + 5(256) + 8(16) + 1(1)$

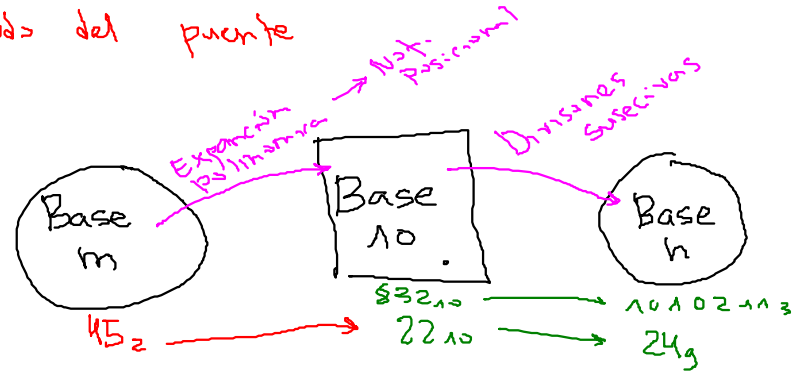
$= 42369_{10}$



2. Conversion entre sistemas numericos

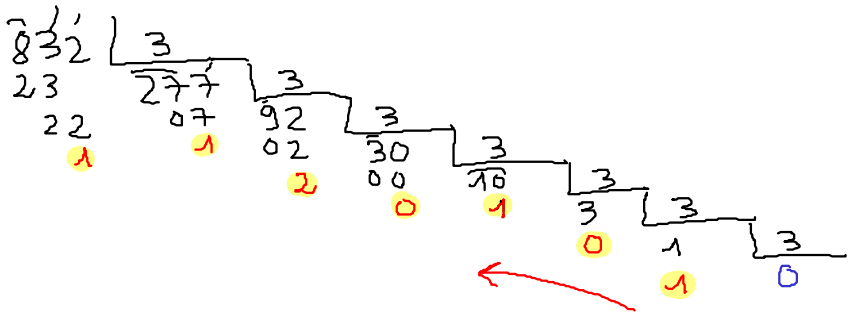


1. Metodo del puente



Convertir:

1. $832_{10} = N_3 = 1010211_3$



2. $1010211_3 =$ Horner

3. $42_5 = X_9$

- P1: $42_5 = 4(5^1) + 2(5^0) = 4(5) + 2(1) = 20 + 2 = 22_{10}$

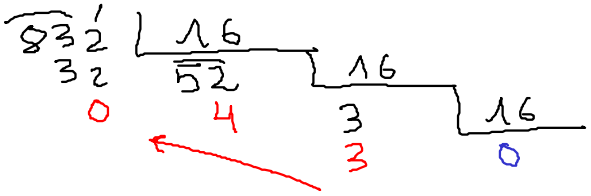
- P2:

24_9

$42_5 = 22_{10} = 24_9$

3. Convertir 832_{10} a base 2, 8, 16

$832_{10} \longrightarrow N_{16}$ $\qquad$ $832_{10} = 340_{16}$



$832_{10} \longrightarrow N_8$

$832_{10} \longrightarrow N_2$

2. Metodo directo: 2, $8 = 2^3$, $16 = 2^4$

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	1010
B	1011
C	1100
D	1101
E	1110
F	1111

Convertir 832_{10} a base 2, 8, 16

a. $832_{10} = 340_{16}$

→ 16 (grupos 4)

b. $832_{10} = X_2$

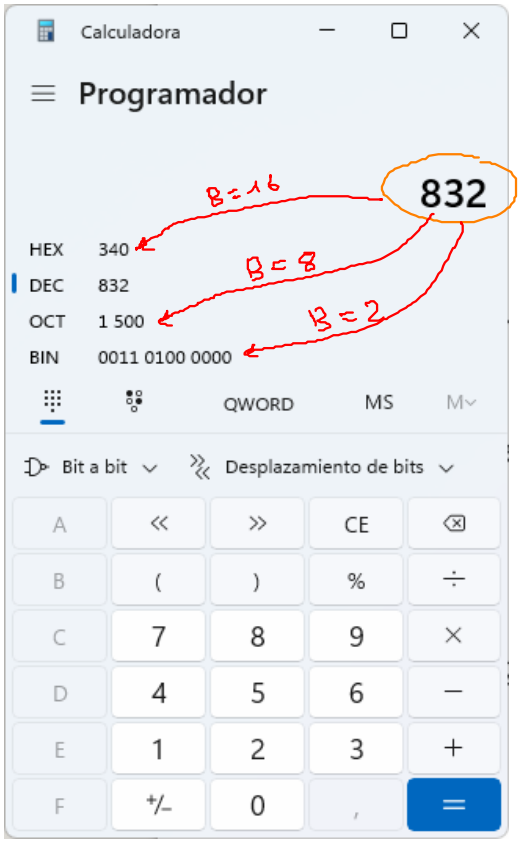
$340_{16} = \underbrace{3}_{0011} \underbrace{4}_{0100} \underbrace{0}_{0000} = 0011\,0100\,0000_2$

c. $832_{10} = X_8$

grupos de 3 (Base)

$X_2 = 001\,100\,000\,000 = 1500_8$

1 5 0 0



2. Sumador

Suma decimal

acarreo

$$\begin{array}{r} {\scriptstyle 1}\,9 \\ +\,7 \\ \hline 16 \end{array} \qquad 9+7=16$$

$$\begin{array}{r} {\scriptstyle 1\,1}\,23 \\ +\,78 \\ \hline 101 \end{array} \qquad 3+8=11$$

$2+7+1=10$

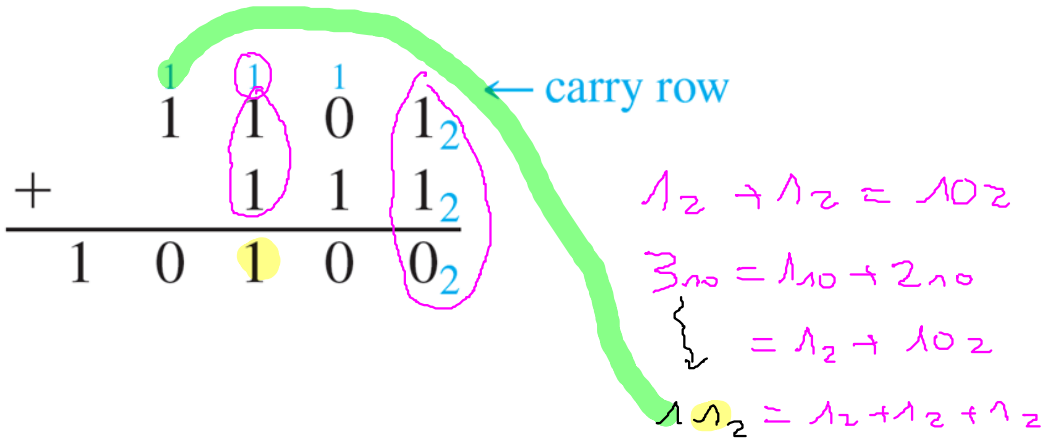
Suma Binaria $1001_2 + 111_2$

$$\begin{array}{r} {\scriptstyle 1\,1\,1\,1}\,1001 \\ +\,\,\,111 \\ \hline 10000 \end{array}$$

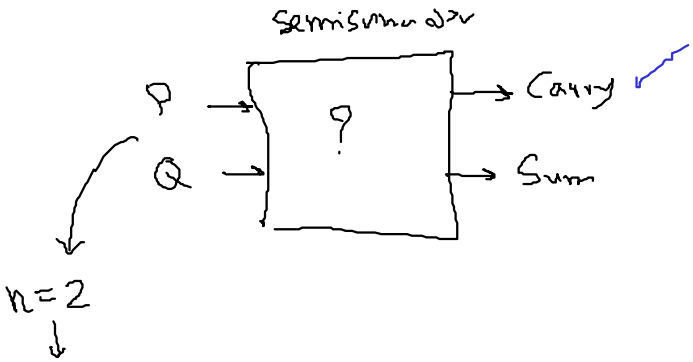
Base 10

$1_2 + 1_2 = 10_2 \longleftrightarrow 1+1=2$

$0_2 + 1_2 = 01_2 \longrightarrow 0+1=1$



Hacer un Sumador



P	Q
Carry	Sum

n = 2

filas: $f = 2^2 = 4$

Entradas		Salidas	
P	Q	Carry	Sum
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

P	Q
Carry	Sum

Sum = P'Q + PQ'

Carry = PQ