Thực hành Kiến trúc máy tính

Week 4

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Assignment 1

.text

start:

li $t0,0 #No Overflow is default status

addu $s3,$s1,$s2 # s3 = s1 + s2

xor $t1,$s1,$s2 #Test if $s1 and $s2 have the same sign

bltz $t1,EXIT #If not, exit

slt $t2,$s3,$s1

bltz $s1,NEGATIVE #Test if $s1 and $s2 is negative?

beq $t2,$zero,EXIT #s1 and $s2 are positive

# if $s3 > $s1 then the result is not overflow

j OVERFLOW

NEGATIVE:

bne $t2,$zero,EXIT #s1 and $s2 are negative

# if $s3 < $s1 then the result is not overflow

OVERFLOW:

li $t0,1 #the result is overflow

EXIT:

TH1: s1 = 1, s2 = 2

addi $s1, $zero, 1

addi $s2, $zero, 2

=> t0 = 0 No overflow

TH2: s1 = 2147483647, s2 = 2

addi $s1, $zero, 2147483647

addi $s2, $zero, 2

=> t0 = 1 Overflow

TH3: s1 = -3, s2 = 2

addi $s1, $zero, -3

addi $s2, $zero, 2

=> t0 = 0 No overflow

TH4: s1 = -3, s2 = -2

addi $s1, $zero, -3

addi $s2, $zero, -2

=> t0 = 0 No overflow

TH5: s1 = -2147483647, s2 = -2

addi $s1, $zero, -2147483647

addi $s2, $zero, -2

=> t0 = 1 Overflow

Assignment 2

.text

addi $s0, $zero, 0x12345678 # set $s0

andi $t1, $s0, 0xff000000 # Extract MSB of $s0

andi $t2, $s0, 0xffffff00 # Clear LSB of $s0

or $t3, $s0, 0x000000ff # Set LSB of $s0 (bits 7 to 0 are set to 1)

xor $s0, $s0, $s0 # Clear $s0 (s0 = 0, use xor)

Assignment 3

a.

.text

sra $at, $s1, 0x1f

xor $s0, $s1, $s1

subu $s0, $s0, $at

b.

text.

addu $s0, $zero, $s1

c.

.text

nor $s2, $s1, $zero

d.

.text

slt $t0, $s2, $s1 # t0 = (s2 < s1) ? 1 : 0

beq $t0, $zero, label # if not, label

label:

Assignment 4

.text

start:

li $t0, 0 #No overflow

addu $s3, $s1, $s2 # s3 = s1 + s2

xor $t1, $s1, $s2 # S1, s2 have the same sign

bltz $t1, EXIT # if not, exit

xor $t2, $s3, $s1 # s3, s1 have the same sign

bltz $t2, OVERFLOW # if not, overflow

j EXIT

OVERFLOW:

li $t0, 1 #Overflow

EXIT:

TH1: s1 = 1, s2 = 2

addi $s1, $zero, 1

addi $s2, $zero, 2

=> t0 = 0 No overflow

TH2: s1 = 2147483647, s2 = 2

addi $s1, $zero, 2147483647

addi $s2, $zero, 2

=> t0 = 1 Overflow

TH3: s1 = -2147483647, s2 = -2

addi $s1, $zero, -2147483647

addi $s2, $zero, -2

=> t0 = 1 Overflow

Assignment 5

.text

addi $s1, $zero, 4096 #Gán s1 = 4096

addi $s2, $zero, 4 #Gán s2 = 4

addi $t1, $zero, 1 #Gán t1 = 1

loop:

beq $s1, $t1, exit #Nếu s1 = 1, exit

sll $s2, $s2, 1 #Giảm s2 đi 2 lần

sra $s1, $s1, 1 #Tăng s1 lên 2 lần

j loop

exit: