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Arquitetura de Computadores 2

Lista 2

1) addi $s0, $0, 10

addi $s1, $0, -1

addi $s0, $s0, 1

addi $s2, $s0, $s1

2) addi $s0, $0, 3

sll $s1, $s0, 2

3) addi $s0, $0, 3

sll $s1, $s0, 10

add $s1, $s1, $s0

4) addi $s0,$s0,3

sra $s1,$s0,2

5) addi $s0, $0, 0x1234

sll $s0, $s0, 16

ori $s0, $s0, 0x5678

6) addi $s0,$0,-1

addi $t0,$0,32

div $s0,$t0

mflo $s1

7) addi $t0, $0, 0x1001

sll $t0, $t0, 16

lw $s0, 32($t0)

addi $s1, $0, 10

add $t1, $s1, $s0

sw $t1, 64($t0)

8) addi $t0, $zero, 0x1001

sll $t0, $t0, 16

lw $s0, 0($t0)

ori $s1, $s1, 10

add $s2, $s1, $s0

9) addi $t0, $0, 0x1001

sll $t0, $t0, 16

ori $t0, $t0, 0x????

ori $t1, $t0, 0x0002

lw $s1, 0($t0)

addi $s0, $0, 5

add $t2, $s0, $s1

sw $t2, 0($t1)

10) addi $t0, $zero, 0x1001

sll $t0, $t0, 16

ori $t0, $t0, 0x????

lw $s0, 0($t0)

lw $s1, 4($t0)

sw $s1, 0($t0)

sw $s0, 4($t0)

ori $s0, $zero, 0

ori $s1, $zero, 10

do:

addi $s0, $s0, 1

bne $s0, $s1, do

12) addi $t0, $0, 0x1001

sll $t0, $t0, 16

lw $s0, 0($t0)

slt $t1, $s0, $0

bne $t1, $0, neg

j fim

neg:

sub $s0, $0, $s0

fim:

sw $s0, 0($t0)

13) .text

.globl main

main:

addi $t0, $0, 0x1001

sll $t0, $t0, 16

lw $s0, 0($t0)

ori $t3, $0, 50

slt $t1, $t3, $s0

bne $t1, $0, fim

slti $t1, $s0, 30

bne $t1, $0, fim

ori $s1,$0,1

fim:

sw $s1, 4($t0)

.data

TEMP: .word 30

FLAG: .word -1

14) .text

.globl main

main:

addi $t0, $0, 0x1001

sll $t0, $t0, 16

add $t2, $t0, 12

do:

ori $t4, $0, 0

add $t3, $t0, $0

loop:

lw $s1, 0($t3)

lw $s2, 4($t3)

slt $t1, $s2, $s1

beq $t1,$0,increm

ori $t4, $0, 1

sw $s1, 4($t3)

sw $s2, 0($t3)

increm:

addi $t3, $t3, 4

bne $t3,$t2,loop

bne $t4, $0, do

.data

x0: .word 5

x1: .word 3

x2: .word 2

x3: .word 4

15) .text

.globl main

main:

lui $t0, 0x1001

lw $s0, 0($t0)

andi $t1, $s0, 1

add $a0, $s0, $0

bne $t1, $0, impar

par:

addi $a1, $0, 3

jal exp

add $s1, $0, $v0

add $a0, $s0, $0

addi $a1, $0, 2

jal exp

add $s1, $s1, $v0

add $a0, $s0, $0

addi $a1, $0, 1

jal exp

sll $t2, $v0, 1

sub $s1, $s1, $t2

j fim

impar:

addi $a1, $0, 4

jal exp

add $s1, $0, $v0

add $a0, $s0, $0

addi $a1, $0, 2

jal exp

sub $s1, $s1, $v0

addi $s1, $s1, 1

j fim

exp:

add $t2,$0,$a0

loop:

beq $a1, $0, expfim

mult $t2,$a0

mflo $t2

addi $a1, $a1, -1

j loop

expfim:

add $v0, $0, $t2

jr $ra

fim:

sw $s1, 4($t0)

.data

x: .word 3

16) .text

.globl main

main:

lui $t0, 0x1001

lw $s0, 0($t0)

add $a0, $0, $s0

slt $t1, $0, $s0

beq $t1, $0, menorIgual

addi $a1, $0, 2

jal exp

addi $s1, $v0, 1

j fim

menorIgual:

addi $a1, $0, 3

jal exp

addi $s1, $v0, -1

j fim

exp:

add $t2,$0,$a0

loop:

beq $a1, $0, expfim

mult $t2,$a0

mflo $t2

addi $a1, $a1, -1

j loop

expfim:

add $v0, $0, $t2

jr $ra

fim:

sw $s1, 4($t0)

.data

x: .word -1

17) .text

.globl main

main:

lui $t0, 0x1001

lw $s0, 0($t0)

lw $s1, 4($t0)

ori $t2, $0, 98

loop:

add $t1, $s0, $s1

sw $t1, 8($t0)

lw $s0, 4($t0)

add $s1, $0, $t1

addi $t0, $t0, 4

addi $t2, $t2, -1

beq $t2, $0, fim

j loop

fim:

.data

a0: .word 0

a1: .word 1

18) .text

.globl main

main:

lui $t0, 0x1001

lw $s0, 0($t0)

addi $s1,$0,0

ori $t1,$0,50

ori $t2,$0,100

ori $t4,$0,150

ori $t5,$0,200

slt $t3,$s0,$t1

bne $t3,$0,fim

slt $t3,$t5,$s0

bne $t3,$0,fim

slt $t3,$t2,$s0

slt $t6,$s0,$t4

xor $t3, $t3,$t6

beq $t3, $0, fim

addi $s1,$0,1

fim:

.data

a0: .word 201

19) .text

.globl main

main:

addi $t0, $0, 0x1001

sll $t0, $t0, 16

bubbleSort:

add $t2, $t0, 8

do:

ori $t4, $0, 0

add $t3, $t0, $0

loop:

lw $s1, 0($t3)

lw $s2, 4($t3)

slt $t1, $s2, $s1

beq $t1,$0,increm

ori $t4, $0, 1

sw $s1, 4($t3)

sw $s2, 0($t3)

increm:

addi $t3, $t3, 4

bne $t3,$t2,loop

bne $t4, $0, do

lw $s1, 4($t0)

sw $s1, 12($t0)

.data

A: .word 23

B: .word 98

C: .word 17

20) .text

.globl main

main:

addi $t0, $0, 0x1001

sll $t0, $t0, 16

lw $s0, 0($t0)

loop:

sll $t1, $t2, 1

addi $t1, $t1, 1

sw $t1, 0($t0)

add $s1,$s1,$t1

addi $t2, $t2, 1

addi $t0, $t0, 4

bne $t2,100,loop

sw $s1, 0($t0)

ULA: 2 + 5n -> 502

Desvio: 1n -> 100

Mem.: 2 + 1n -> 102

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704

n -> 100

CPIm = (502\*3 + 100\*4 + 102\*5)/704 = 3,4318

CPUtime = 704 \* 3,4318 \* 10 = 24159,872 ns = 24,159872 ms

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Versão Pior

.text

.globl main

main:

addi $t0, $0, 0x1001

sll $t0, $t0, 16

lw $s0, 0($t0)

loop:

sll $t1, $t2, 1

addi $t1, $t1, 1

sw $t1, 0($t0)

add $s1,$s1,$t1

addi $t2, $t2, 1

addi $t0, $t0, 2

addi $t0, $t0, 2

bne $t2,100,loop

sw $s1, 0($t0)

ULA: 2 + 6n -> 602

Desvio: 1n -> 100

Mem.: 2 + 1n -> 102

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804

n -> 100

CPIm = (602\*3 + 100\*4 + 102\*5)/804 = 3,3781

CPUtime = 804 \* 3,3781 \* 10 = 27159,924 ns = 27,159924 ms

Sup = 27,159924/24,159872 = 1,124

21) addi $S3, $S2, 396

LOOP:

lw $S1, 0($S2)

addi $S1, $S1, 1

sw $S1, 0 ($S2)

addi $s2, $s2, 4

sub $S4, $S3, $S2

bne $S4, $zero, LOOP

ULA : 1 + 3n = 298

Desvio: 1n = 99

Mem: 2n =198

Total: 595

n : 396 / 4 = 99

CPIm = (298\*3 + 99\*4 + 198\*5)/595 = 3,8319

CPUTime = 595 \* 3,8319 \* 10 = 22799,805 ns = 22,799805 ms

22) lui $a0,0x1001

addi $a1, $0, 10

jal somaVetor

nop

syscall

somaVetor:

addi $t0, $0, 0

addi $t1, $0, 0

loop: beq $t0, $a1, fim

andi $t2, $t0, 1

bne $t2, $0, else

sll $t2, $t0, 1

addi $t2, $t2, -1

j inc

else:

add $t2, $0, $t0

inc:

sw $t2, 0($a0)

addi $a0, $a0, 4

addi $t0, $t0, 1

j loop

fim:

add $v0, $0, $t1

jr $ra

23) .text

.globl main

main:

lui $t0,0x1001

lw $a0, 0($t0)

lw $a1, 4($t0)

jal exp

sw $v0, 8($t0)

syscall

exp:

addi $t1, $0, 1

add $t2,$0,$a0

loop:

mult $t2,$a0

mflo $t2

addi $a1, $a1, -1

bne $a1, $t1, loop

add $v0, $0, $t2

jr $ra

.data

x: .word 4

y: .word 2