Báo cáo thực hành KTMT tuần 4 Lê Quốc Đảng 20225801

Assignment 1

TH1: \$s1 = 0x7ffffffff, \$s2 = 1

```
#Laboratory Exercise 4, Home Assignment 1
   .text
 2
 3 start:
 4 addi $s1,$zero,0x7fffffff
 5 addi $s2,$zero,1
 6 li $t0,0 #No Overflow is default status
 7 addu $s3,$s1,$s2 # s3 = s1 + s2
 8 xor $t1,$s1,$s2 #Test if $s1 and $s2 have the same sign
 9 bltz $t1,EXIT #If not, exit
10 slt $t2,$s3,$s1 #$s3<$s1
11 bltz $s1, NEGATIVE #Test if $s1 and $s2 is negative?
12 beq $t2,$zero,EXIT #s1 and $s2 are positive
13 # if $s3 > $s1 then the result is not overflow
14 j OVERFLOW
15 NEGATIVE:
16 bne $t2,$zero,EXIT #s1 and $s2 are negative
17 # if $s3 < $s1 then the result is not overflow
18 OVERFLOW:
19 li $t0,1 #the result is overflow
20 EXIT:
```

Thanh ghi	Giá trị ban đầu	Giá trị sau
\$s1	0x0000000	0x7fffffff
\$s2	0x0000000	0x0000001
\$t0	0x0000000	0x0000000
\$s3	0x0000000	0x80000000
\$t1	0x0000000	0x7ffffffe
\$t2	0x0000000	0x0000001
\$t0	0x0000000	0x0000001

\$at			
\$v0	\$zero	0	0x0000000
\$v1 3 0x0000000000000000000000000000000000	\$at	1	0x7fffffff
\$a0	\$ v 0	2	0x00000000
\$a1	\$v1	3	0x00000000
\$a2 6 0x00000000 \$a3 7 0x00000000 \$t0 8 0x00000000 \$t1 9 0x7fffffff \$t2 10 0x00000000 \$t3 11 0x00000000 \$t4 12 0x00000000 \$t5 13 0x00000000 \$t5 13 0x00000000 \$t5 13 0x00000000 \$t5 13 0x00000000 \$t5 14 0x00000000 \$t7 15 0x000000000 \$t7 0x7fffffff \$t82 18 0x000000000 \$t83 19 0x80000000 \$t83 19 0x80000000 \$t84 10 0x000000000000000000000000000000000	\$a0	4	0x00000000
\$a3 7 0x00000000 \$t0 8 0x000000000000000000000000000000000	\$a1	5	0x00000000
\$t0	\$a2	6	0x00000000
\$t1 9 0x7fffffff \$t2 10 0x0000000 \$t3 11 0x0000000 \$t4 12 0x0000000 \$t5 13 0x0000000 \$t6 14 0x0000000 \$t7 15 0x0000000 \$s0 16 0x0000000 \$s1 17 0x7ffffff \$s2 18 0x0000000 \$s3 19 0x8000000 \$s4 20 0x0000000 \$s5 21 0x00000000	\$a3	7	0x00000000
\$t2	\$t0	8	0x0000001
\$t3	\$t1	9	0x7ffffffe
\$t4 12 0x00000000 \$t5 13 0x00000000 \$t6 14 0x00000000 \$t7 15 0x00000000 \$s0 16 0x00000000 \$s1 17 0x7fffffff \$s2 18 0x00000000 \$s3 19 0x80000000 \$s4 20 0x00000000 \$s5 21 0x00000000	\$t2	10	0x00000001
\$t5	\$t3	11	0x00000000
\$t6	\$t4	12	0x00000000
\$t7	\$t5	13	0x00000000
\$s0 16 0x0000000 \$s1 17 0x7ffffff \$s2 18 0x0000000 \$s3 19 0x8000000 \$s4 20 0x0000000 \$s5 21 0x00000000	\$t6	14	0x00000000
\$s1 17 0x7ffffff \$s2 18 0x0000000 \$s3 19 0x80000000 \$s4 20 0x000000000 \$s5 21 0x0000000000000000000000000000000000	\$t7	15	0x00000000
\$s2 18 0x0000000 \$s3 19 0x8000000 \$s4 20 0x0000000 \$s5 21 0x00000000	\$s0	16	0x0000000
\$s3	\$s1	17	0x7fffffff
\$s4 20 0x0000000 \$s5 21 0x0000000	\$s2	18	0x0000001
\$s5 21 0x0000000	\$s3	19	0x80000000
	\$s4	20	0x00000000
22 0000000	\$s5	21	0x00000000
22 0X0000000	\$s6	22	0x00000000
\$s7 23 0x0000000	\$s7	23	0x00000000
\$t8 24 0x0000000	\$t8	24	0x00000000
\$t9 25 0x0000000	\$t9	25	0x0000000

Thanh ghi t0 = 1, xảy ra tràn số

⇒ Kết quả đúng

Assignment 2

```
1   .text
2   li $s0, 0x12345678
3   #Extract MSB of $s0, store in $t0
4   andi $t0,$s0,0xff000000
5   srl $t0,$t0,24
6   #Clear LSB of $s0, store in $t1
7   andi $t1,$s0,0xffffff00
8   #Set LSB of $s0 (bits 7 to 0 are set to 1), store in $t2
9   ori $t2,$s0,0x0000000ff
10   #Clear $s0 (s0=0, must use logical instructions)
11   andi $s0,$s0,0
```

Kết quả sau chương trình:

\$t0	8	0x00000012
\$t1	9	0x12345600
\$t2	10	0x123456ff
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x0000000
\$s0	16	0x00000000
\$s1	17	0x00000000
\$s2	18	0x00000000
\$s3	19	0x00000000
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$s7	23	0x00000000

Assignment 3

```
a. abs $s0,s1
sra $at, $s1, 0x1f
xor $s0, $at, $s1
subu $s0, $s0, $at
```

Kết quả:

\$t6	14	0
\$t6 \$t7	15	0
\$s0	16	4
\$s1	17	-4
\$s2	18	0
\$s0 \$s1 \$s2 \$s3	19	0

b. move \$s0,s1

addu \$s0, \$zero, \$s1

Kết quả:

1	1	
\$t6	14	0
\$t6 \$t7 \$s0 \$s1 \$s2 \$s3	15	0
\$s0	16	-4
\$s1	17	-4
\$s2	18	0
\$s3	19	0

c. not \$s0,\$s1

nor \$s0, \$s1, \$zero

Kết quả:

\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000005
\$s1	17	0xfffffffa
\$s2	18	0x0000000
\$s3	19	0x00000000

d. ble \$s1,s2,L

slt \$at, \$s2, \$s1 beq \$at, \$zero, L

Assignment 4

```
.text
 1
 2
    start:
 3 li $t0,0 #Default $t0 = 0 no overflow
   li $s1, 0x7fffffff
   li $s2, 2
   addu $s3, $s1, $s2 # s3 = s1 + s2
 7
   xor $t1, $s1, $s2 #Test if $s1 and $s2 have the same sign
   bltz $t1, EXIT #If not, exit
   xor $t2, $s3, $s1 #Test if $s1 and $s3 have the same sign
   bgtz $t2, EXIT #Neu $t2 > 0, exit
10
11 j OVERFLOW
12 OVERFLOW:
   li $t0,1 #The result is overflow
13
14 EXIT:
```

Khởi tạo \$s1 = 0x7fffffff, \$s2 = 2.

Kết quả sau chương trình:

8	0x0000001
9	0x7ffffffd
10	0xfffffffe
11	0x00000000
12	0x00000000
13	0x00000000
14	0x00000000
15	0x00000000
16	0x00000000
17	0x7fffffff
18	0x00000002
19	0x80000001
	9 10 11 12 13 14 15 16 17

t0 = 1, xảy ra tràn số

⇒ Kết quả đúng

Assignment 5

Khởi tạo \$s0 = 8, \$s1 = 15.

```
1   .text
2   li $s0,8
3   li $s1,15
4   Loop:
5   beq $s0,1,Exit #If $s0 = 1, exit
6   srl $s0,$s0,1 #shift right $s0 1 bit
7   sll $s1,$s1,1 #shift left $s1 1 bit
8   j Loop
9   Exit:
```

Kết quả sau khi kết thúc chương trình:

\$s0	16	1
\$s1	17	120

⇒ Kết quả đúng