

Lista 3

1).text

.globl main

main:

lui \$s0,0x1001

addi \$a0, \$s0,0

addi \$a1, \$zero, 5

jal func1

func1:

addi \$sp,\$sp,-12

sw \$s0, 12(\$sp)

addi \$t0, \$zero, 30

slt \$t0, \$t0, \$a1

beq \$t0, \$zero, corpo

addi \$a1, \$zero, 30

corpo:

sw \$ra, 8(\$sp)

addi \$t1, \$zero,0

addi \$t0, \$zero,0

loop:

beq \$t0,\$a1,fim

sw \$a0, 4(\$sp)

addi \$a0,\$t0,0

jal func2

lw \$a0, 4(\$sp)

```
addi $s0, $v0,0
```

```
andi $t2, $t0, 1
```

```
bne $t2, $zero, impar
```

```
sll $s0, $s0,1
```

```
sll $t2,$t0,1
```

```
add $s0,$s0,$t2
```

```
addi $s0,$s0,1
```

impar:

```
sw $s0, 0($a0)
```

```
addi $a0, $a0, 4
```

```
add $t1,$t1,$s0
```

```
addi $t0,$t0,1
```

```
j loop
```

fim:

```
addi $sp,$sp,12
```

```
lw $ra, 8($sp)
```

```
lw $s0, 4($sp)
```

```
add $v0, $t1,$zero
```

```
jr $ra
```

func2:

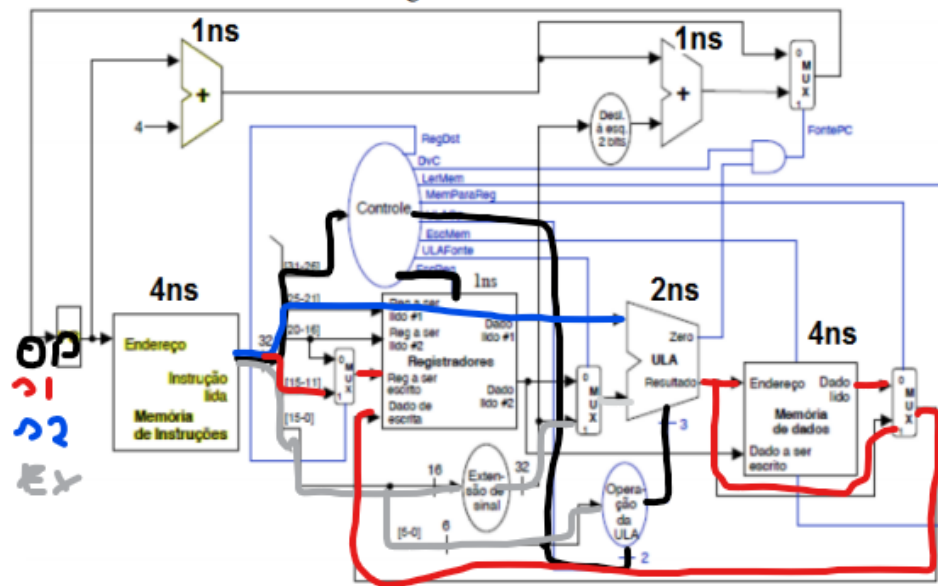
```
mult $a0,$a0
```

```
mflo $v0
```

```
jr $ra
```

2)

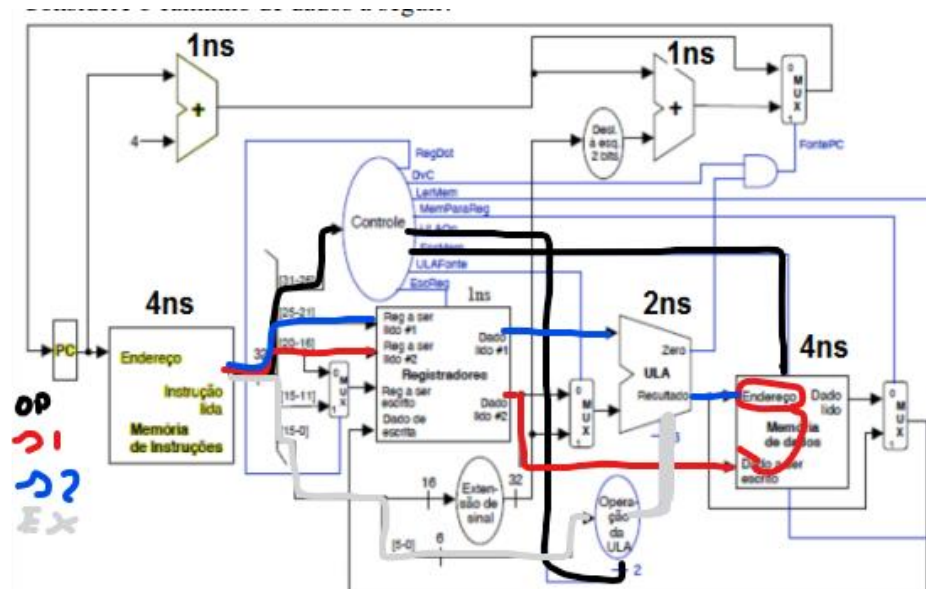
Considere o caminho de dados a seguir:



Através das instruções a seguir, explique as ações de cada unidade funcional do diagrama acima e como o controle atua em cada unidade.

- LW \$S1, num(\$S2)
- SW \$S1, num(\$S2)
- BEQ \$S1, \$S2, pulos
- ADD \$S1, \$S2, \$S3

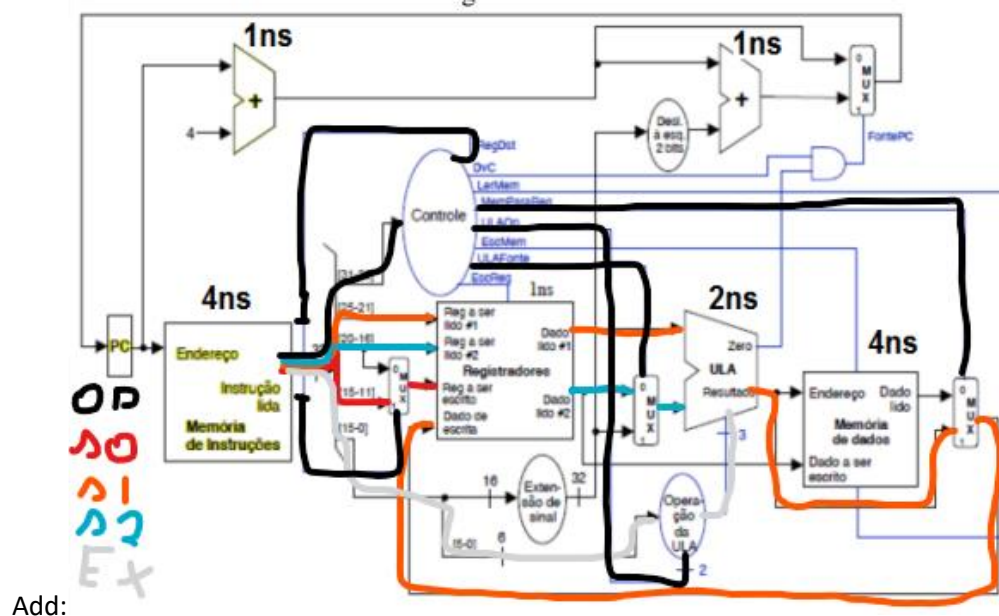
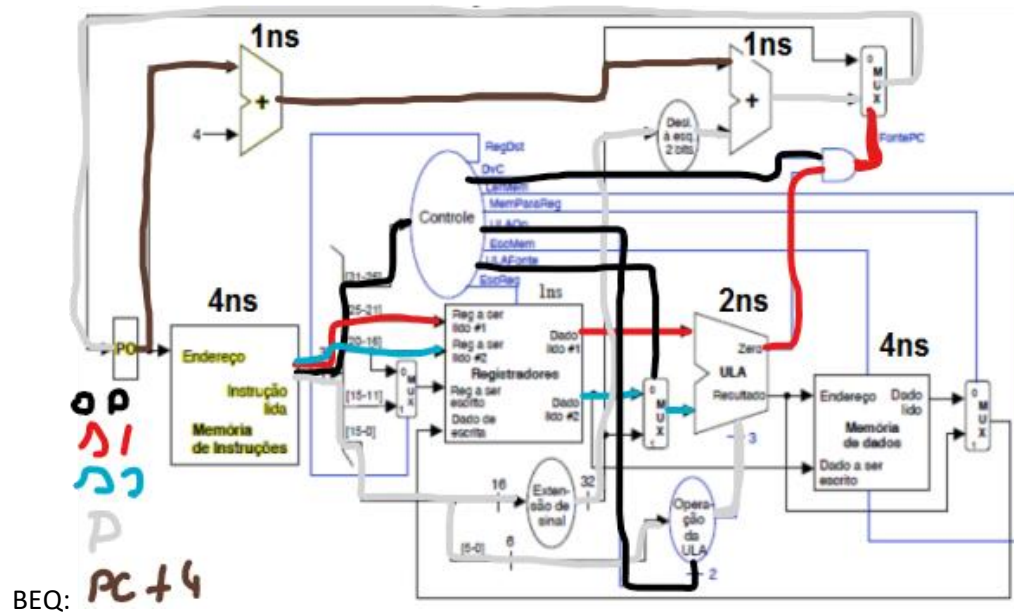
Load:



Através das instruções a seguir, explique as ações de cada unidade funcional do diagrama acima e como o controle atua em cada unidade.

- LW \$S1, num(\$S2)
- **SW \$S1, num(\$S2)**
- BEQ \$S1, \$S2, pulos
- ADD \$S1, \$S2, \$S3

Store:



3) a) LW \$S1, num(\$S2): $4 + 1 + 2 + 4 + 1 = 12\text{ns}$

SW \$S1, num(\$S2): $4 + 1 + 2 + 4 = 11\text{ns}$

BEQ \$S1, \$S2, p: $4 + 1 + 2 = 7\text{ns}$

ADD \$S1, \$S2, \$S3: $4 + 1 + 2 + 1 = 8\text{ns}$

b) GCC:

-Monociclo: 12ns

-Multiciclo: $(12 \cdot 0.22 + 11 \cdot 0.11 + 8 \cdot 0.49 + 7 \cdot 0.16 + 4 \cdot 0.02) = 8.97\text{ns}$

Speedup: $12/8.97 = 1,3378$

ABC:

-Monociclo: 12ns

-Multiciclo: $(12 \cdot 0.11 + 11 \cdot 0.49 + 8 \cdot 0.22 + 7 \cdot 0.02 + 4 \cdot 0.16) = 9.25\text{ns}$

Speedup: $12/9.25 = 1,2972$

4)

