1ª prova → 11/09

Parte 1:

Codificação

Álgebra Linear

Projetos Simples

Parte 2:

Memórias e Máquinas de estados

Parte 3:

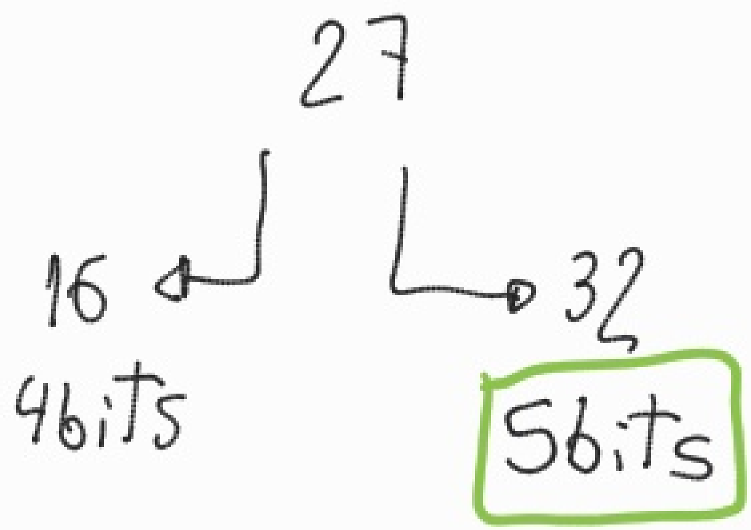
Processador MIPS

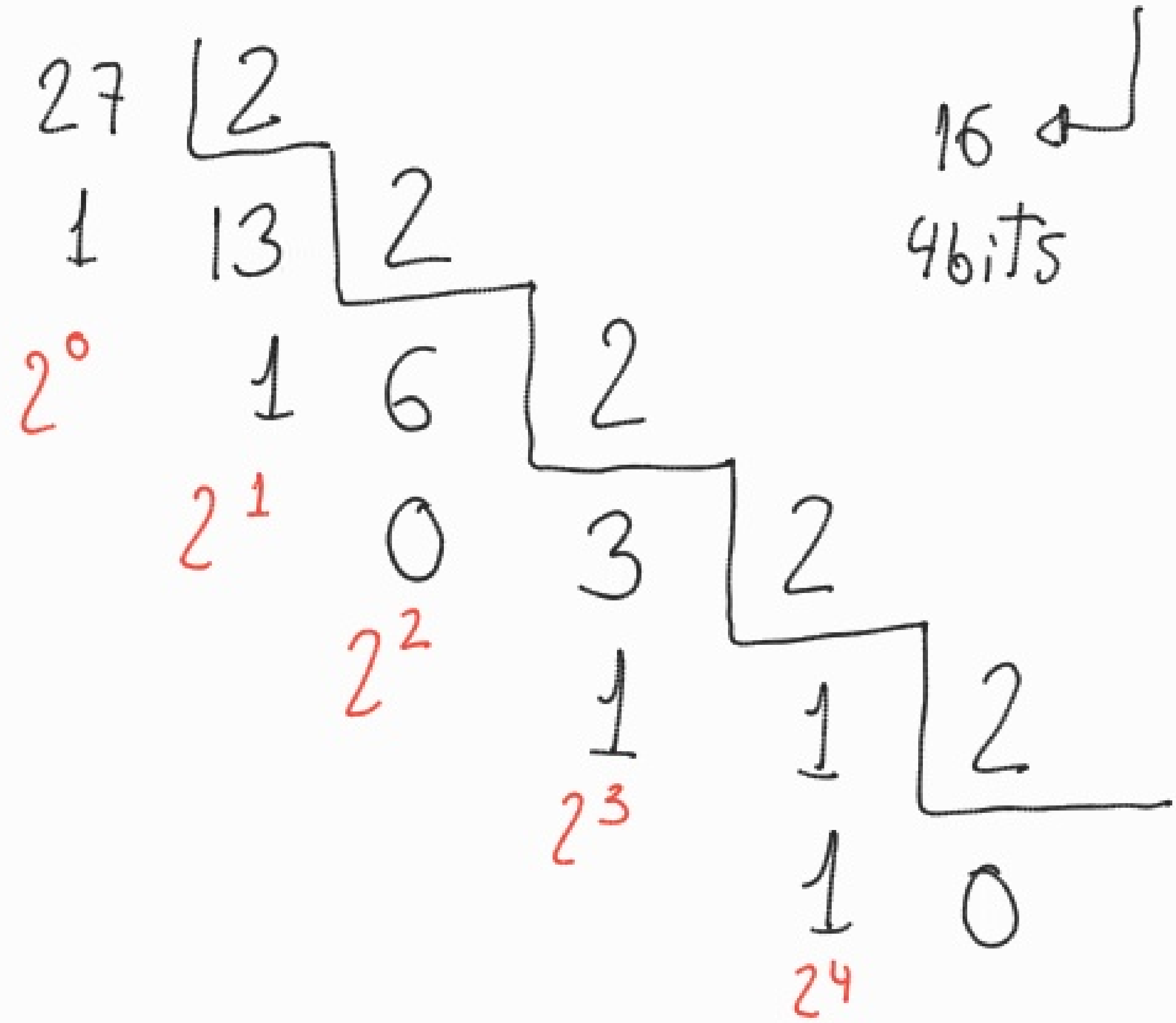
Codificação

0 0 0

0 e 1

$2^3 = 8$ bits





| 1 | 1 | 0 | 1 | 1 |

$16 + 8 + 0 + 2 + 1 = 27$

XOR → exclusive or

↳ ou a, ou b, somente

and → As duas partes verdadeiras

0	0	○	0	0
0	0	●	1	1
0	1	○	0	2
0	1	●	1	3
1	0	○	0	-4
1	0	●	1	-3
1	1	○	0	-2
1	1	●	1	-1

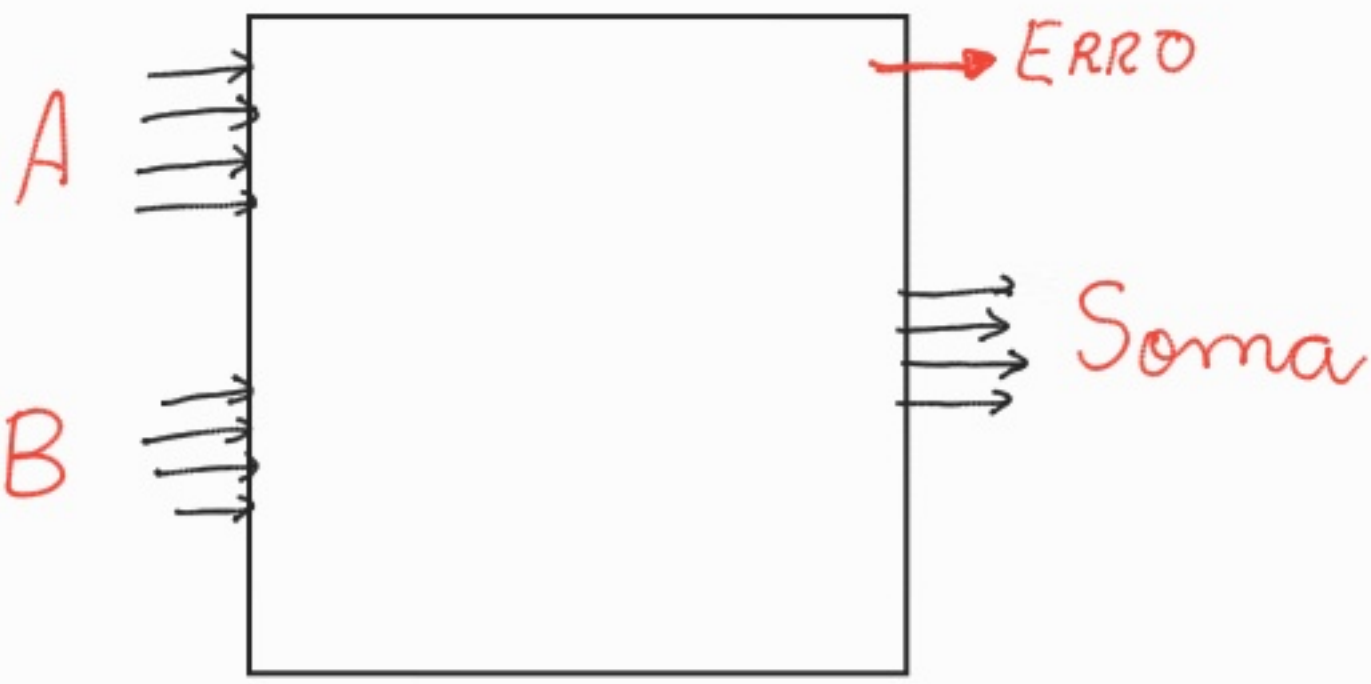
Para transformar para negativo:

Positivo → Inverte os bits → Soma +1

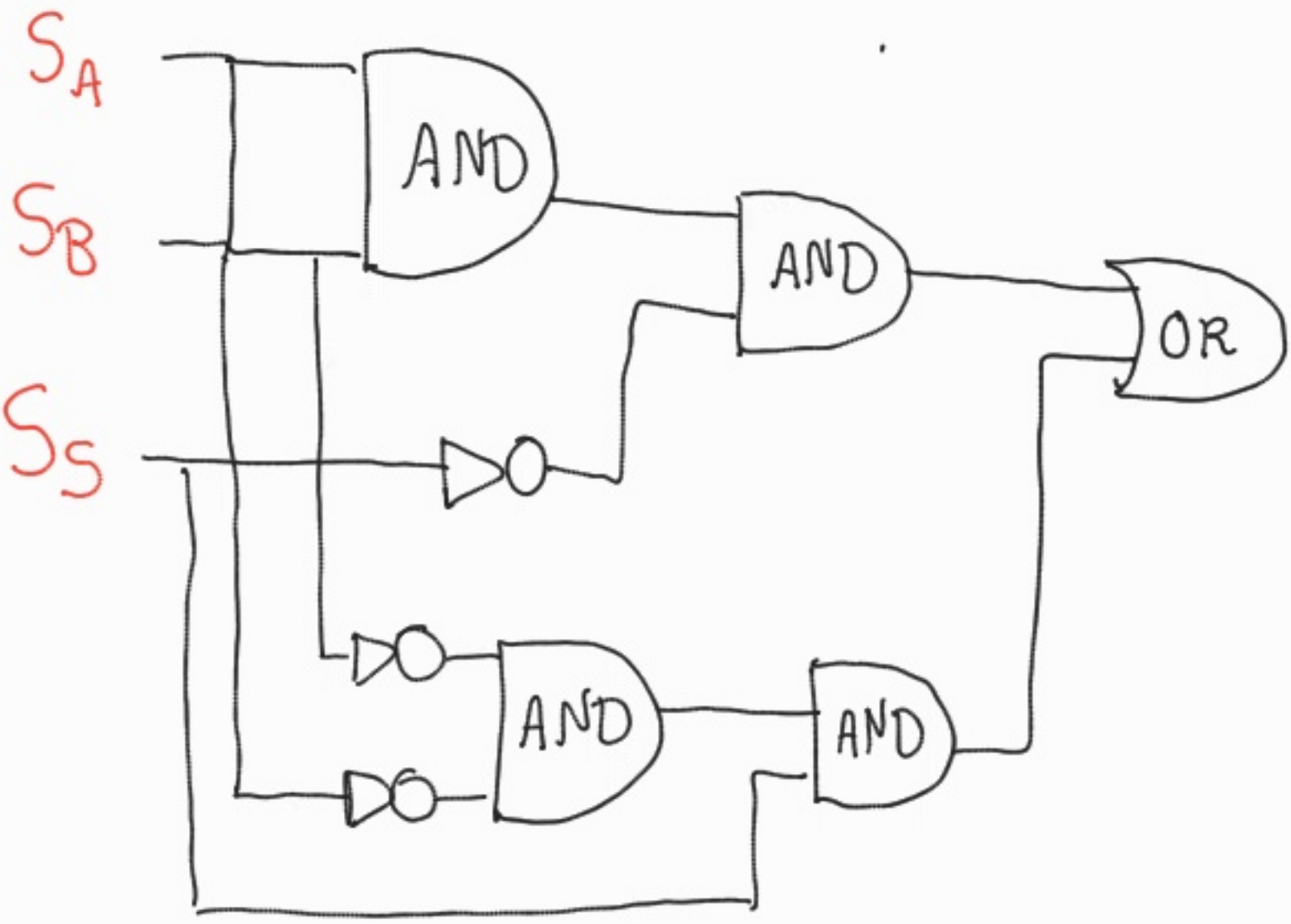
↳ Negativo

```
 1   1
 1 1 0 1  = -3
 0 1 0 1  = +5
---------
 0 0 1 0  = +2
```

Método complemento 2



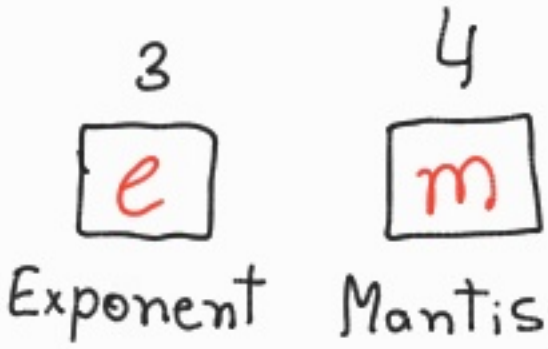
Sinal A	Sinal B	Sinal Soma	Erro
0	0	0	0
		1	1
	1	0	0
		1	
1	0	0	0
		1	
1	1	0	1
		1	0



Codificações:

- Inteiro sem sinal: $\overset{16\,8\,4\,2\,1}{10110} = 22$
- Complemento 2: $\overset{5\,4\,3\,2\,1}{10110} \rightarrow 00101 = -4$
- Hexadecimal: 0, 6, A, -F, etc...
- (BCD, Display 7 Seg.): Saídas
- Float??
  - ↳ Padrão IEEE

Float:



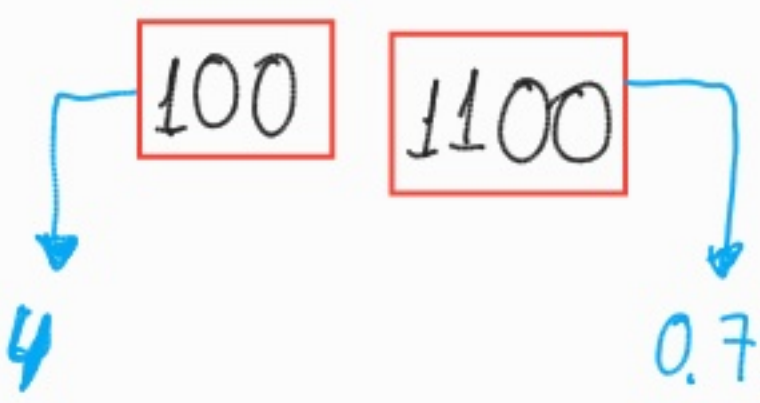
$$F = 2^{e-3} \times [1 - m]$$

P.S.: e e m estão em código binário.

$$3,5 = 2^{4-3} \times 1,75$$

$$= 2^{4-3} \times [1 + 0,75]$$

1/2 → 0,5
1/4 → 0,25
1/8 → 0,125
1/16 → 0,0625



P.S.: O m, antes de converter, deve estar entre 1 e 2

$$\begin{array}{r} \overset{1}{3},5 \\ +\,3,5 \\ \hline 7,0 \end{array}$$

$$\begin{array}{r} 100\ \ \overset{1}{1}\ \ 1100 \\ +\,100\ \ 1\ \ 1100 \\ \hline 100\ \ 10\ \ 1100 \end{array}$$

↳ Fora do padrão!

Quebra e adiciona 1

$= 101\ \ 1\ \ 1100$

$2^{2} \times 1,75 = 7$

Float 7 bit ~ IEEE 754

e				m			
1	0	0		1	0	0	0

$\rightarrow 2^{4-3} x \left(1 + \frac{1}{2}\right)$

↳ 4

1/2, 1/4, 1/8, 1/16

3 [100] [1000] $3 * 3 = 9$

9 [110] [0010]

$$2^{e_a-3} \times (1+m_a)$$

$$2^{e_b-3} \times (1+m_b)$$

$$2^{\underbrace{e_a+e_b-3}_{e_c}-3}$$

```
        1 1000
    ×   1 1000
    ----------
        00000
       000000
      000000
    1 11000
  + 1 1000 1
  ------------
  10010000000
```

$3{,}5 \rightarrow 2^{4-3} \times (1+0{,}75)$ 100 1 1100

$+9{,}0 \rightarrow 2^{6-3} \times (1+0{,}125) =$ 110 1 0010

12,5 0 1110

1 Alinhar os expoentes

2- Efetuar soma

3- Colocar resposta no padrão

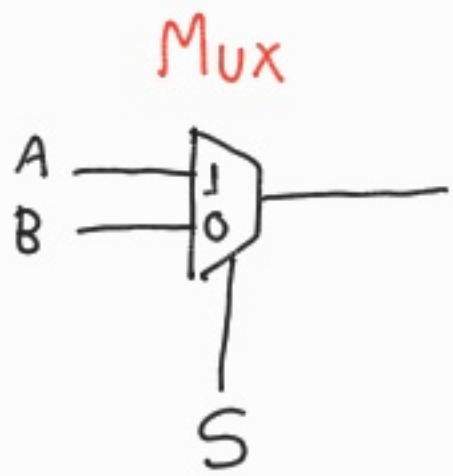
ALU ou UL Aritmética / Lógica / Unidade

0 AND

1 OR

2 +

3 -



$\overline{S}B + SA$

C1C0	F
0 0	A+B+1
0 1	A
1 0	A AND B
1 1	A-B

Computer Organization and Design


```
lw   $t1, 0($gp)
lw   $t2, 4($gp)
lw   $t3, 8($gp)
slt  $t4, $t1, $t2
beq  $t4, $t0, SWAP
```