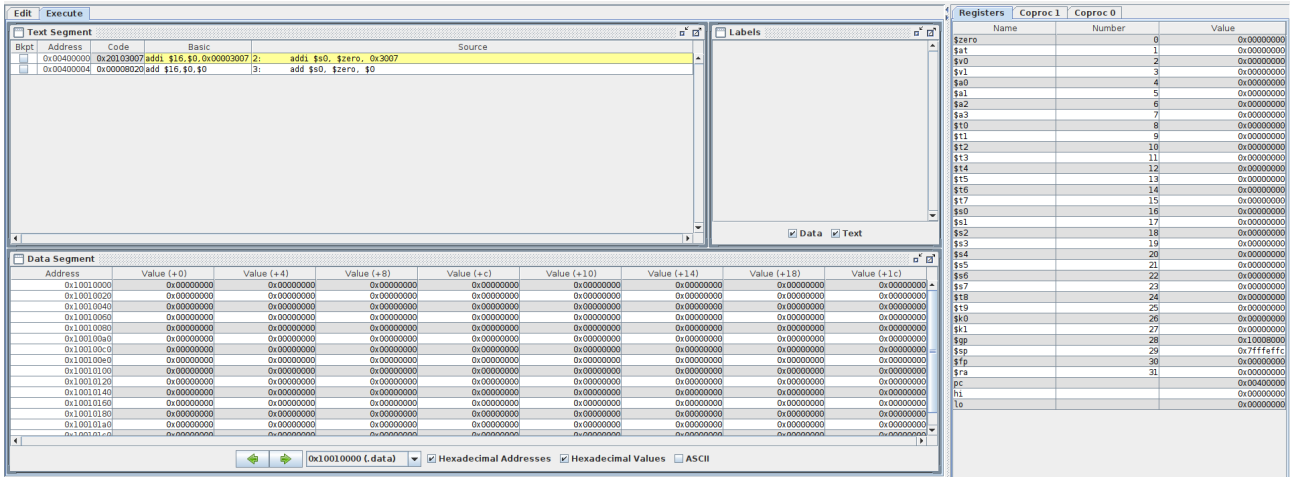
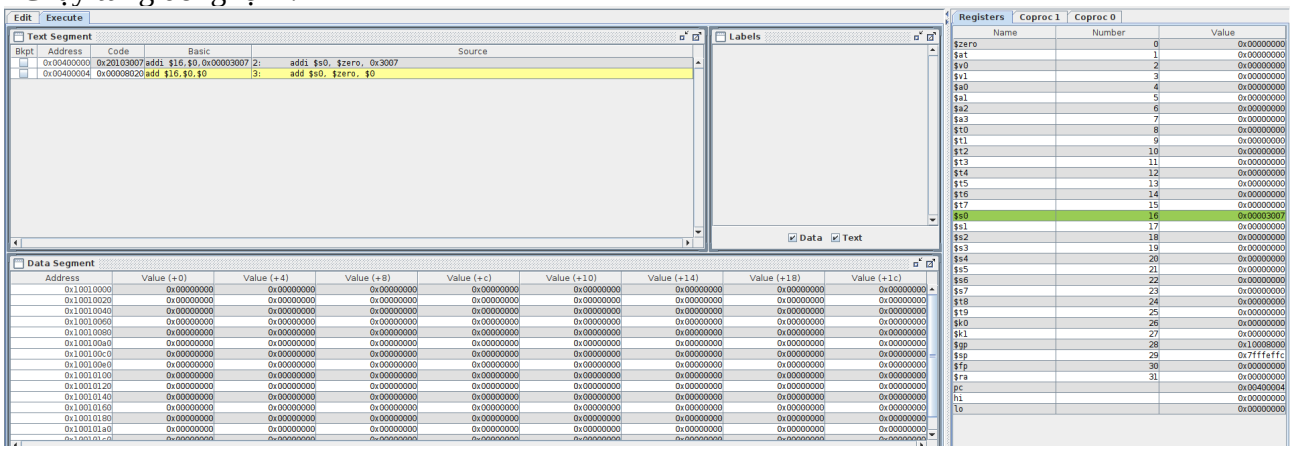
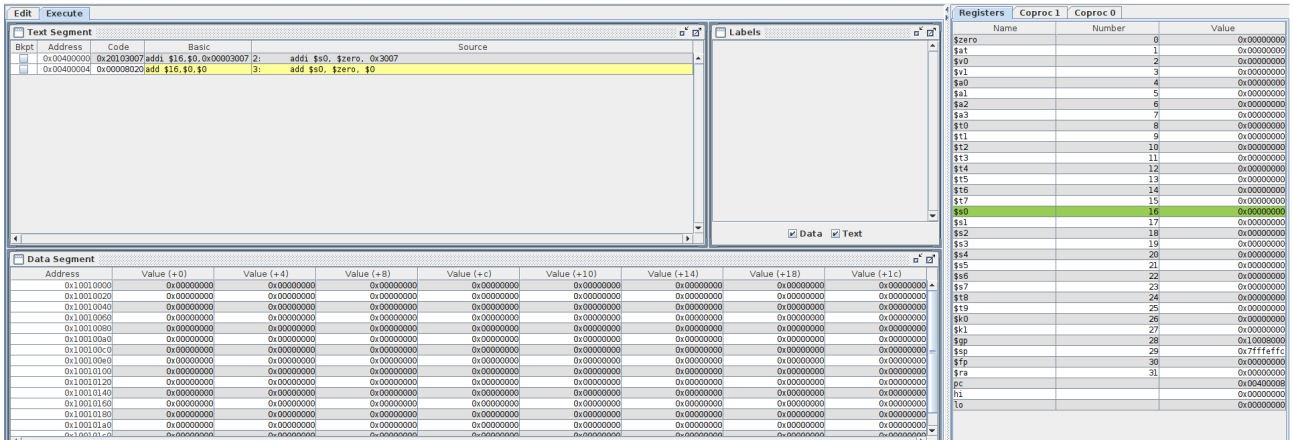
BÁO CÁO THỰC HÀNH LAB02

Bài 1:



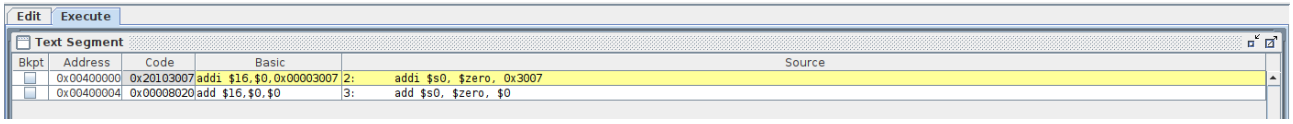
*Chạy từng dòng lệnh:



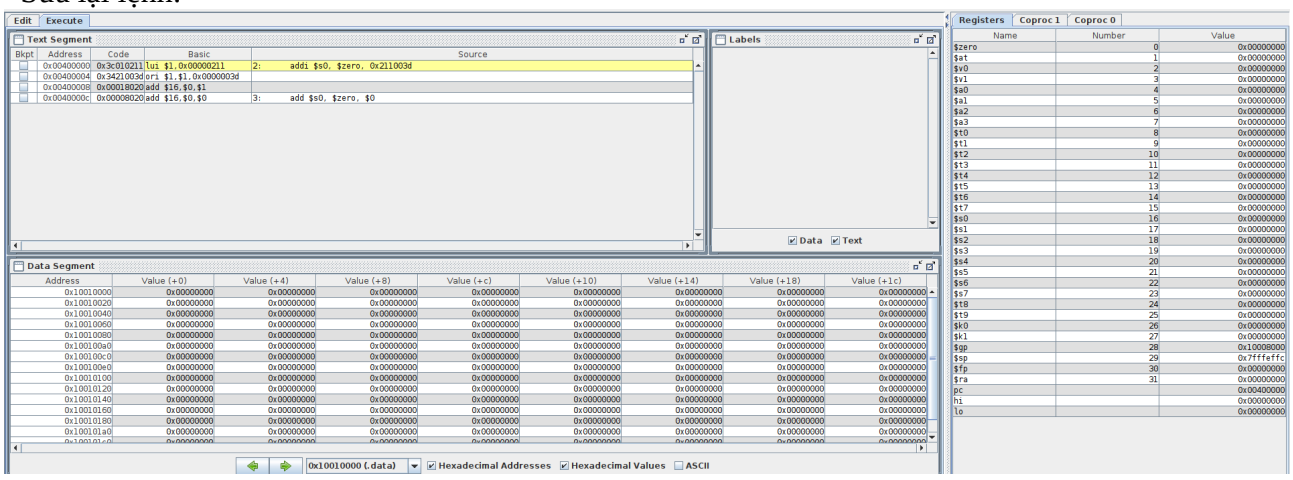


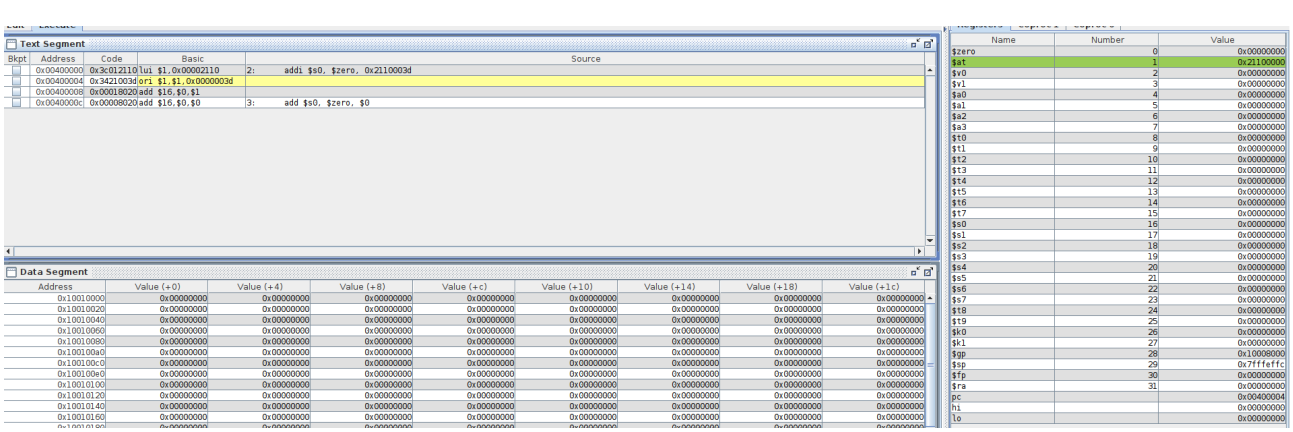
*Sự thay đổi giá trị của thanh ghi:
Sự thay đổi giá trị của thanh ghi $s0 khi chạy từng lệnh :
0x00000000 → 0x00003007 → 0x00000000
Sự thay đổi giá trị của thanh ghi $pc khi chạy từng lệnh:
0x00400000 → 0x00400004 → 0x00400008
*So sánh mã máy của các lệnh:
addi $s0, $zero, 0x3007
op: 8
rs: $zero
rt: $s0
imm: 0x3007
0010 0000 0001 0000 0011 0000 0000 0111 => 0x20103007

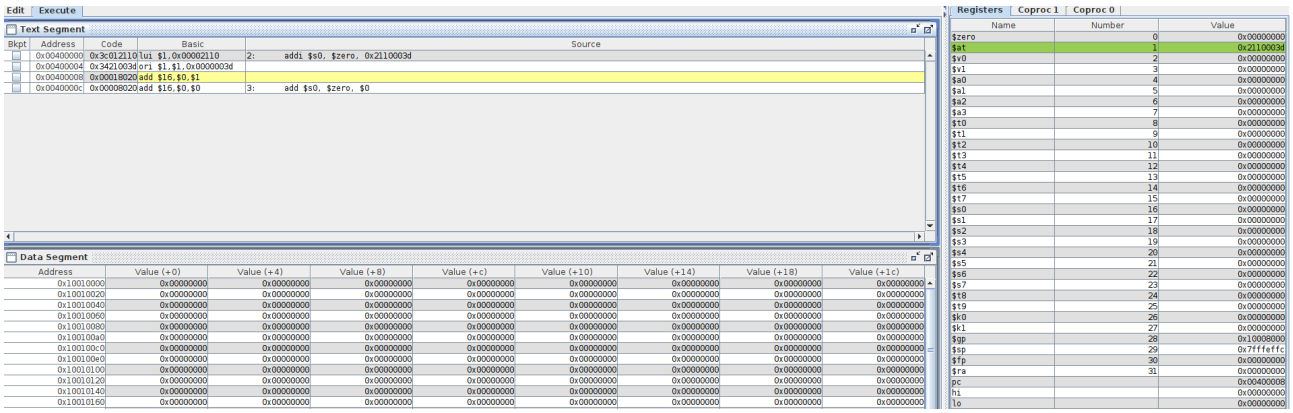
add $s0, $zero, $0
op:0
rd: $s0
rs: $zero
rt: $0
shamt: 0
funct:32
0000 0000 0000 0000 1000 0000 0010 0000 => 0x00008020

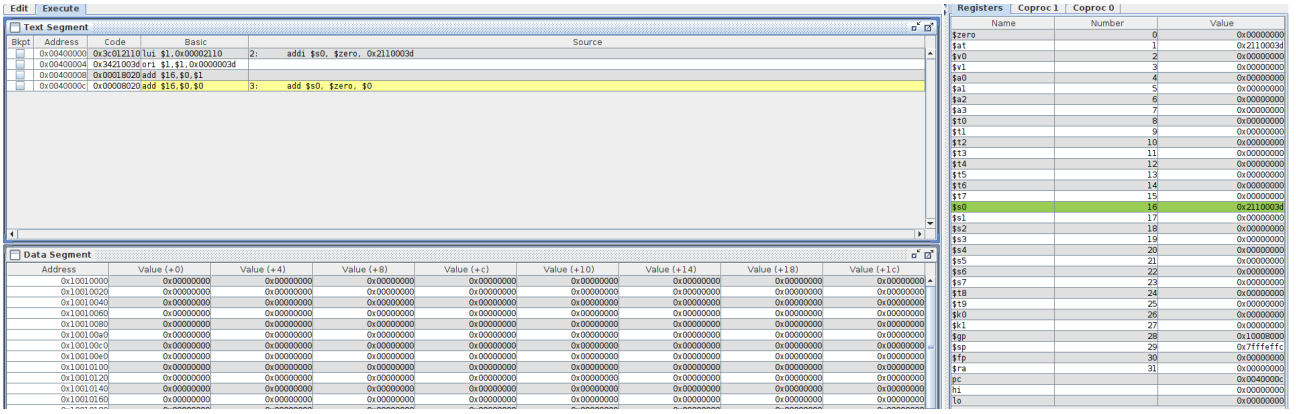


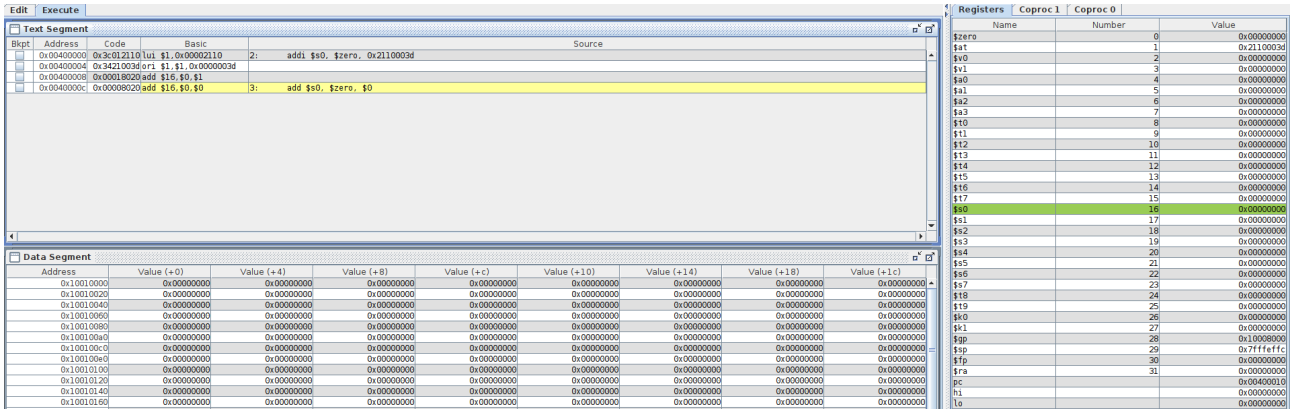
*Sửa lại lệnh:





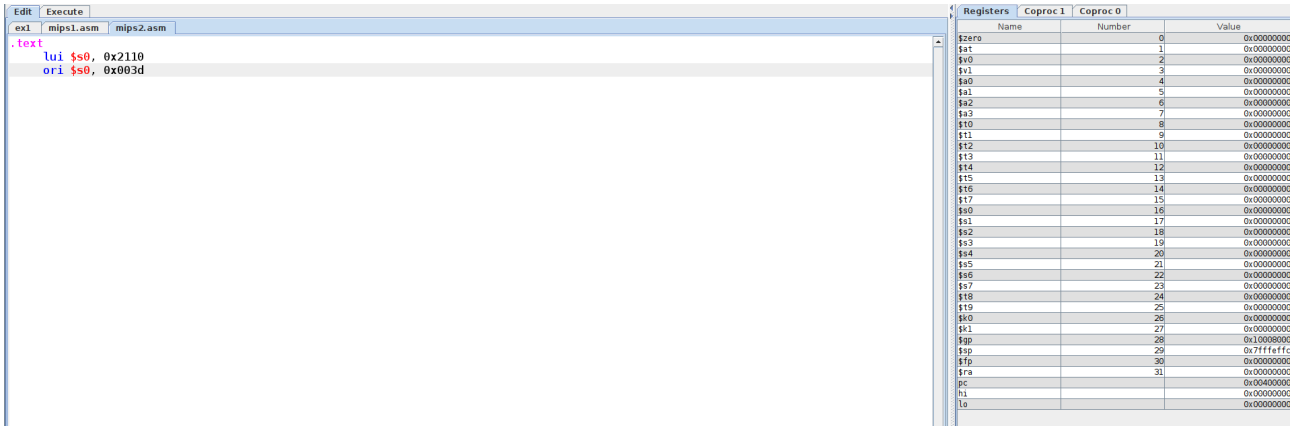


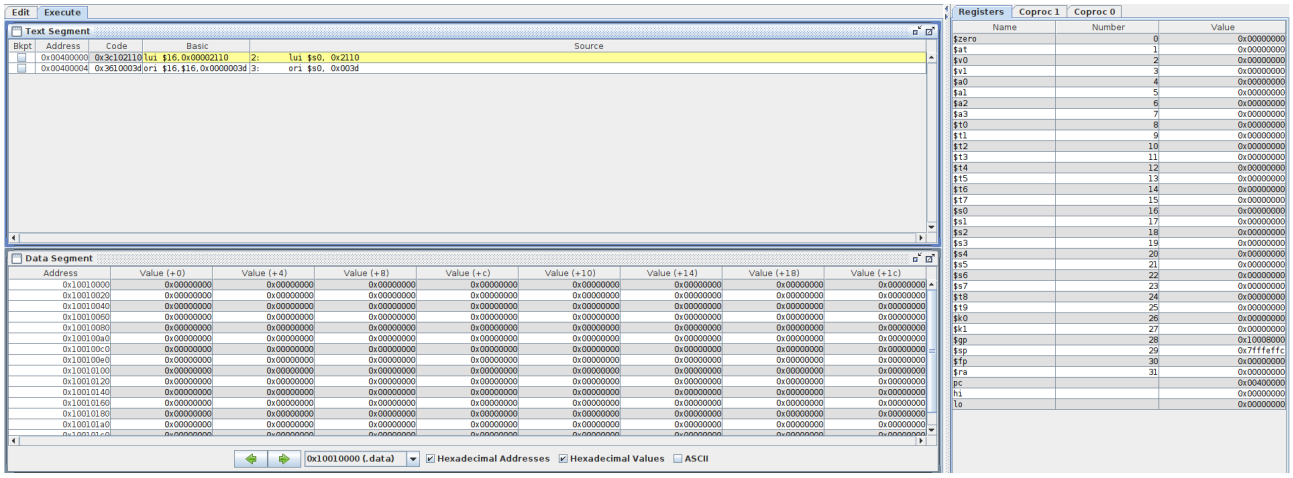




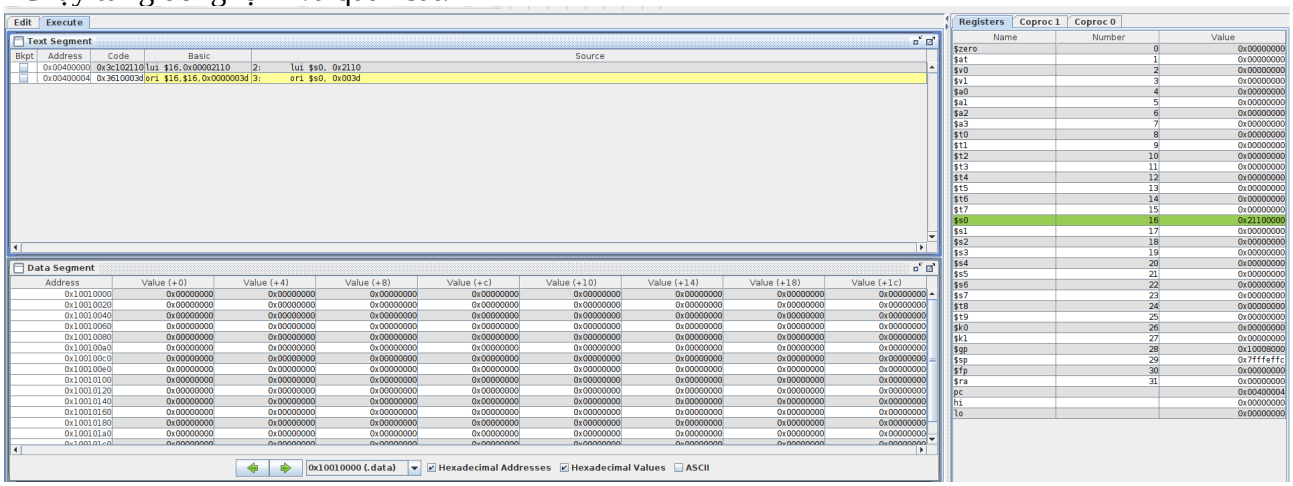
Khi sửa lệnh lui, vì hằng số ở đây là 32 bit nên để thực hiện được lệnh addi thì phải tách thành hai lệnh basic là lui và ori.

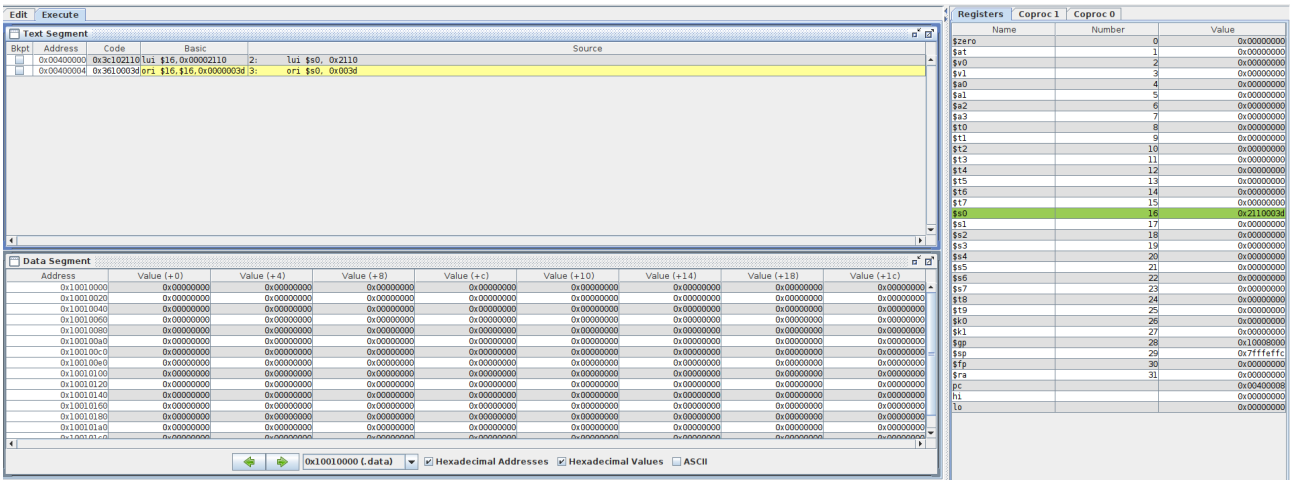
Bài 2:



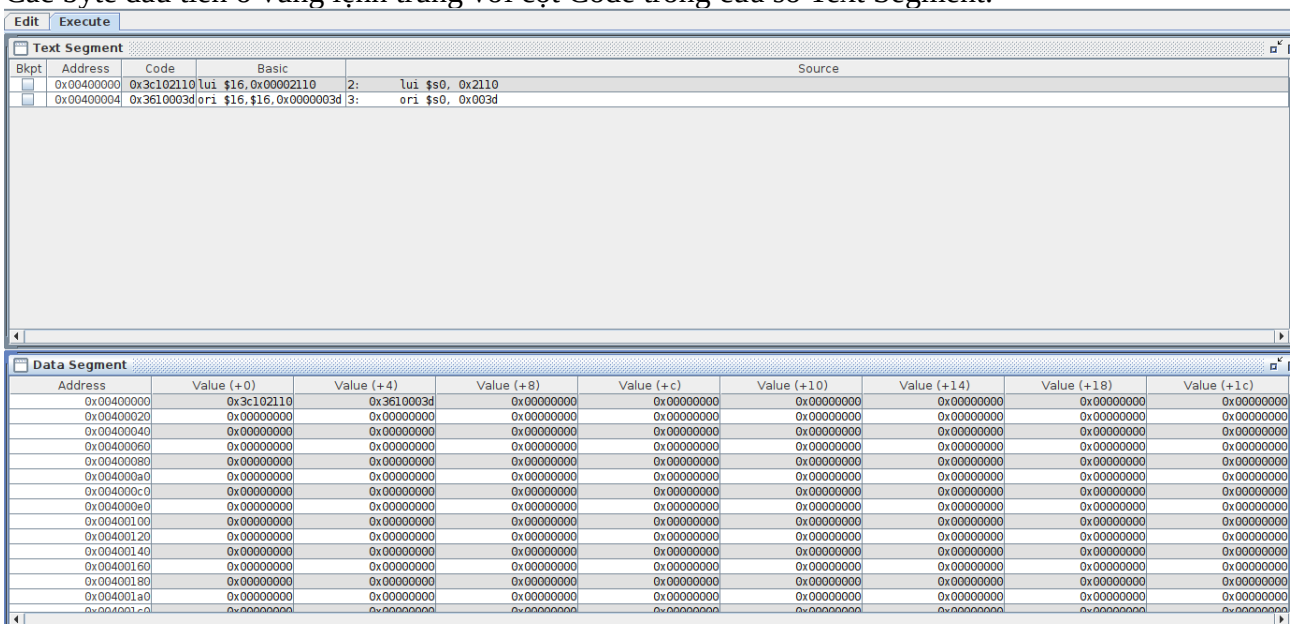


*Chạy từng dòng lệnh và quan sát:

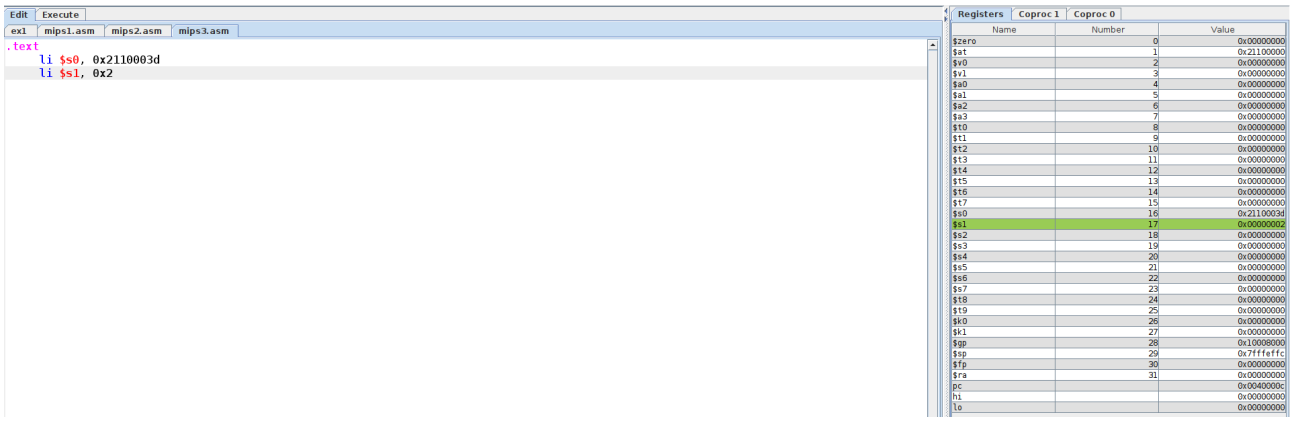


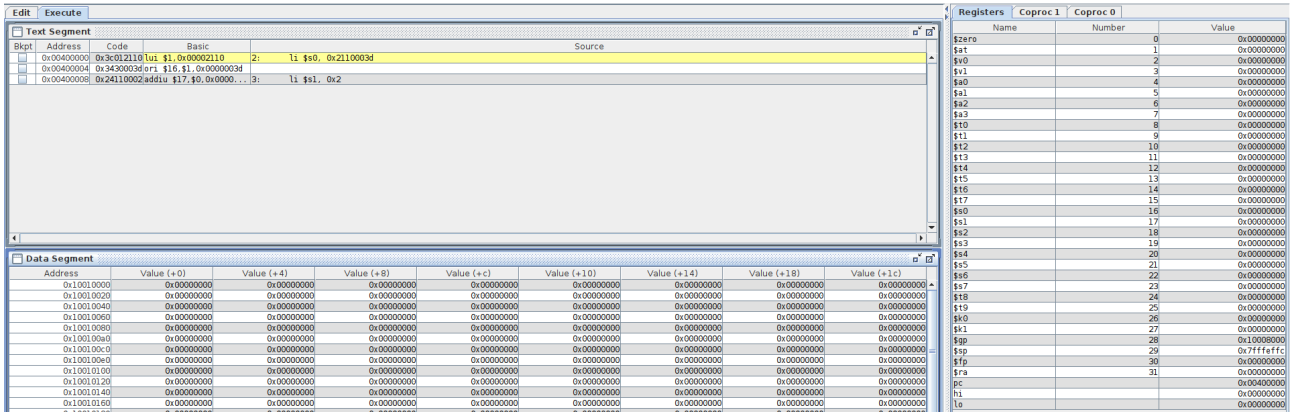


*Sự thay đổi của các thanh ghi:
$s0: 0x00000000 → 0x21100000 → 0x2110003d
$pc: 0x00400000 → 0x00400004 → 0x00400008
*Quan sát cửa sổ Data Segment:
Các byte đầu tiên ở vùng lệnh trùng với cột Code trong cửa sổ Text Segment.



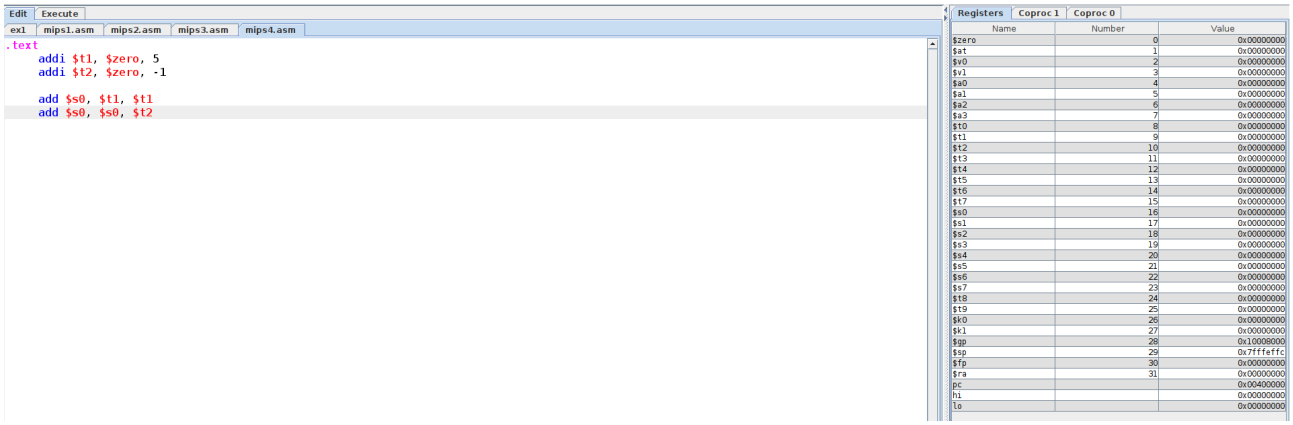
Bài 3:

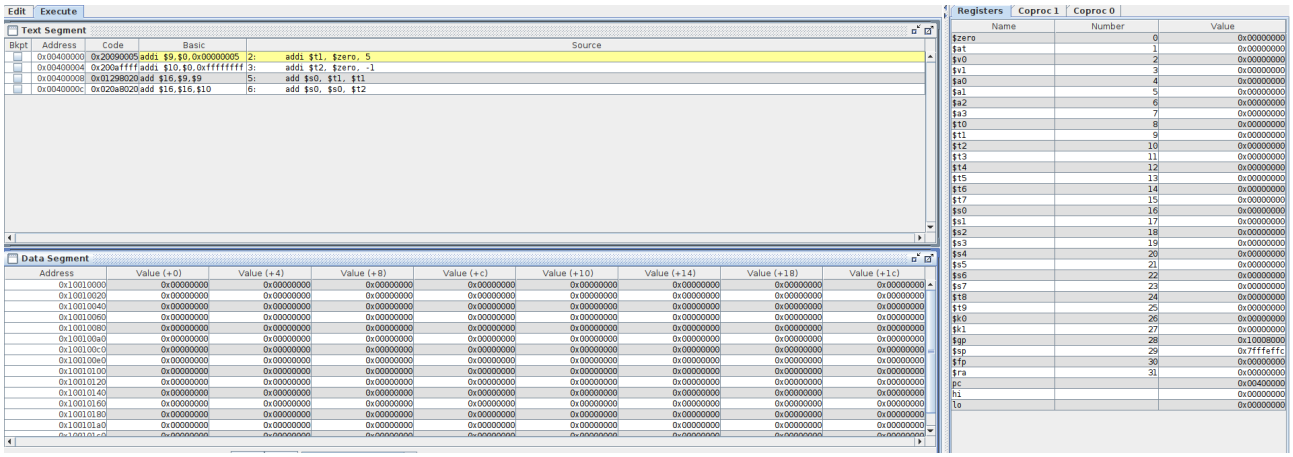




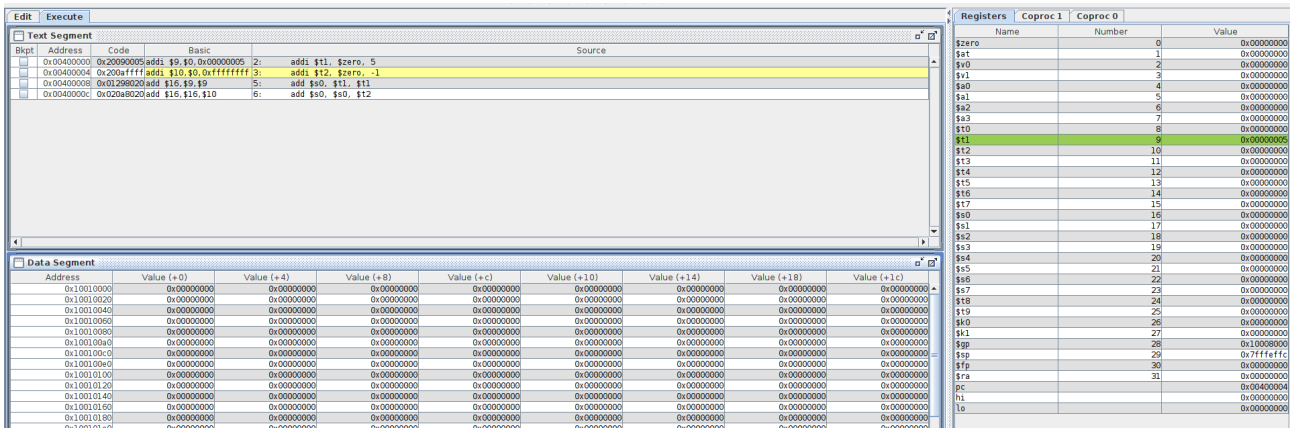
Hằng số 0x2110003d là 32 bit nên lệnh li thứ nhất để thực hiện được cần phải tách thành 2 lệnh basic là lui và ori.

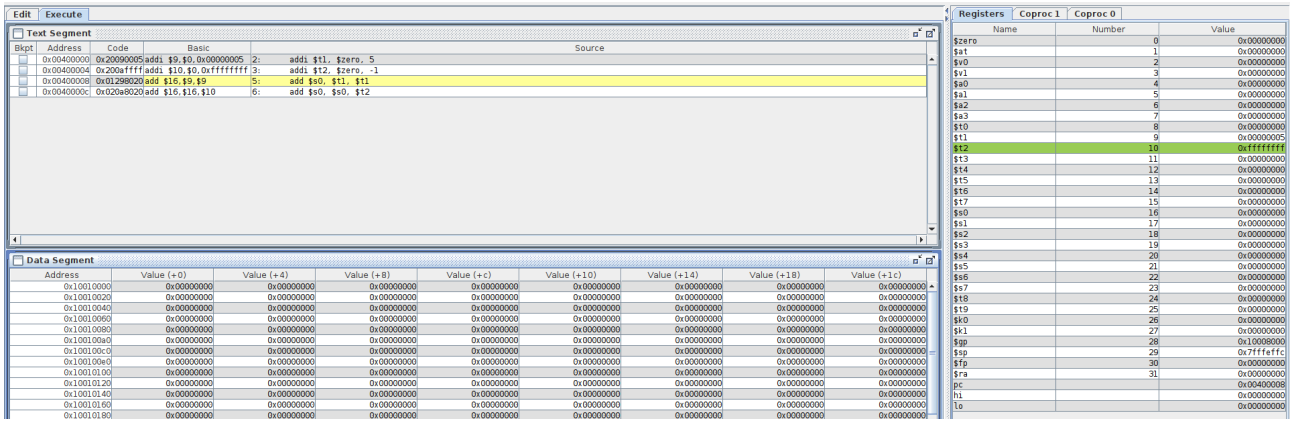
Bài 4:

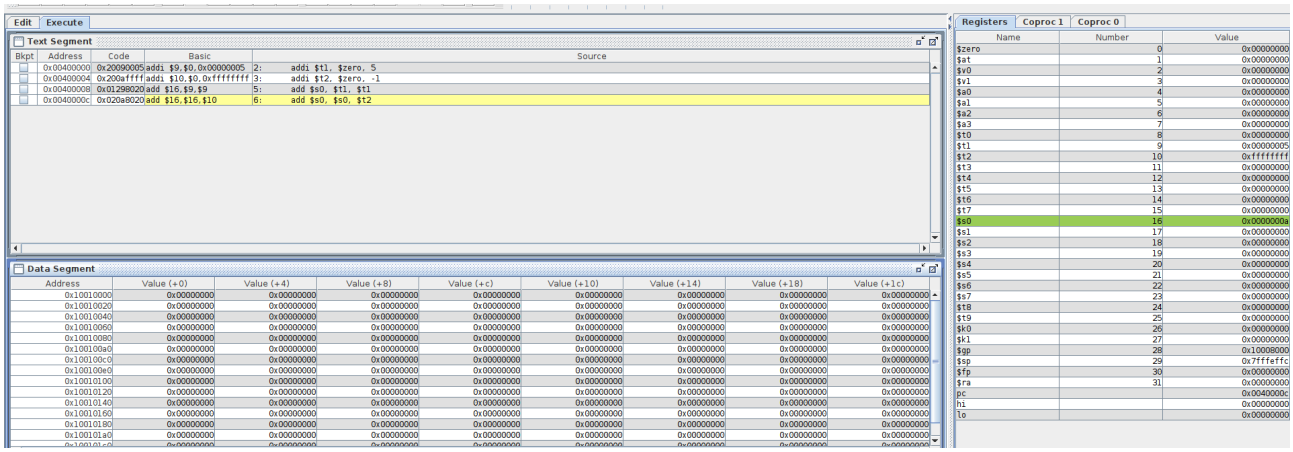


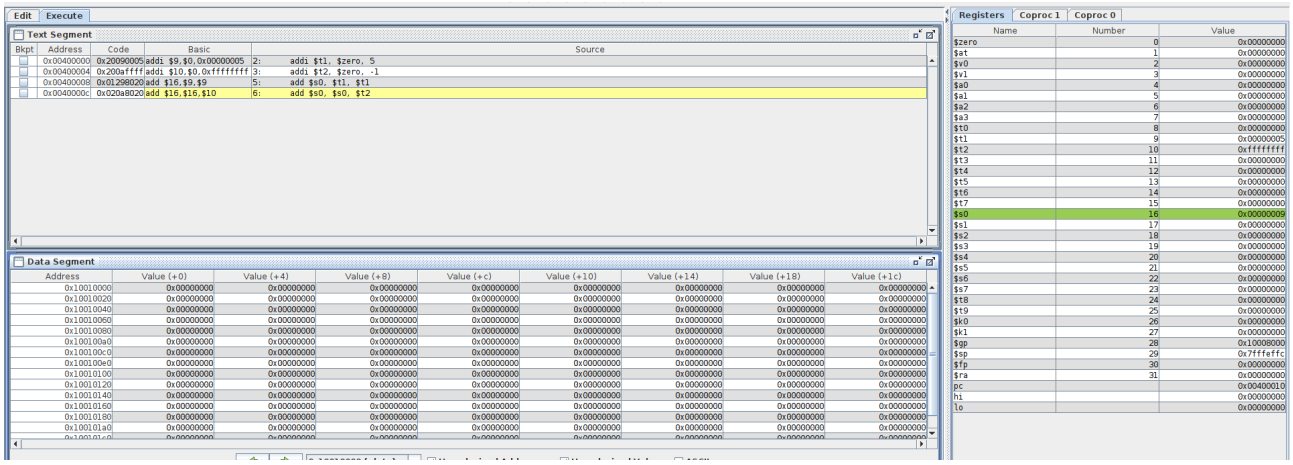


*Chạy từng lệnh:





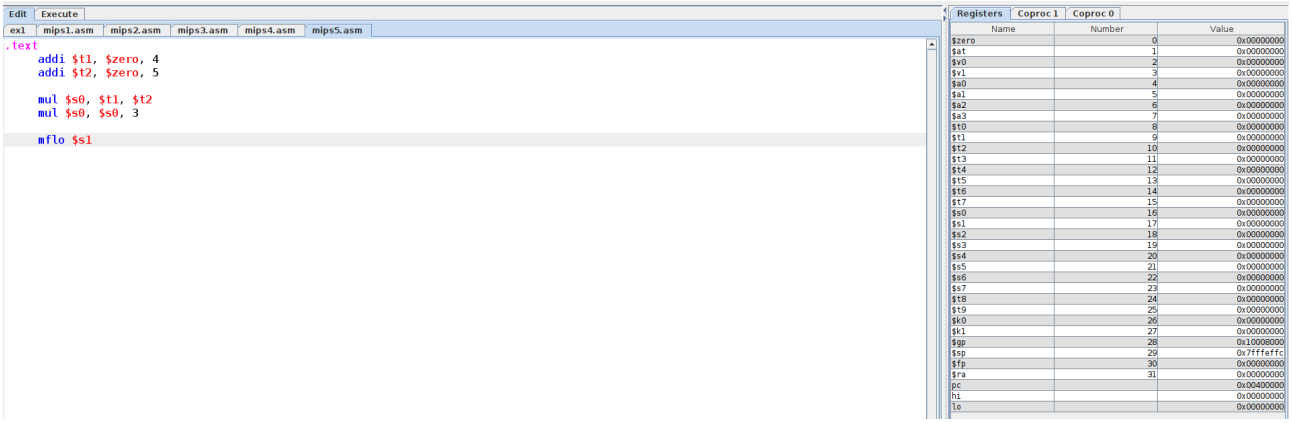


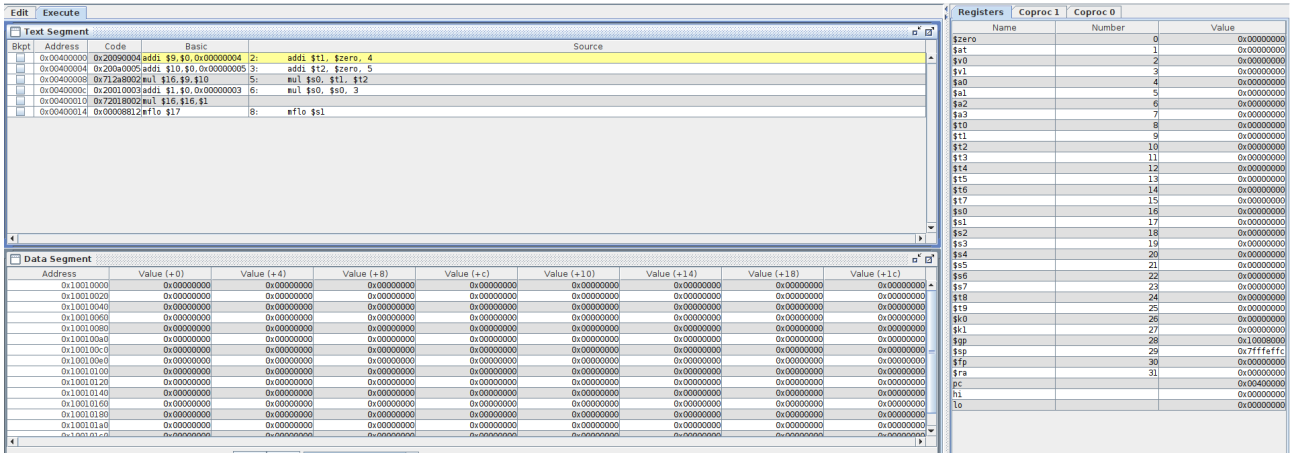


Kết quả bằng 9 → chạy đúng kết quả.

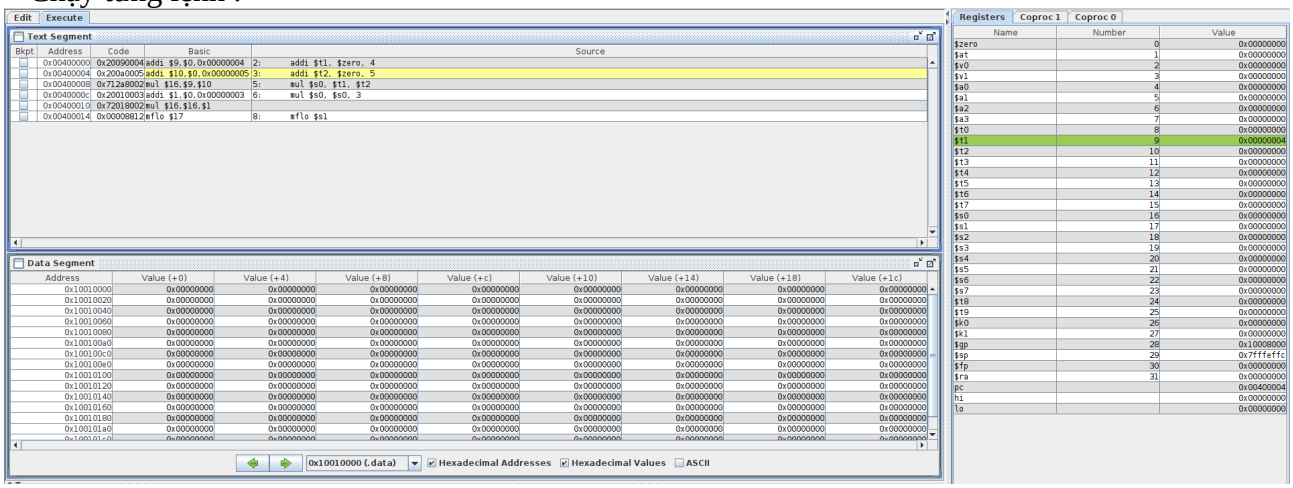
*Sự thay đổi của các thanh ghi:
$t1 : 0x00000000 → 0x00000005
$t2 : 0x00000000 → 0xffffffff
$s0 : 0x00000000 → 0x0000000a → 0x00000009
*Kiểm nghiệm với khuôn mẫu của kiểu lệnh I:
addi $9, $0, 0x00000005
op: 8
rs:$0
rt:$9
imm: 0x00000005
0010 0000 0000 1001 0000 0000 0000 0101 => 0x20090005
addi $10, $0, 0xffffffff
op: 8
rs: $0
rt: $10
imm: 0xffffffff
0010 0000 0000 1010 1111 1111 1111 1111 => 0x200affff
*Kiểm nghiệm với khuôn mẫu của kiểu lệnh R:
add $16, $9, $9
op:0
rs:$9
rt:$9
rd: $16
sh:0
fn:32
0000 0001 0010 1001 1000 0000 0010 0000 => 0x01298020
add $16, $16, $10
op:0
rs: $16
rt: $10
rd: $16
sh:0
fn:32
0000 0010 0000 1010 1000 0000 0010 0000 => 0x020a8020

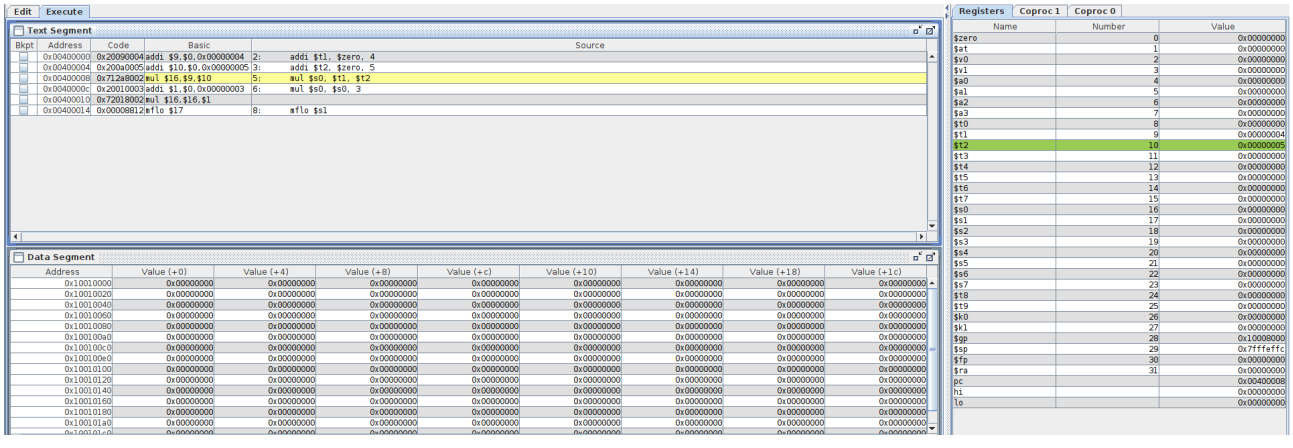
Bài 5:

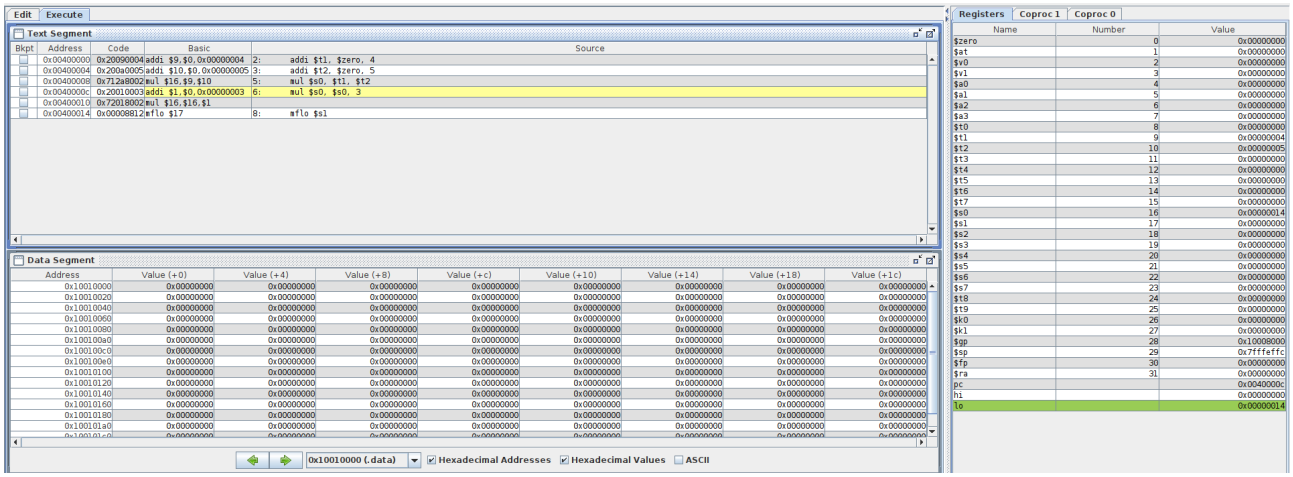


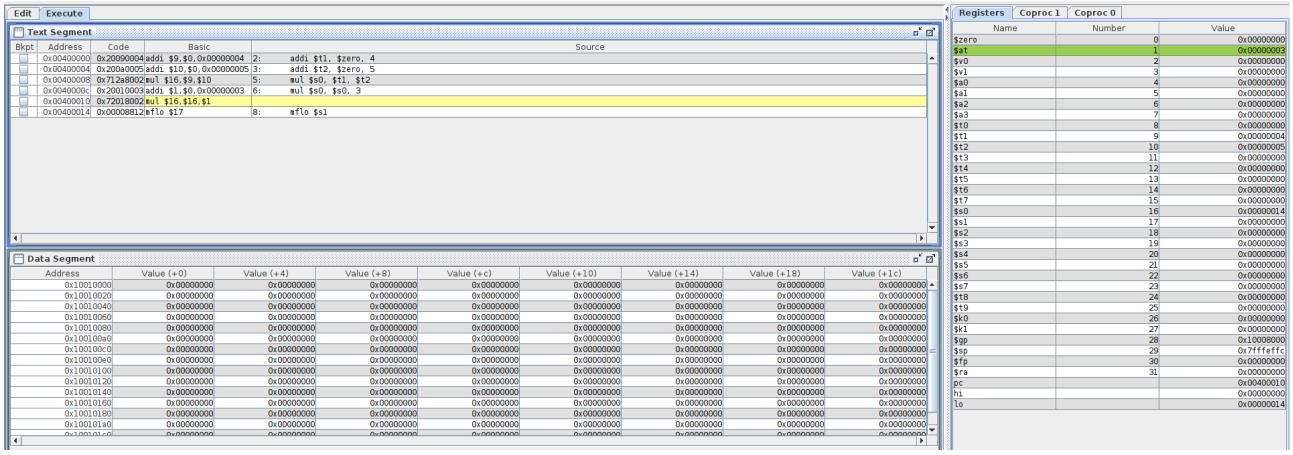


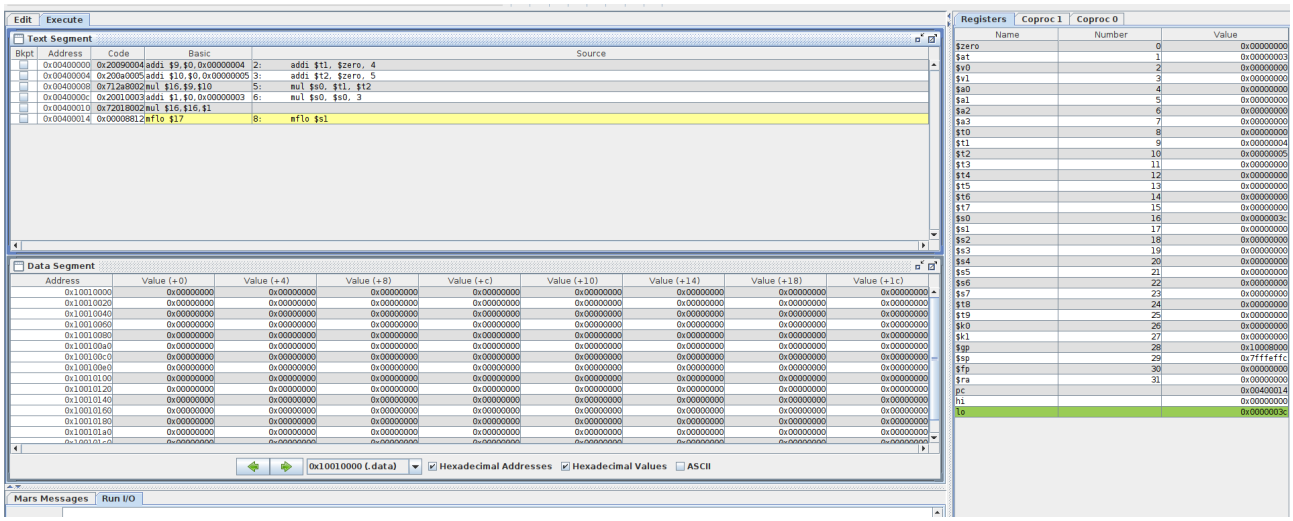
*Giải thích điều bất thường:
-lệnh mul đầu tiên thực hiện bình thường do là lệnh mul basic (nhân hai biến)
-lệnh mul thứ 2 không phải là lệnh basic (vì nhân hằng với biến), nên thực hiện biến đổi thành hai lệnh (gán hằng số cho thanh ghi tạm rồi mới thực hiện phép nhân)
* Chạy từng lệnh :

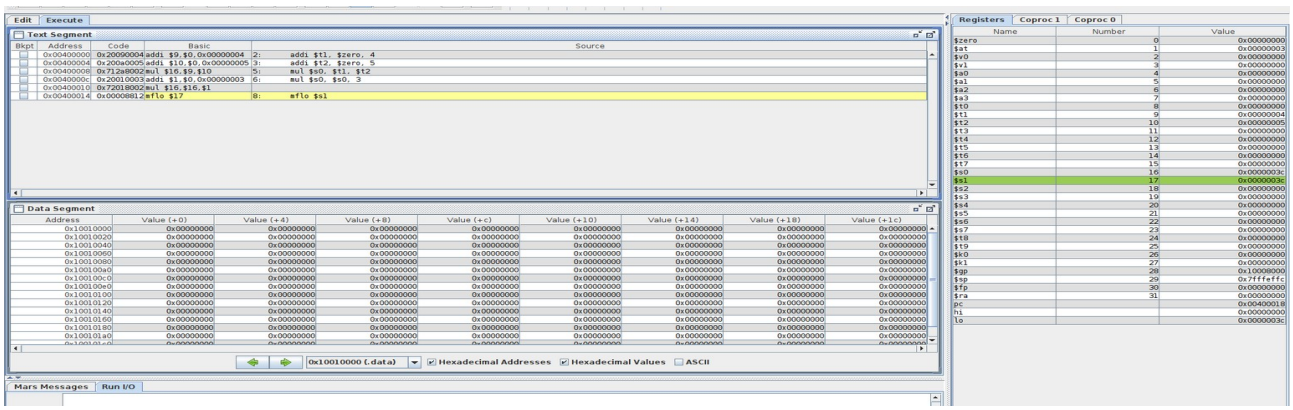





Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x20090004 addi $9,$0,0x00000004 2: addi $t1, $zero, 4
0x00400004 0x200a0005 addi $10,$0,0x00000005 3: addi $t2, $zero, 5
0x00400008 0x712a8002 mul $16,$9,$10 5: mul $s0, $t1, $t2
0x0040000c 0x20010003 addi $1,$0,0x00000003 6: mul $s0, $s0, 3
0x00400010 0x72018002 mul $16,$16,$1
0x00400014 0x00008812 mflo $17 8: mflo $s1
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x10010020 0x10010040 0x10010060 0x10010080 0x100100a0 0x100100c0 0x100100e0 0x10010100 0x10010120 0x10010140 0x10010160 0x10010180 0x100101a0
0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x00000000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000004
$t2 10 0x00000005
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000014
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x00000000
$t9 25 0x00000000
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x0040000c
hi 0x00000000
lo 0x00000014

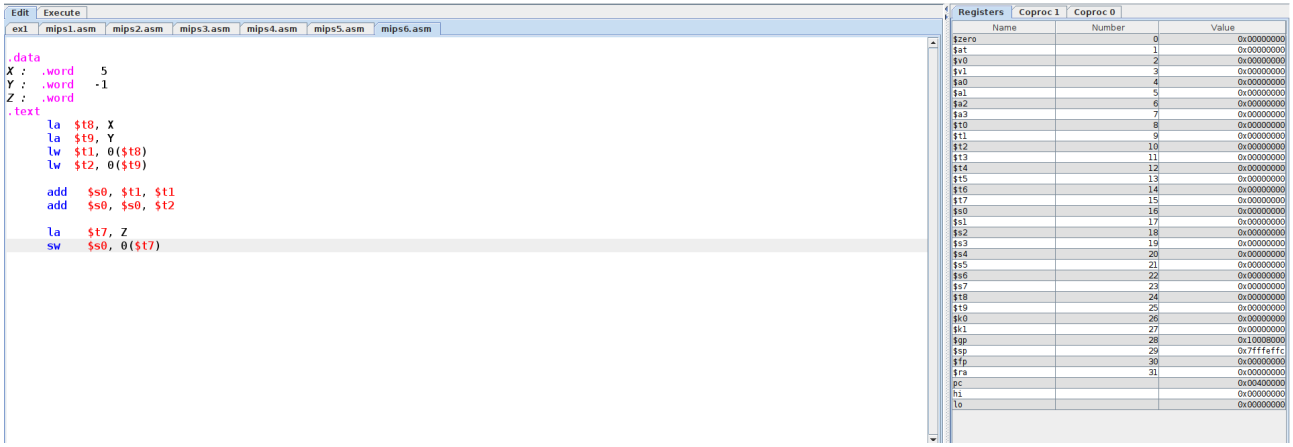

Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x20090004 addi $9,$0,0x00000004 2: addi $t1, $zero, 4
0x00400004 0x200a0005 addi $10,$0,0x00000005 3: addi $t2, $zero, 5
0x00400008 0x712a8002 mul $16,$9,$10 5: mul $s0, $t1, $t2
0x0040000c 0x20010003 addi $1,$0,0x00000003 6: mul $s0, $s0, 3
0x00400010 0x72018002 mul $16,$16,$1
0x00400014 0x00008812 mflo $17 8: mflo $s1
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x10010020 0x10010040 0x10010060 0x10010080 0x100100a0 0x100100c0 0x100100e0 0x10010100 0x10010120 0x10010140 0x10010160 0x10010180 0x100101a0
0x00000000
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x00000003
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000004
$t2 10 0x00000005
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000014
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x00000000
$t9 25 0x00000000
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400010
hi 0x00000000
lo 0x00000014

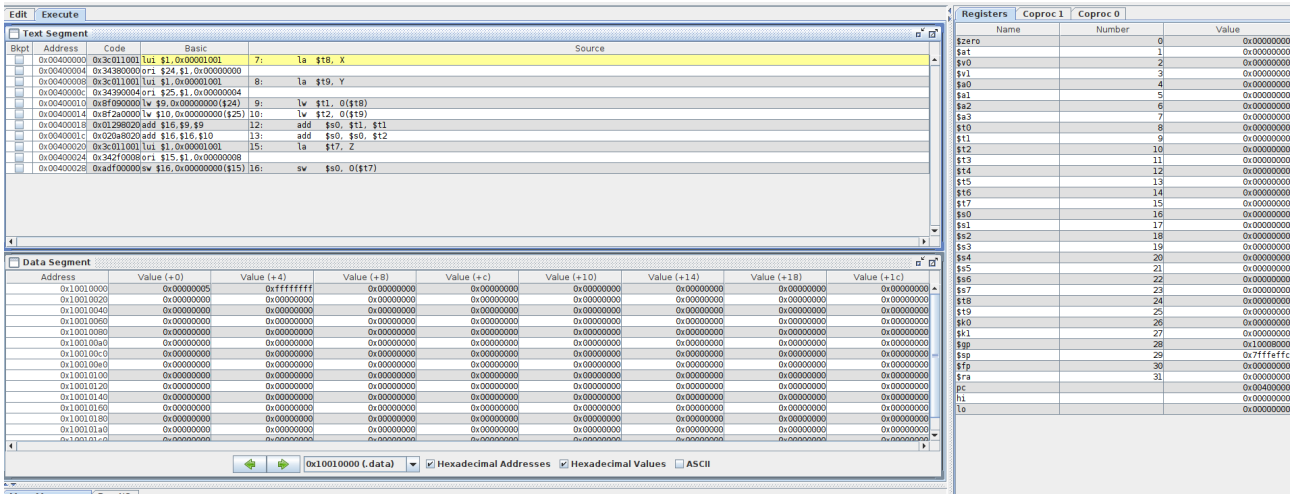

Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x20090004 addi $9,$0,0x00000004 2: addi $t1, $zero, 4
0x00400004 0x200a0005 addi $10,$0,0x00000005 3: addi $t2, $zero, 5
0x00400008 0x712a8002 mul $16,$9,$10 5: mul $s0, $t1, $t2
0x0040000c 0x20010003 addi $1,$0,0x00000003 6: mul $s0, $s0, 3
0x00400010 0x72018002 mul $16,$16,$1
0x00400014 0x00008812 mflo $17 8: mflo $s1
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x10010020 0x10010040 0x10010060 0x10010080 0x100100a0 0x100100c0 0x100100e0 0x10010100 0x10010120 0x10010140 0x10010160 0x10010180 0x100101a0
0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Mars Messages
Run I/O
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x00000003
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000004
$t2 10 0x00000005
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x0000003c
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x00000000
$t9 25 0x00000000
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400014
hi 0x00000000
lo 0x0000003c


Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x20090004 addi $9,$0,0x00000004 2: addi $t1, $zero, 4
0x00400004 0x200a0005 addi $10,$0,0x00000005 3: addi $t2, $zero, 5
0x00400008 0x712a8002 mul $16,$9,$10 5: mul $s0, $t1, $t2
0x0040000c 0x20010003 addi $1,$0,0x00000003 6: mul $s0, $s0, 3
0x00400010 0x72018002 mul $16,$16,$1
0x00400014 0x00008812 mflo $17 8: mflo $s1
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x10010020 0x10010040 0x10010060 0x10010080 0x100100a0 0x100100c0 0x100100e0 0x10010100 0x10010120 0x10010140 0x10010160 0x10010180 0x100101a0
0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Mars Messages
Run I/O
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x00000003
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000004
$t2 10 0x00000005
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x0000003c
$s1 17 0x00000011
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x00000000
$t9 25 0x00000000
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400018
hi 0x00000000
lo 0x0000003c

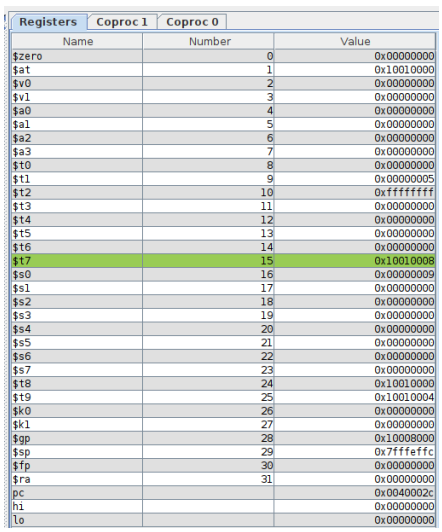
* Sự thay đổi của các thanh ghi:
$t1 : 0x00000000 → 0x00000004
$t2: 0x00000000 → 0x00000005
$lo: 0x00000000 → 0x00000014 → 0x0000003c
$at: 0x00000000 → 0x00000003
$s0: 0x00000000 → 0x0000003c
$s1: 0x00000000 → 0x0000003c
Thanh ghi hi không thay đổi giá trị vì kết quả dưới 32 bit, kết quả ở đây được ghi vào thanh ghi lo.

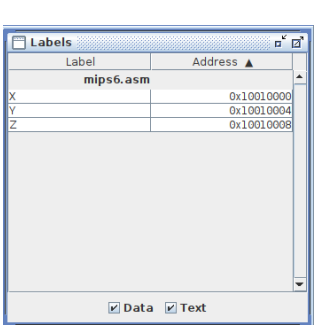
Bài 6:

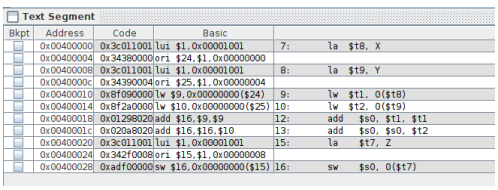




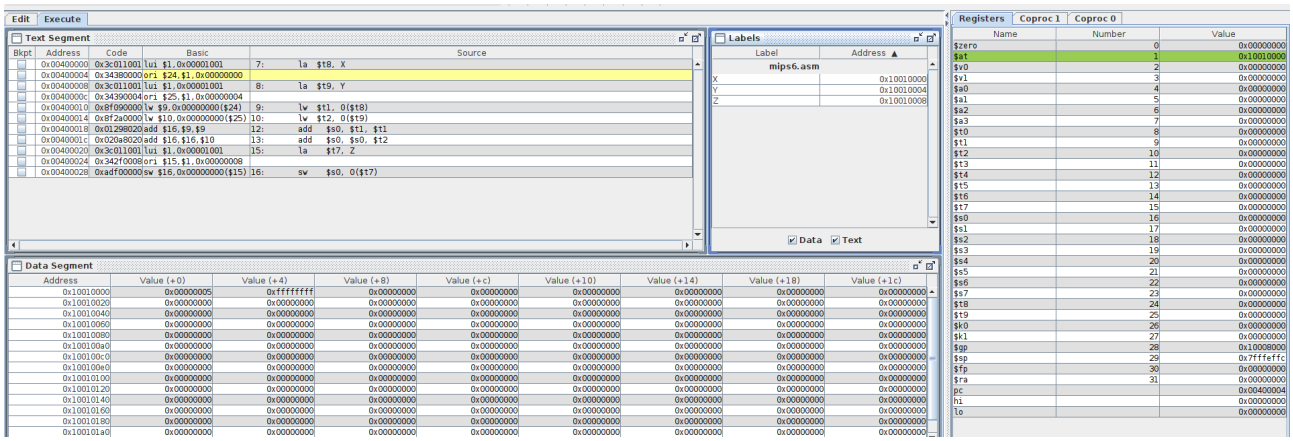
* Lệnh la được biên dịch bằng cách tách thành 2 lệnh basic là lui và ori
* Ở cửa sổ Data Segment :
Địa chỉ của X = $t8
Địa chỉ của Y = $t9
Địa chỉ của Z = $t7
Tương ứng với hằng số khi biên dịch lệnh la thành mã máy.

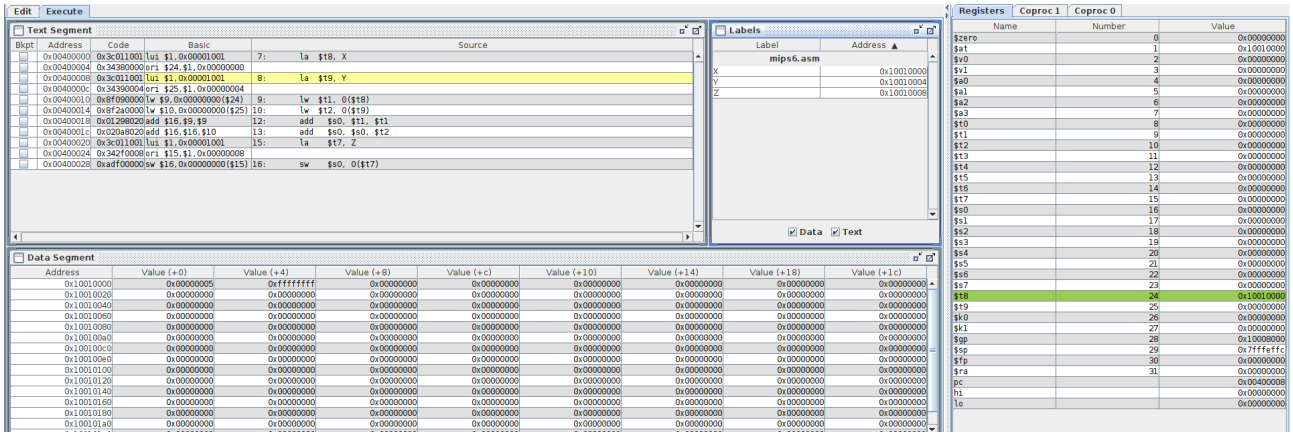


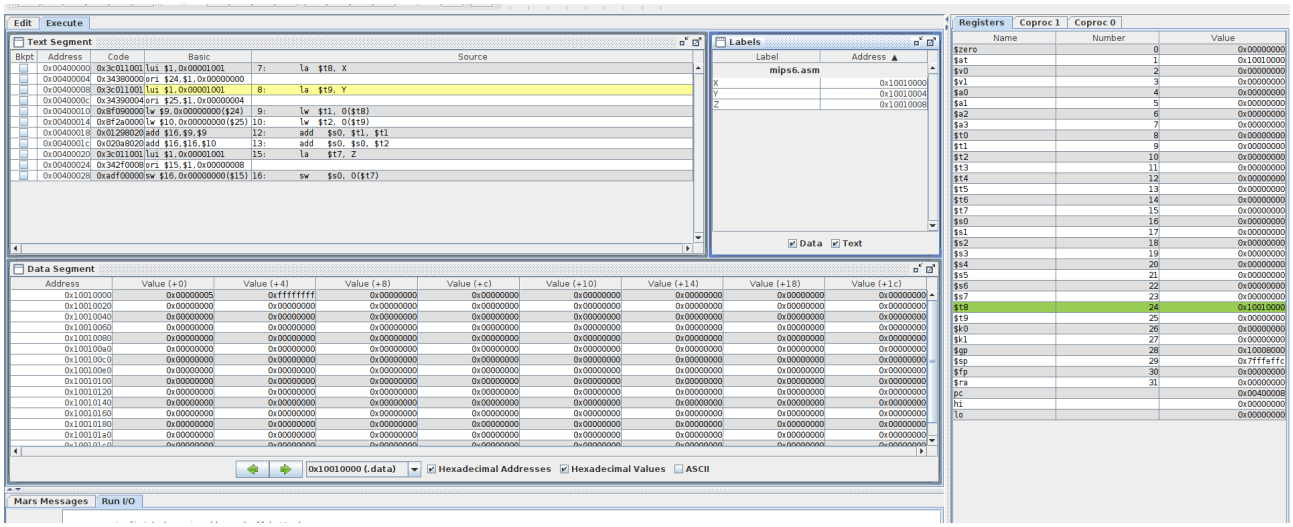


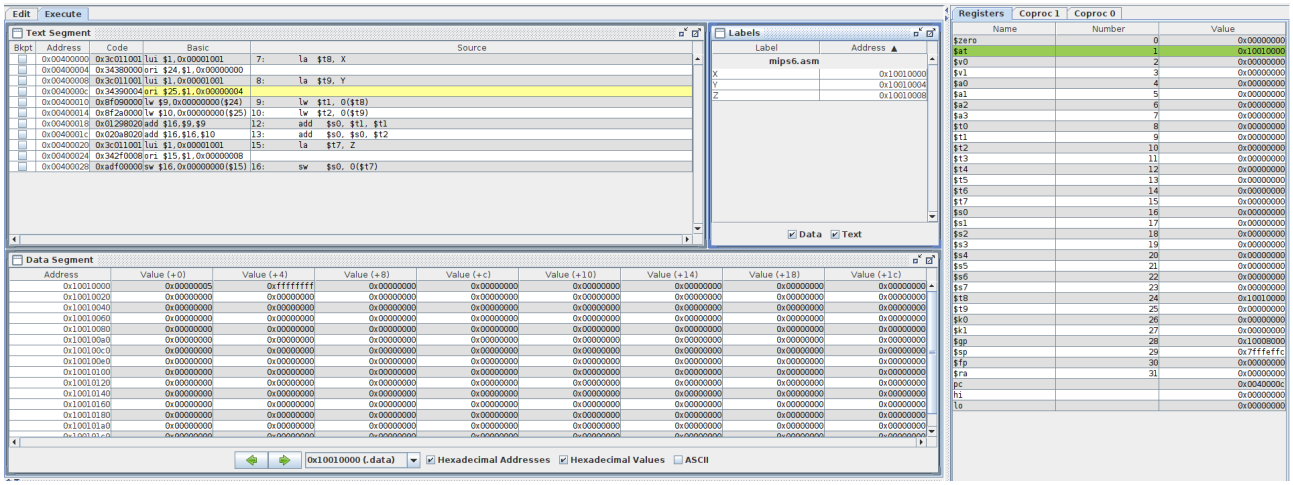


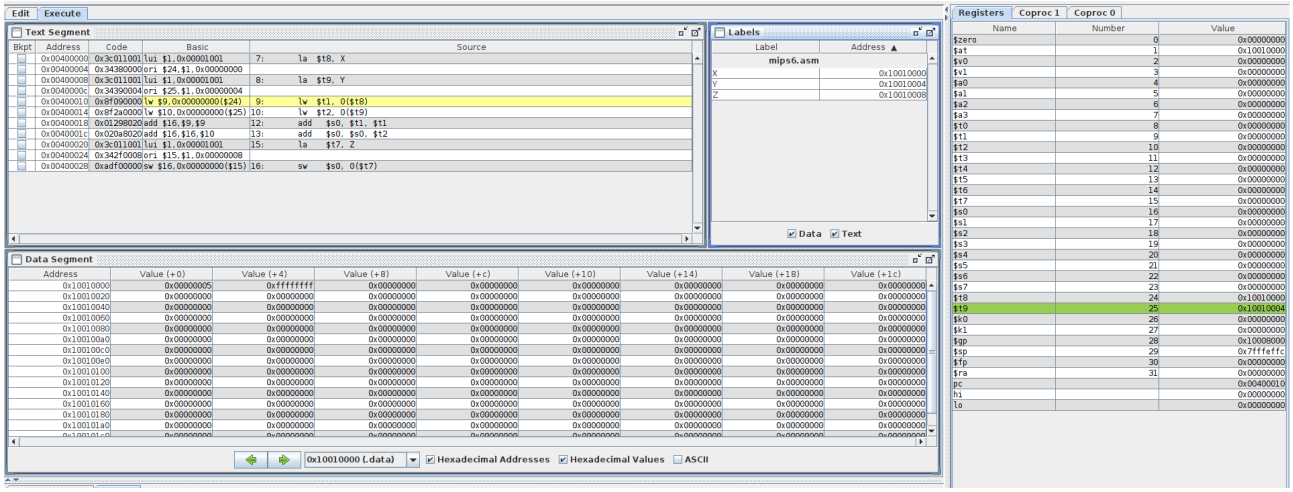
*Chạy từng dòng lệnh và quan sát:

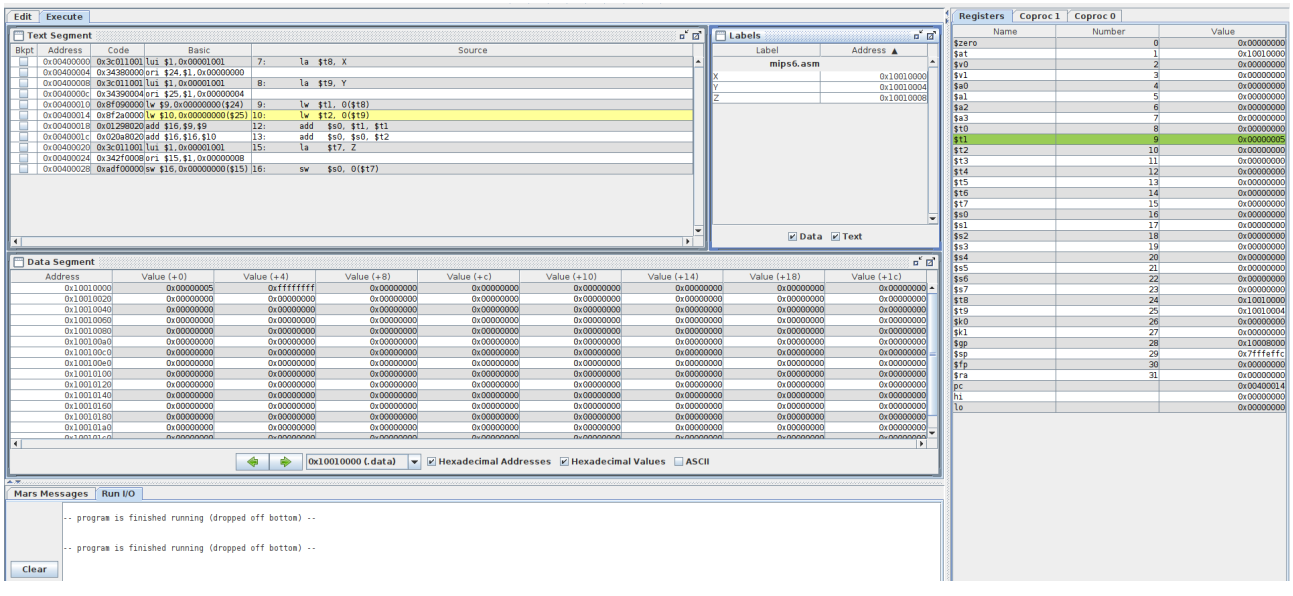


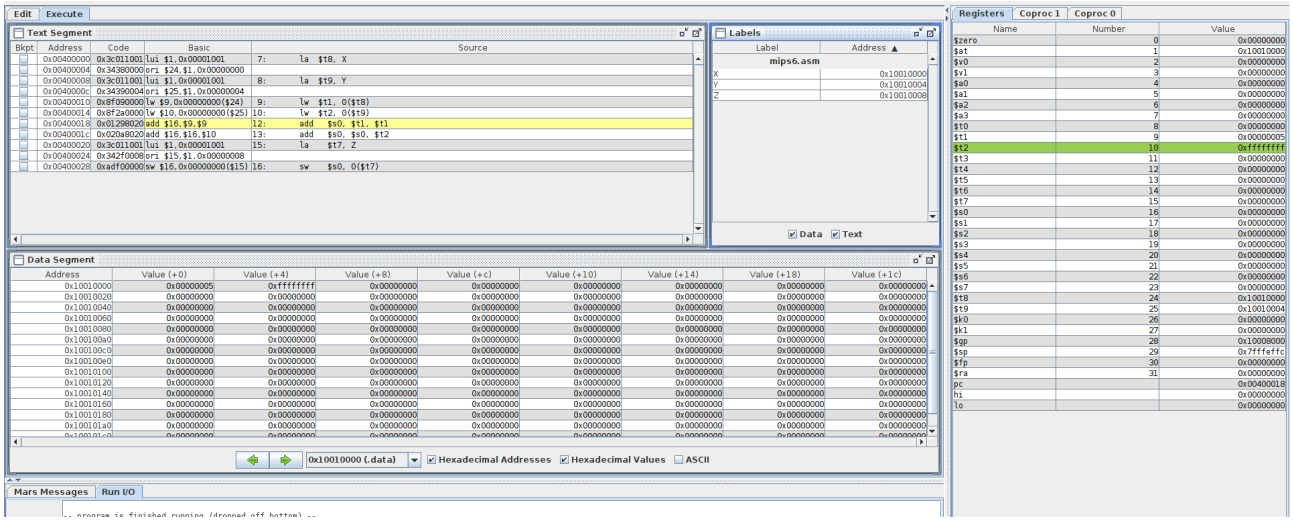


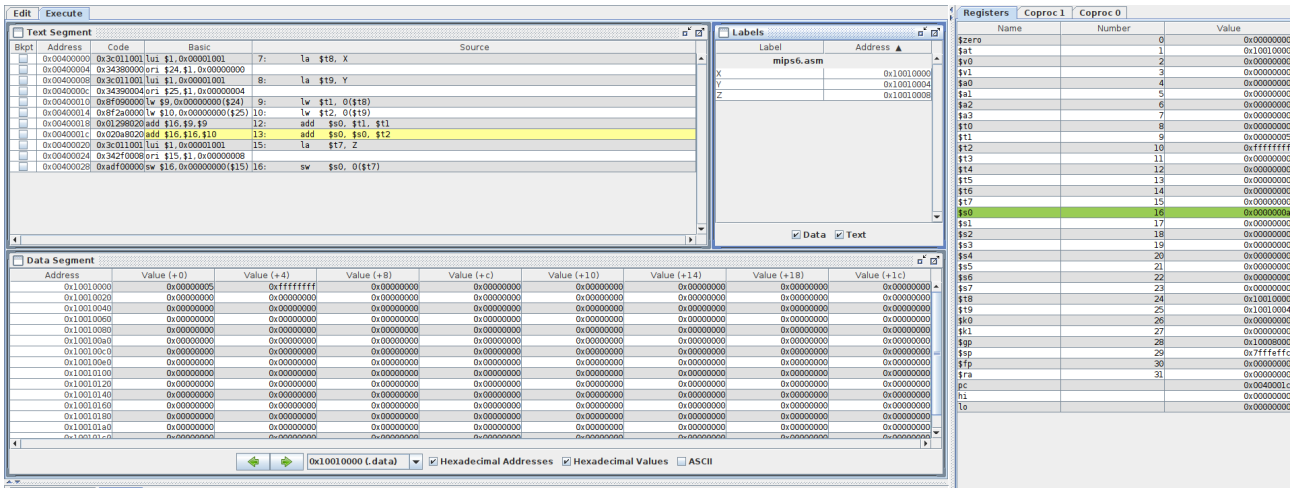


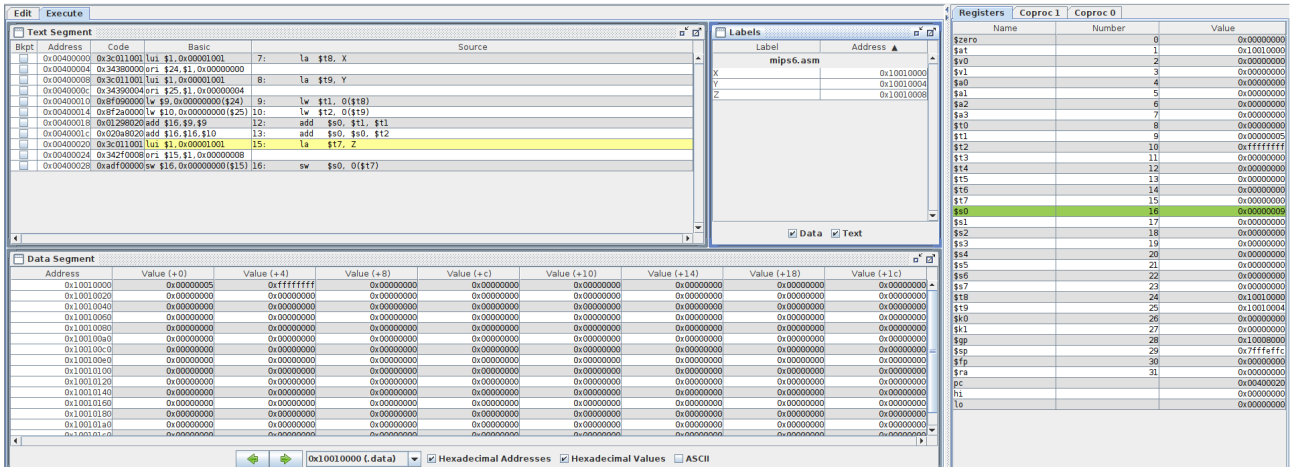

Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x3c011001 lui $1,0x00001001 7: la $t8, X
0x00400004 0x34380000 ori $24,$1,0x00000000
0x00400008 0x3c011001 lui $1,0x00001001 8: la $t9, Y
0x0040000c 0x34390004 ori $25,$1,0x00000004
0x00400010 0x8f090000 lw $9,0x00000000($24) 9: lw $t1, 0($t8)
0x00400014 0x8f2a0000 lw $10,0x00000000($25) 10: lw $t2, 0($t9)
0x00400018 0x01298020 add $16,$9,$9 12: add $s0, $t1, $t1
0x0040001c 0x020a8020 add $16,$16,$10 13: add $s0, $s0, $t2
0x00400020 0x3c011001 lui $1,0x00001001 15: la $t7, Z
0x00400024 0x342f0008 ori $15,$1,0x00000008
0x00400028 0xadf00000 sw $16,0x00000000($15) 16: sw $s0, 0($t7)
Labels
Label Address
mips6.asm
X 0x10010000
Y 0x10010004
Z 0x10010008
Data Text
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x00000005 0xffffffff 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010020 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010040 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010140 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010160 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010180 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100101a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000000
$t2 10 0x00000000
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x10010000
$t9 25 0x10010000
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x0040000c
hi 0x00000000
lo 0x00000000

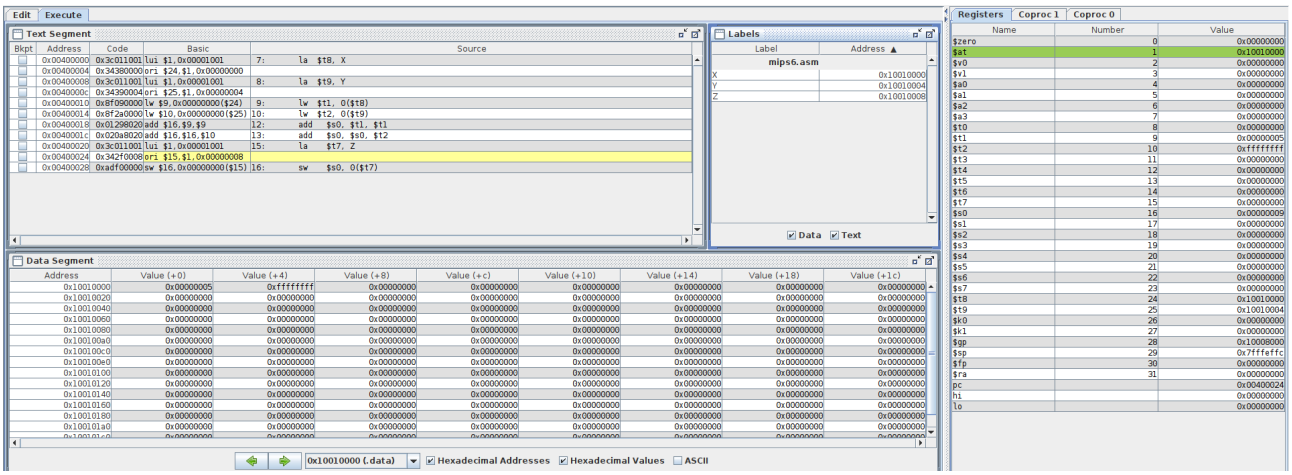

Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x3c011001 lui $1,0x00001001 7: la $t8, X
0x00400004 0x34380000 ori $24,$1,0x00000000
0x00400008 0x3c011001 lui $1,0x00001001 8: la $t9, Y
0x0040000c 0x34390004 ori $25,$1,0x00000004
0x00400010 0x8f090000 lw $9,0x00000000($24) 9: lw $t1, 0($t8)
0x00400014 0x8f2a0000 lw $10,0x00000000($25) 10: lw $t2, 0($t9)
0x00400018 0x01298020 add $16,$9,$9 12: add $s0, $t1, $t1
0x0040001c 0x020a8020 add $16,$16,$10 13: add $s0, $s0, $t2
0x00400020 0x3c011001 lui $1,0x00001001 15: la $t7, Z
0x00400024 0x342f0008 ori $15,$1,0x00000008
0x00400028 0xadf00000 sw $16,0x00000000($15) 16: sw $s0, 0($t7)
Labels
Label Address
mips6.asm
X 0x10010000
Y 0x10010004
Z 0x10010008
Data Text
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x00000005 0xffffffff 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010020 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010040 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010140 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010160 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010180 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100101a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000000
$t2 10 0x00000000
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x10010000
$t9 25 0x10010004
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400010
hi 0x00000000
lo 0x00000000

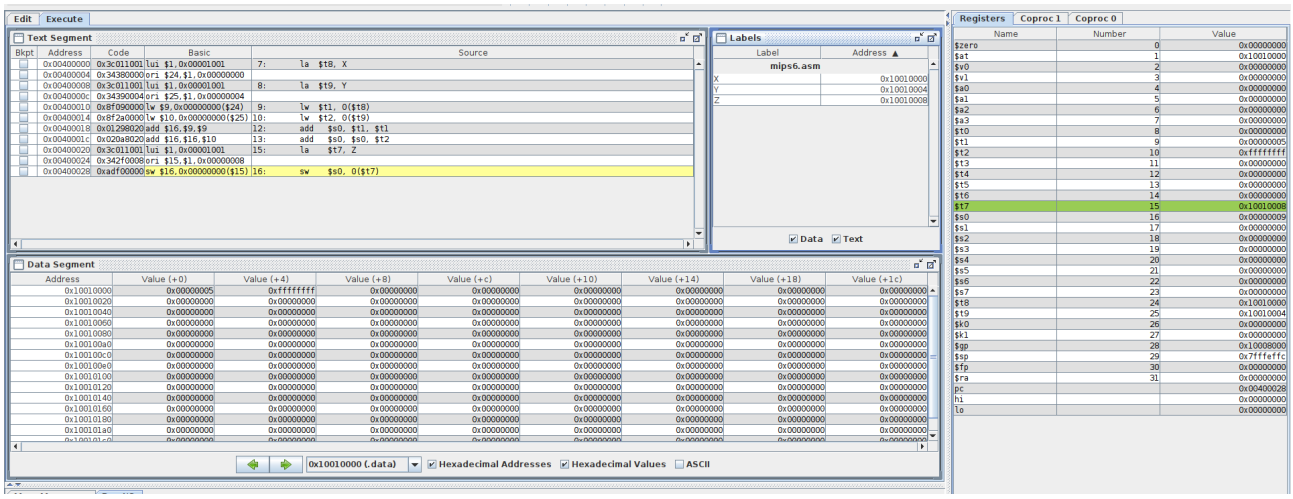

Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x3c011001 lui $1,0x00001001 7: la $t8, X
0x00400004 0x34380000 ori $24,$1,0x00000000
0x00400008 0x3c011001 lui $1,0x00001001 8: la $t9, Y
0x0040000c 0x34390004 ori $25,$1,0x00000004
0x00400010 0x8f090000 lw $9,0x00000000($24) 9: lw $t1, 0($t8)
0x00400014 0x8f2a0000 lw $10,0x00000000($25) 10: lw $t2, 0($t9)
0x00400018 0x01298020 add $16,$9,$9 12: add $s0, $t1, $t1
0x0040001c 0x020a8020 add $16,$16,$10 13: add $s0, $s0, $t2
0x00400020 0x3c011001 lui $1,0x00001001 15: la $t7, Z
0x00400024 0x342f0008 ori $15,$1,0x00000008
0x00400028 0xadf00000 sw $16,0x00000000($15) 16: sw $s0, 0($t7)
Labels
Label Address
mips6.asm
X 0x10010000
Y 0x10010004
Z 0x10010008
Data Text
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x00000005 0xffffffff 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010020 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010040 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010140 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010160 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010180 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100101a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Mars Messages
Run I/O
-- program is finished running (dropped off bottom) --
-- program is finished running (dropped off bottom) --
Clear
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000005
$t2 10 0x00000000
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x10010000
$t9 25 0x10010004
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400014
hi 0x00000000
lo 0x00000000


Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x3c011001 lui $1,0x00001001 7: la $t8, X
0x00400004 0x34380000 ori $24,$1,0x00000000
0x00400008 0x3c011001 lui $1,0x00001001 8: la $t9, Y
0x0040000c 0x34390004 ori $25,$1,0x00000004
0x00400010 0x8f090000 lw $9,0x00000000($24) 9: lw $t1, 0($t8)
0x00400014 0x8f2a0000 lw $10,0x00000000($25) 10: lw $t2, 0($t9)
0x00400018 0x01298020 add $16,$9,$9 12: add $s0, $t1, $t1
0x0040001c 0x020a8020 add $16,$16,$10 13: add $s0, $s0, $t2
0x00400020 0x3c011001 lui $1,0x00001001 15: la $t7, Z
0x00400024 0x342f0008 ori $15,$1,0x00000008
0x00400028 0xadf00000 sw $16,0x00000000($15) 16: sw $s0, 0($t7)
Labels
Label Address
mips6.asm
X 0x10010000
Y 0x10010004
Z 0x10010008
Data Text
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x00000005 0xffffffff 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010020 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010040 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010140 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010160 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010180 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100101a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Mars Messages
Run I/O
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000005
$t2 10 0xffffffff
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x10010000
$t9 25 0x10010004
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400018
hi 0x00000000
lo 0x00000000


Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x3c011001 lui $1,0x00001001 7: la $t8, X
0x00400004 0x34380000 ori $24,$1,0x00000000
0x00400008 0x3c011001 lui $1,0x00001001 8: la $t9, Y
0x0040000c 0x34390004 ori $25,$1,0x00000004
0x00400010 0x8f090000 lw $9,0x00000000($24) 9: lw $t1, 0($t8)
0x00400014 0x8f2a0000 lw $10,0x00000000($25) 10: lw $t2, 0($t9)
0x00400018 0x01298020 add $16,$9,$9 12: add $s0, $t1, $t1
0x0040001c 0x020a8020 add $16,$16,$10 13: add $s0, $s0, $t2
0x00400020 0x3c011001 lui $1,0x00001001 15: la $t7, Z
0x00400024 0x342f0008 ori $15,$1,0x00000008
0x00400028 0xadf00000 sw $16,0x00000000($15) 16: sw $s0, 0($t7)
Labels
Label Address
mips6.asm
X 0x10010000
Y 0x10010004
Z 0x10010008
Data Text
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x00000005 0xffffffff 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010020 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010040 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010140 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010160 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010180 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100101a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000005
$t2 10 0xffffffff
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x10010000
$t9 25 0x10010004
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x0040001c
hi 0x00000000
lo 0x00000000


Edit
Execute
Text Segment
Bkpt Address Code Basic Source
0x00400000 0x3c011001 lui $1,0x00001001 7: la $t8, X
0x00400004 0x34380000 ori $24,$1,0x00000000
0x00400008 0x3c011001 lui $1,0x00001001 8: la $t9, Y
0x0040000c 0x34390004 ori $25,$1,0x00000004
0x00400010 0x8f090000 lw $9,0x00000000($24) 9: lw $t1, 0($t8)
0x00400014 0x8f2a0000 lw $10,0x00000000($25) 10: lw $t2, 0($t9)
0x00400018 0x01298020 add $16,$9,$9 12: add $s0, $t1, $t1
0x0040001c 0x020a8020 add $16,$16,$10 13: add $s0, $s0, $t2
0x00400020 0x3c011001 lui $1,0x00001001 15: la $t7, Z
0x00400024 0x342f0008 ori $15,$1,0x00000008
0x00400028 0xadf00000 sw $16,0x00000000($15) 16: sw $s0, 0($t7)
Labels
Label Address
mips6.asm
X 0x10010000
Y 0x10010004
Z 0x10010008
Data Text
Data Segment
Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
0x10010000 0x00000005 0xffffffff 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010020 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010040 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010060 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010080 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100c0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100100e0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010100 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010120 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010140 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010160 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010180 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x100101a0 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000 0x00000000
0x10010000 (.data)
Hexadecimal Addresses
Hexadecimal Values
ASCII
Registers
Coproc 1
Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000000
$v1 3 0x00000000
$a0 4 0x00000000
$a1 5 0x00000000
$a2 6 0x00000000
$a3 7 0x00000000
$t0 8 0x00000000
$t1 9 0x00000005
$t2 10 0xffffffff
$t3 11 0x00000000
$t4 12 0x00000000
$t5 13 0x00000000
$t6 14 0x00000000
$t7 15 0x00000000
$s0 16 0x00000000
$s1 17 0x00000000
$s2 18 0x00000000
$s3 19 0x00000000
$s4 20 0x00000000
$s5 21 0x00000000
$s6 22 0x00000000
$s7 23 0x00000000
$t8 24 0x10010000
$t9 25 0x10010004
$k0 26 0x00000000
$k1 27 0x00000000
$gp 28 0x10008000
$sp 29 0x7fffeffc
$fp 30 0x00000000
$ra 31 0x00000000
pc 0x00400020
hi 0x00000000
lo 0x00000000





*Sự thay đổi giá trị các thanh ghi :
$at : 0x00000000 → 0x10010000
$t8 : 0x00000000 → 0x10010000
$t9 : 0x00000000 → 0x10010004
$t1 : 0x00000000 → 0x00000005
$t2 : 0x00000000 → 0xffffffff
$s0 : 0x00000000 → 0x0000000a → 0x00000009
$t7 : 0x00000000 → 0x10010008
- Vai trò của lệnh lw và sw :
lw $rt, imm($rs) : gán giá trị của thanh ghi $rs vào thanh ghi $rt ($rt = M[$rs+imm])
ở đây lw gán $t1 = $t8 và $t2 = $t9
sw $rt, imm($rs) : gán giá trị của thanh ghi $rt vào thanh ghi $rs (M[$rs+imm] = $rt)
- Các lệnh lb, sb:
lb : chép 1 byte tại vị trí trong bộ nhớ RAM vào byte thấp của thanh ghi.
sb : lưu một byte thấp trong thanh ghi vào vị trí trong bộ nhớ RAM.