

Computación – Curso 2024



TP 4

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TP4)1)a)

$$1001101011_2 = 1 \times 2^9 + 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^3 + 1 \times 2^1 + 1 \times 2^0 = 512 + 64 + 32 + 8 + 2 + 1 = 619$$

```
>> bin2dec('1001101011')  
ans =  
    619
```

TP4)1)a)

$$\begin{aligned} F3A5_{16} &= F \times 16^3 + 3 \times 16^2 + A \times 16^1 + 5 \times 16^0 \\ &= 15 \times 4096 + 3 \times 256 + 10 \times 16 + 5 \times 1 \\ &= 61440 + 768 + 160 + 5 = 62373 \end{aligned}$$

```
>> hex2dec('F3A5')
```

```
ans =
```

```
62373
```

TP4)1)a)

$$\begin{aligned} 7324_8 &= 7 \times 8^3 + 3 \times 8^2 + 2 \times 8^1 + \\ &\quad 4 \times 8^0 = 7 \times 512 + 3 \times 64 + 2 \times 8 + \\ &\quad 4 \times 1 = 3584 + 192 + 16 + 4 = 3796 \end{aligned}$$

```
>> base2dec('7324', 8)
```

```
ans =
```

```
3796
```

TP4)1)b)

```
>> dec2bin(256)
```

```
ans =
```

```
100000000
```

```
.....
```

```
>> dec2bin(127)
```

```
ans =
```

```
1111111
```

TP4)1)b)

```
>> dec2bin(65535)
```

```
ans =
```

```
1111111111111111
```

```
.....
```

```
>> dec2bin(3029)
```

```
ans =
```

```
101111010101
```

TP4)1)b)

```
>> dec2hex(256)
```

```
ans =
```

```
100
```

.....

```
>> dec2hex(127)
```

```
ans =
```

```
7F
```

TP4)1)b)

```
>> dec2hex(65535)
```

```
ans =
```

```
FFFF
```

.....

```
>> dec2hex(3029)
```

```
ans =
```

```
BD5
```

TP4)1)b)

```
>> dec2base(256, 8)
```

```
ans =
```

```
400
```

```
.....
```

```
>> dec2base(127, 8)
```

```
ans =
```

```
177
```

TP4)1)b)

```
>> dec2base(65535, 8)
```

```
ans =
```

```
177777
```

.....

```
>> dec2base(3029, 8)
```

```
ans =
```

```
5725
```

TP4)2)a)M y S

$$18_{10} \xrightarrow{\text{red arrow}} \begin{array}{cccccccc} 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0_2 = \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ S & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{array}$$

$$= 1 \times 2^4 + 1 \times 2^2 = 16 + 2 = 18$$

TP4)2)a)Ca2

$$18_{10} \xrightarrow{\text{red arrow}} 0 \ 0 \ 0 \ 1 \ 0 \ 0 \ 1 \ 0_2 =$$



$$(-2^7) \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0$$

$$= 1 \times 2^4 + 1 \times 2^2 = 16 + 2 = 18$$

TP4)2)a)M y S

$$119_{10} \xrightarrow{\text{red arrow}} \begin{array}{cccccccc} 0 & 1 & 1 & 1 & 0 & 1 & 1 & 1_2 = \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ S & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{array}$$

$$\begin{aligned} &= 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 \\ &= 64 + 32 + 16 + 4 + 2 + 1 = 119 \end{aligned}$$

TP4)2)a)Ca2

$$119_{10} \xrightarrow{\text{red arrow}} 0 \ 1 \ 1 \ 1 \ 0 \ 1 \ 1 \ 1_2 =$$



$$(-2^7) \ 2^6 \ 2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0$$

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

$$= 64 + 32 + 16 + 4 + 2 + 1 = 119$$

TP4)2)a)M y S

$$+ 49_{10} \longrightarrow \begin{array}{cccccccc} 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1_2 = \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ S & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{array}$$

$$- 49_{10} \longrightarrow 1 \ 0 \ 1 \ 1 \ 0 \ 0 \ 0 \ 1_2$$

TP4)2)a)Ca2

$$+ 49_{10} \xrightarrow{\text{red arrow}} \begin{array}{cccccccc} 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1_2 = \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ (-2^7) & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{array}$$

$$- 49_{10} \xrightarrow{\text{red arrow}} 1 \quad 1 \quad 0 \quad 0 \quad 1 \quad 1 \quad 1 \quad 1_2$$

$$\begin{aligned} &= -1 \times 2^7 + 1 \times 2^6 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 \\ &= -128 + 64 + 8 + 4 + 2 + 1 = -49 \end{aligned}$$

TP4)2)a)M y S

$$+3_{10} \longrightarrow \begin{array}{cccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1_2 = \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ S & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{array}$$

$$-3_{10} \longrightarrow 1 \ 0 \ 0 \ 0 \ 0 \ 0 \ 1 \ 1_2$$

TP4)2)a)Ca2

$$+3_{10} \xrightarrow{\text{red arrow}} \begin{array}{cccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1_2 = \\ \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\ (-2^7) & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \end{array}$$

$$-3_{10} \xrightarrow{\text{red arrow}} 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 1_2$$

$$\begin{aligned} &= -1 \times 2^7 + 1 \times 2^6 + 1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 \\ &+ 1 \times 2^0 = -128 + 64 + 32 + 16 + 8 + 4 + 1 = -3 \end{aligned}$$

TP4)2)c)

```
>> intmax('uint16')
```

```
ans = 65535
```

```
>> intmin('uint16')
```

```
ans = 0
```

```
>> intmax('int16')
```

```
ans = 32767
```

```
>> intmin('int16')
```

```
ans = -32768
```

TP4)2)c)

```
>> intmax('uint8')
```

```
ans = 255
```

```
>> intmin('uint8')
```

```
ans = 0
```

```
>> intmax('int8')
```

```
ans = 127
```

```
>> intmin('int8')
```

```
ans = -128
```

TP4)2)c)

```
>> a=int16(2^12)
```

```
a = 4096
```

```
>> 2*a
```

```
ans = 8192
```

```
>> 4*a
```

```
ans = 16384
```

```
>> 8*a+2
```

```
ans = 32767
```

```
>> 10-a
```

```
ans = -4086
```

```
>> b=uint16(2^12)
b = 4096
```

```
>> 2*b
```

```
ans = 8192
```

```
>> 4*b
```

```
ans = 16384
```

```
>> 8*b+2
```

```
ans = 32770
```

```
>> 8*a==8*b
```

```
ans = 0
```

```
>> 10-b
```

```
ans = 0
```

```
>> b=uint16(2^16-2)
b = 65534
```

```
>> b+1
```

```
ans = 65535
```

```
>> b+2
```

```
ans = 65535
```

```
>> 10-b
```

```
ans = 0
```

```
>> realmax('single')
```

```
ans = 3.4028e+38
```

```
>> realmin('single')
```

```
ans = 1.1755e-38
```

```
>> realmax('double')
```

```
ans = 1.7977e+308
```

```
>> realmin('double')
```

```
ans = 2.2251e-308
```

TP4)2)b)I)

- $25 + 100$
- BSS $\rightarrow 25 = 00011001 =$ en Ca2
- BSS $\rightarrow 100 = 01100100 =$ en Ca2
- $$\begin{array}{r} 00011001 \\ + \\ 01100100 \\ \hline 01111101 \end{array}$$
- $01111101 \rightarrow 125$ en BSS y en Ca2
- Con 8 bits, rango en BSS $\rightarrow 0$ a 255
- Con 8 bits, rango en Ca2 $\rightarrow -128$ a $+127$

TP4)2)b)III)

□ 5 - 43

□ BSS $\rightarrow 5 = 00000101 = \text{en Ca2}$

□ BSS $\rightarrow 43 = 00101011 = \text{en Ca2}$

□ 1 1 1 1 0

□ 1 $\rightarrow$ ~~10~~ ~~10~~ ~~10~~ ~~10~~ 10 ~~1~~ 10 1

□ -
 0 0 1 0 1 0 1 1

□ 1 1 0 1 1 0 1 0 $\rightarrow -38 \text{ en Ca2}$

□ BSS $\rightarrow = 128 + 64 + 16 + 8 + 2 = 218!!!! \text{ Mal}$

□ -38 fuera de rango en BSS

TP4)2)b)IV)

□ - 10 - 6

□ $10 = 00001010$ $6 = 00000110$ (Ca2)

□ - $10 = 11110110$ (Ca2)

□ 11110110

□ $\begin{array}{r} \text{---} \\ 00000110 \end{array}$

□ 11110000 = -16 

□ 00010000 = 16

TP4)2)b)V)

- 150 fuera de rango en Ca2
- -100 fuera de rango en BSS

TP4)4)a)

- $123,51 \rightarrow 01111011,1000 = 123,5$
- $0,51 \times 2 = 1,02$
- $0,02 \times 2 = 0,04$
- $0,04 \times 2 = 0,08$
- $0,08 \times 2 = 0,16$
- $\underline{0111}\underline{1011},\underline{1000} = 7B,8 =$
- $= 7 \times 16^1 + 11 \times 16^0 + 8 \times 16^{-1} = 112 + 11 + 0,5 =$
- $= 123,5$

TP4)4)b)

- $101111010,011 = 2^8 + 2^6 + 2^5 + 2^4 + 2^3 + 2^1 + 2^{-2} + 2^{-3} = 256 + 64 + 32 + 16 + 8 + 2 + 0,25 + 0,125 = 378,375$

- $\underline{10111}\underline{1010},\underline{0110} = \underline{17A},\underline{6}$
- $17A,6 = 1 \times 16^2 + 7 \times 16^1 + A \times 16^0 + 6 \times 16^{-1} =$
- $256 + 112 + 10 + 0,375 = 378,375$

	BSS	MyS	Ca2	Exceso 7	Reales --,--
0000	0	0	0	-7	00,00 = 0,0
0001	1	1	1	-6	00,01 = 0,25
0010	2	2	2	-5	00,10 = 0,5
0011	3	3	3	-4	00,11 = 0,75
0100	4	4	4	-3	01,00 = 1,0
0101	5	5	5	-2	01,01 = 1,25
0110	6	6	6	-1	01,10 = 1,5
0111	7	7	7	0	01,11 = 1,75
1000	8	-0	-8	1	10,00 = 2,00
1001	9	-1	-7	2	10,01 = 2,25
1010	10	-2	-6	3	10,10 = 2,5
1011	11	-3	-5	4	10,11 = 2,75
1100	12	-4	-4	5	11,00 = 3,0
1101	13	-5	-3	6	11,01 = 3,25
1110	14	-6	-2	7	11,10 = 3,5
1111	15	-7	-1	-8	11,11 = 3,75

TP4)6)

- a) $111 \times 2^{11} = 7 \times 2^7 = 7 \times 128 = 896$
- b) $-720 = 1 \ 1011010000 \times 2^0$
- $= 1 \ 1,011010000 \times 2^9$
- $= -(1+2^{-2}+2^{-3}+2^{-5}) \times 2^9 =$
- $= -(2^9+2^7+2^6+2^4) = -720$
- Exponente $\rightarrow 00001001+01111111=$
- $10001000 \rightarrow 9$ en exceso 127
- $1 \ 10001000 \ 01101000 \dots 0$