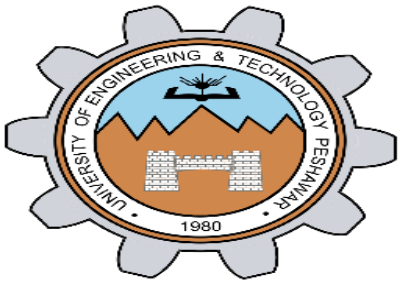
Lab report no 4



Fall 2021

Computer Architecture and Organization Lab

Submitted by:

Name: - **Muhammad Ali**

Registration No: - 19PWCSE1801

Section: **A**

Date: 9,12,2021

Submitted to:

Dr. Amaad khalil

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

Task no 1: -

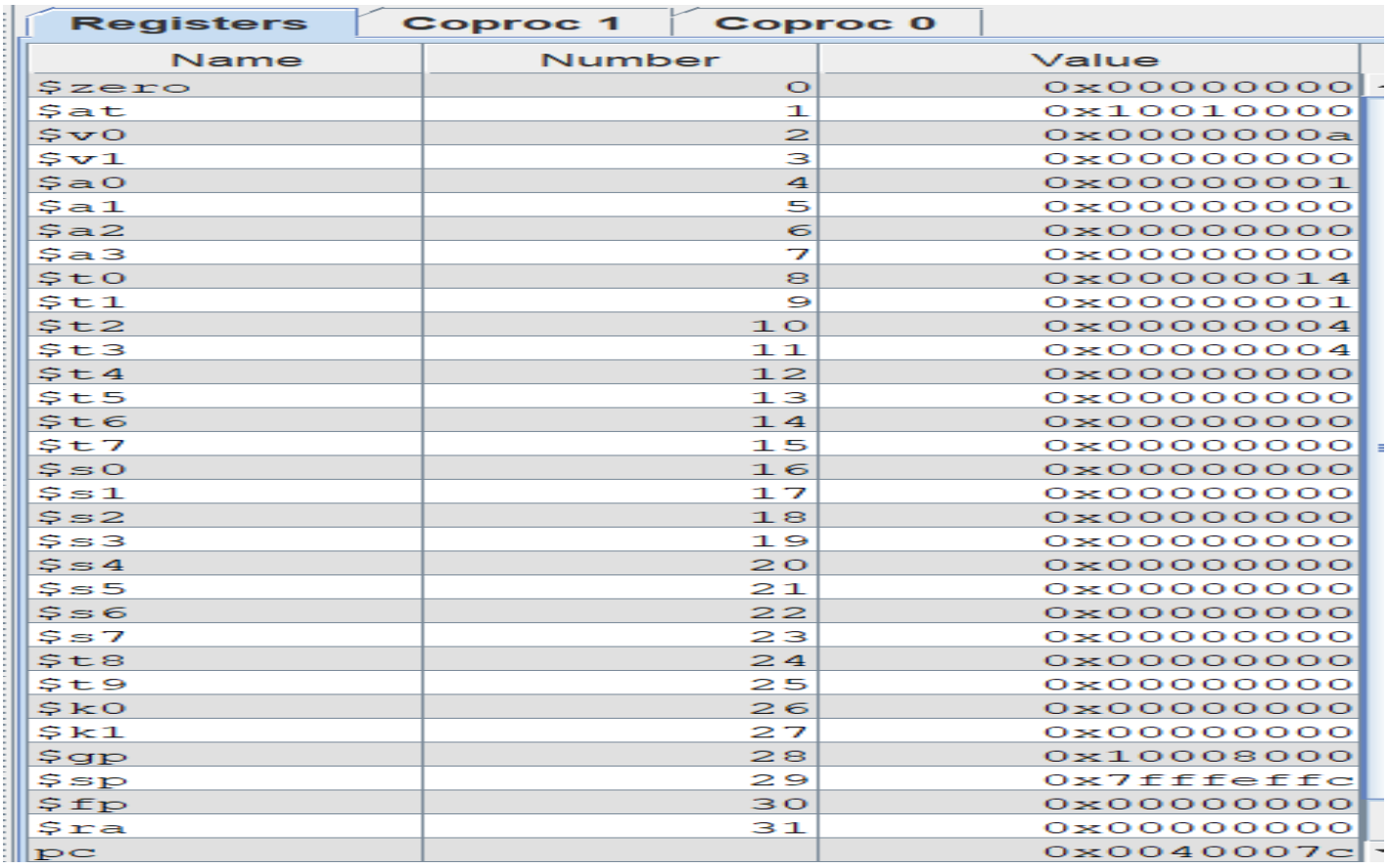
In this task, I enter a number to determine the bit value at specific location i-e 3. Here the input value is logical AND with 3 and then check result by conditions (beq, bne) if it is equal to zero the corresponding bit is zero, if not the bit is one.

```
.data
 myinfo: .asciiz " Muhammad Ali, 19pwcse1801 \n"
 msg1: .asciiz "enter a number \n"
 msg2: .asciiz "bit value of enter number at position 3 \n"
 num1: .word 1
 num2: .word 4
 .text
         lw $t1,num1
         lw $t2,num2
     #display name and reg.no
    li $v0 ,4
    la $a0 ,myinfo
    syscall
  #display string
    li $v0 ,4
    la $a0 ,msg1
    syscall

   li $v0 ,5
    syscall
```

```
  move  $t0 ,$v0



# display bit value at some position
   li $v0 ,4
  la $a0 ,msg2
  syscall

and $t3,$t2,$t0
beq $t3, $0, label
bne $t3, $0, label2


label:
li $v0 ,1
move $a0,$0
syscall
 b khan

label2:
li $v0 ,1
move $a0,$t1
syscall
khan:
 li $v0 ,10
```

syscall

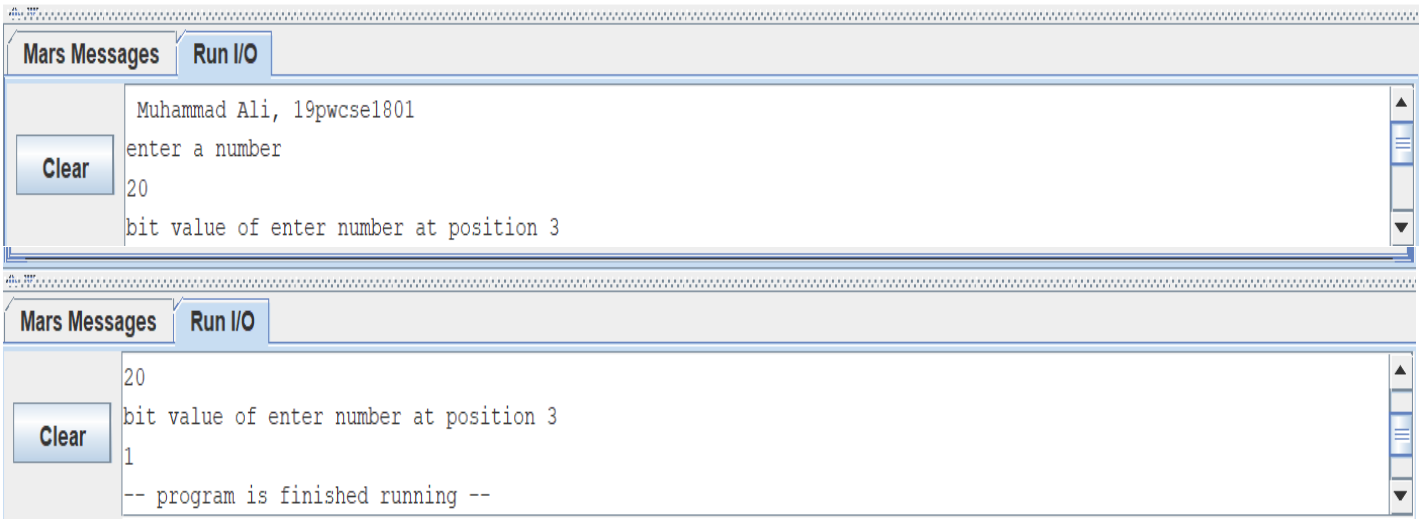
Register values: -



Registers | Coproc 1 | Coproc 0

Name	Number	Value
$zero	0	0x00000000
$at	1	0x10010000
$v0	2	0x0000000a
$v1	3	0x00000000
$a0	4	0x00000001
$a1	5	0x00000000
$a2	6	0x00000000
$a3	7	0x00000000
$t0	8	0x00000014
$t1	9	0x00000001
$t2	10	0x00000004
$t3	11	0x00000004
$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	0x00000000
$t9	25	0x00000000
$k0	26	0x00000000
$k1	27	0x00000000
$gp	28	0x10008000
$sp	29	0x7fffeffc
$fp	30	0x00000000
$ra	31	0x00000000
pc		0x0040007c

Consule: -



Task no 2: -

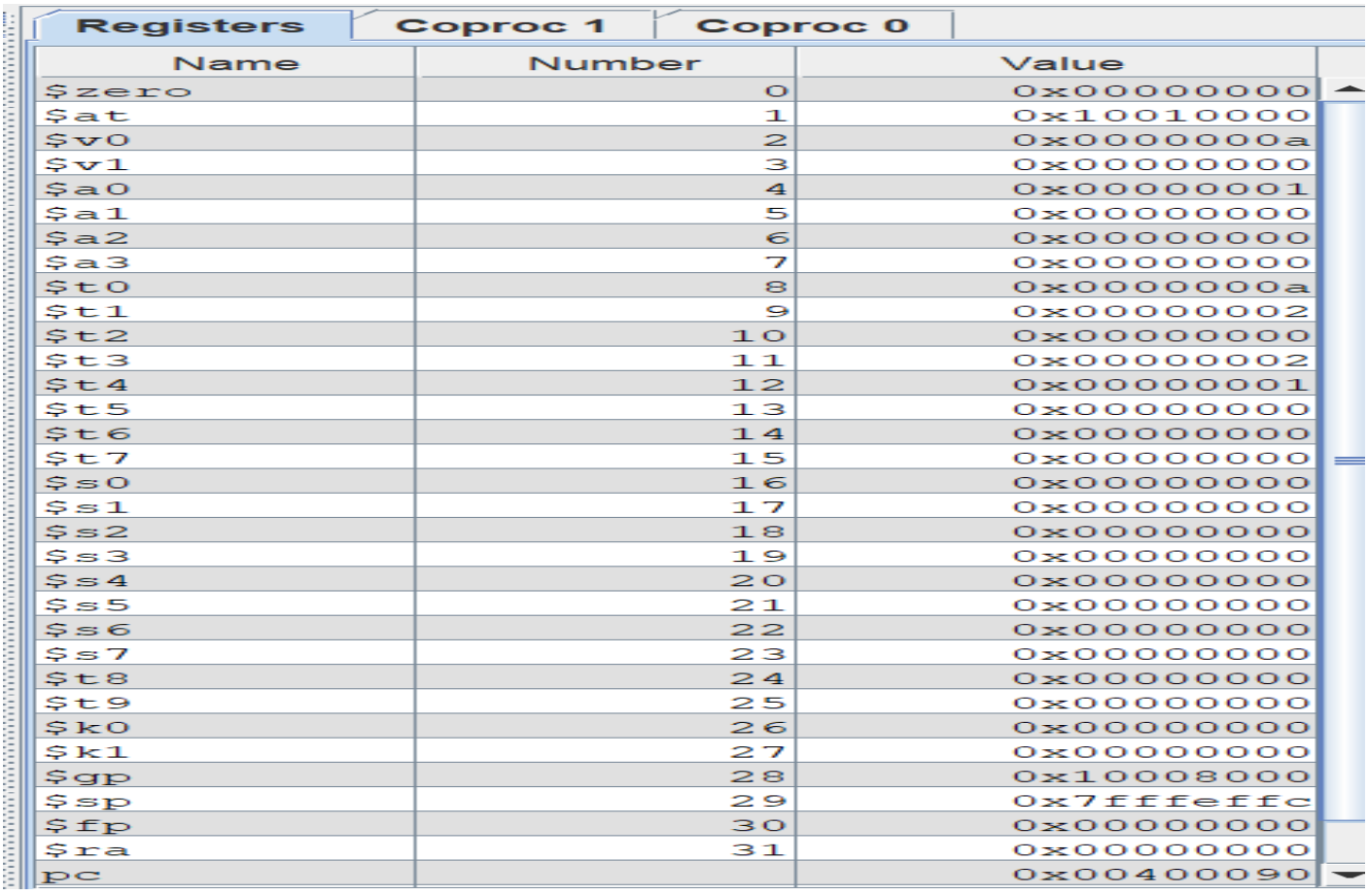
Task 2 is additional task of task 1 in which I have also enter the value for specific location which we want to check.

```
.data
 myinfo: .asciiz " Muhammad Ali, 19pwcse1801 \n"
 msg1: .asciiz "enter a number \n"
 msg2: .asciiz "enter bit number, you want to check \n"
 msg3: .asciiz "bit at a position you want to check \n"
 num1: .word 1
.text
        lw $t4,num1
    #display name and reg.no
   li $v0 ,4
   la $a0 ,myinfo
   syscall
  #display string
   li $v0 ,4
   la $a0 ,msg1
   syscall

  li $v0 ,5
   syscall
   move  $t0 ,$v0
```

```
  li $v0 ,4
  la $a0 ,msg2
  syscall

  li $v0 ,5
  syscall
  move  $t1 ,$v0

# display bit value at some position
   li $v0 ,4
  la $a0 ,msg3
  syscall

and $t3,$t1,$t0
beq $t3, $0, label
bne $t3, $0, label2


label:
li $v0 ,1
   move $a0,$0
syscall
 b khan

label2:
```

```
li $v0 ,1
    move $a0,$t4
syscall

khan:
 li $v0 ,10
 syscall
```

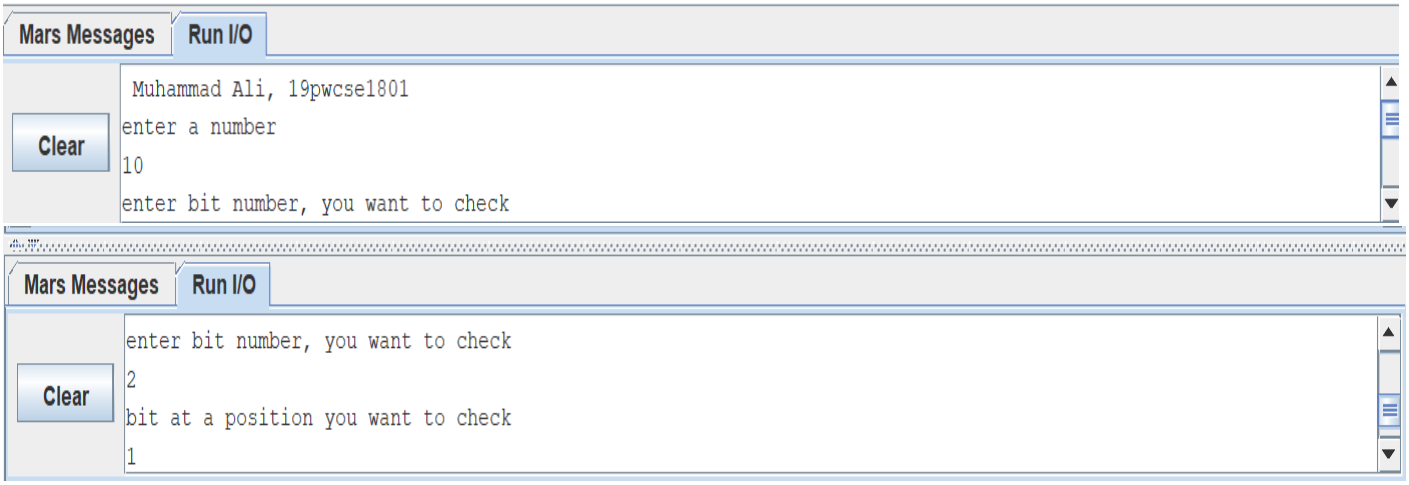
Register values: -



Registers | Coproc 1 | Coproc 0

Name	Number	Value
$zero	0	0x00000000
$at	1	0x10010000
$v0	2	0x0000000a
$v1	3	0x00000000
$a0	4	0x00000001
$a1	5	0x00000000
$a2	6	0x00000000
$a3	7	0x00000000
$t0	8	0x0000000a
$t1	9	0x00000002
$t2	10	0x00000000
$t3	11	0x00000002
$t4	12	0x00000001
$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	0x00000000
$t9	25	0x00000000
$k0	26	0x00000000
$k1	27	0x00000000
$gp	28	0x10008000
$sp	29	0x7fffeffc
$fp	30	0x00000000
$ra	31	0x00000000
pc		0x00400090

Consule: -



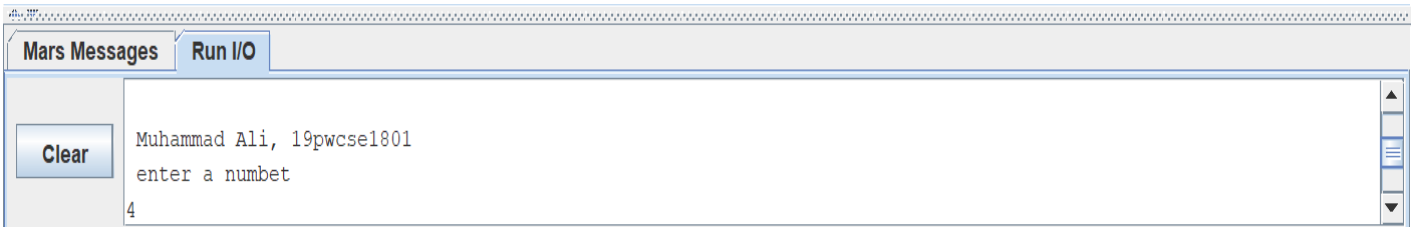
Task no 3: -

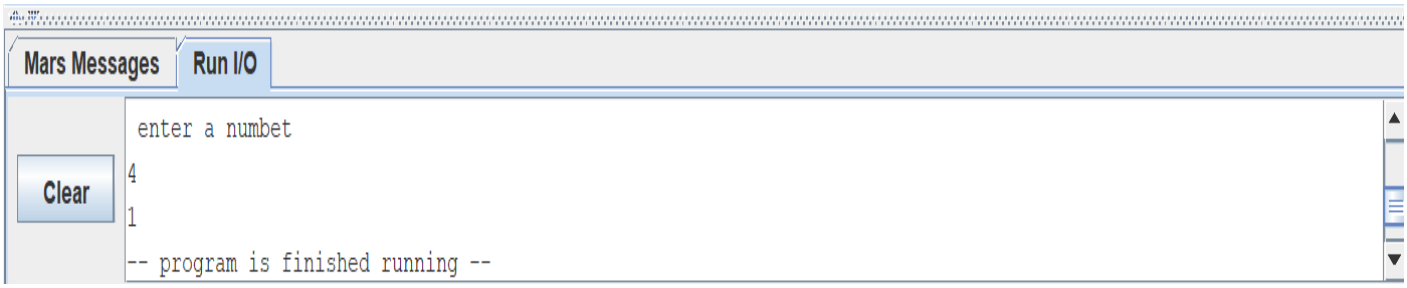
In this task, I have exchanged the 3rd and 1st bit location of a enter number. Enter number is 4 when its 3rd bit(1) is swap with 1st bit(0) the result become is 1.

```
.data
myinfo: .asciiz " Muhammad Ali, 19pwcse1801 \n"
msg1: .asciiz " enter a numbet\n"
msg2: .asciiz "swaped of bit 3 and 1 values of entered number \n"

.text

li $v0 ,4
    la $a0 ,myinfo
    syscall
```

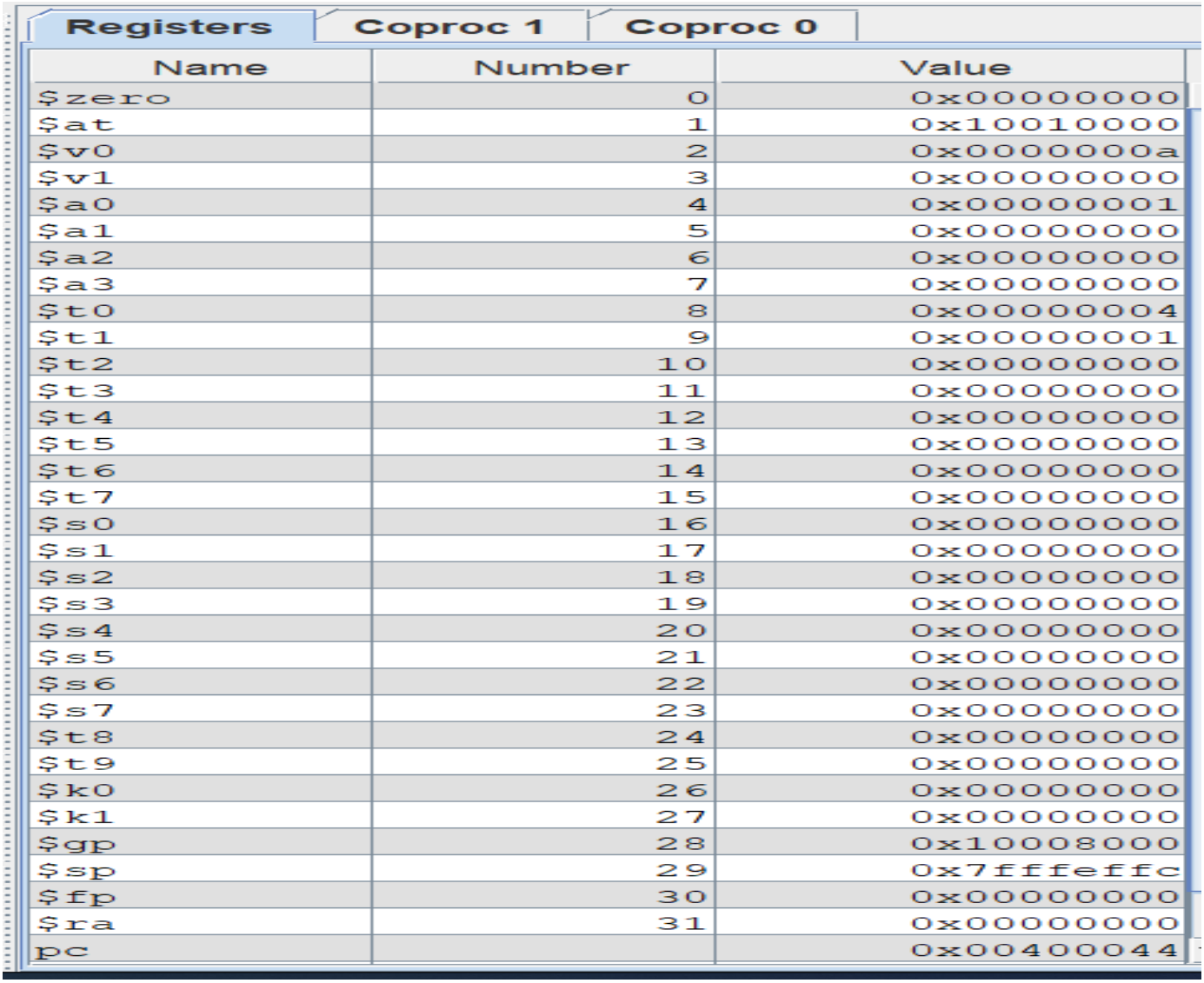
```
li $v0 ,4
la $a0, msg1
syscall

li $v0 ,5
syscall
move $t0, $v0

srl $t1,$t0, 2

li $v0 ,1
move $a0,$t1
syscall

li $v0,10
syscall
```

Consule: -





Register values: -



Registers | Coproc 1 | Coproc 0

Name	Number	Value
$zero	0	0x00000000
$at	1	0x10010000
$v0	2	0x0000000a
$v1	3	0x00000000
$a0	4	0x00000001
$a1	5	0x00000000
$a2	6	0x00000000
$a3	7	0x00000000
$t0	8	0x00000004
$t1	9	0x00000001
$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	0x00000000
$t9	25	0x00000000
$k0	26	0x00000000
$k1	27	0x00000000
$gp	28	0x10008000
$sp	29	0x7fffeffc
$fp	30	0x00000000
$ra	31	0x00000000
pc		0x00400044

Task no 4: -

In this task, user is asking to enter 1st number to decide operation for the next 2 enter values, the process will repeat itself again and again with label (againexecute).

```
.data
 myinfo: .asciiz " Muhammad Ali, 19pwcse1801 \n"
 msg1: .asciiz "enter a number  operation\n"
 msg2: .asciiz "enter a number\n"
 msg3: .asciiz "enter anothernumber\n"
 number1: .word 1
  number2: .word 2
   number3: .word 3
     number4: .word 4
.text


 againexecute:
     lw $t4,number1
          lw $t5,number2
               lw $t6,number3
                    lw $t7,number4
     #display name and reg.no
    li $v0 ,4
    la $a0 ,myinfo
    syscall
```

```
#display string
  li $v0 ,4
  la $a0 ,msg1
  syscall

 li $v0 ,5
  syscall
  move  $t0 ,$v0

  li $v0 ,4
  la $a0 ,msg2
  syscall
 li $v0 ,5
  syscall
  move  $t1,$v0
  li $v0 ,4
  la $a0 ,msg3
  syscall

 li $v0 ,5
  syscall
  move  $t2,$v0
```

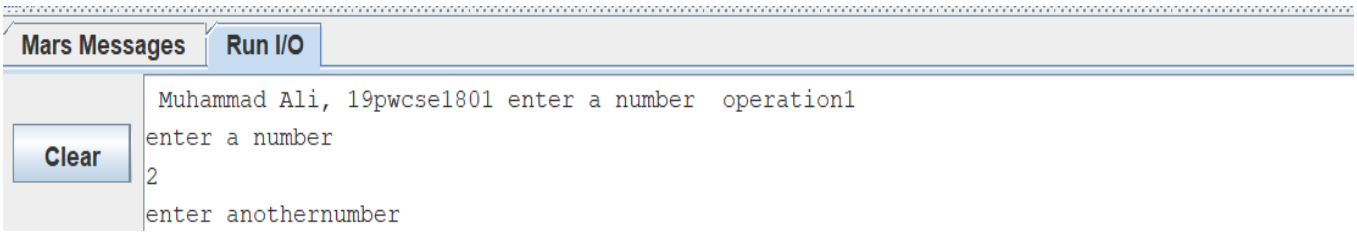
```
  beq $t0 ,$t4,label
    beq $t0 ,$t5,label2
        beq $t0 ,$t6,label3
                beq $t0 ,$t7,label4
label:
add $t3,$t1,$t2
li $v0 ,1
add $a0,$zero,$t3
  syscall
  b againexecute
  b khansab

label2:
  sub $t3,$t1,$t2
  li $v0 ,1
  add $a0,$zero,$t3
  syscall
      b againexecute
      b khansab

label3:
  mul $t3,$t1,$t2
  li $v0 ,1
add $a0,$zero,$t3
```

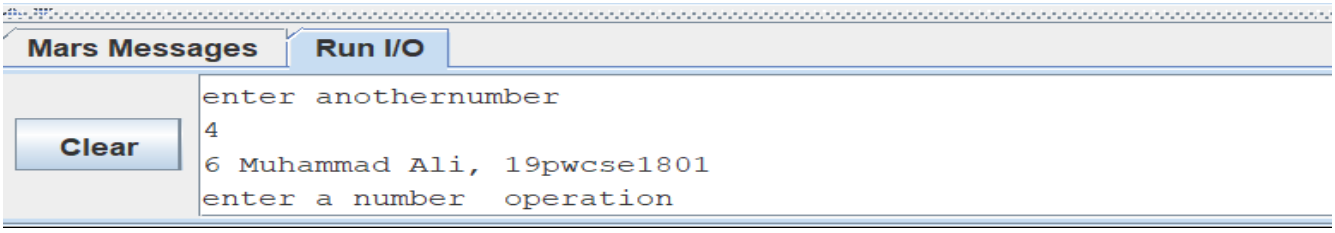
```
syscall
b againexecute
        b khansab

       label4:
    div $t3,$t1,$t2
    mfhi $t0
   syscall

  li $v0 ,1
    move $a0,$t0
    syscall

     mflo $t1
     syscall

    li $v0 ,1
    move $a0,$t1
    syscall

          b againexecute
       b khansab


  khansab:
```

li $v0 ,10

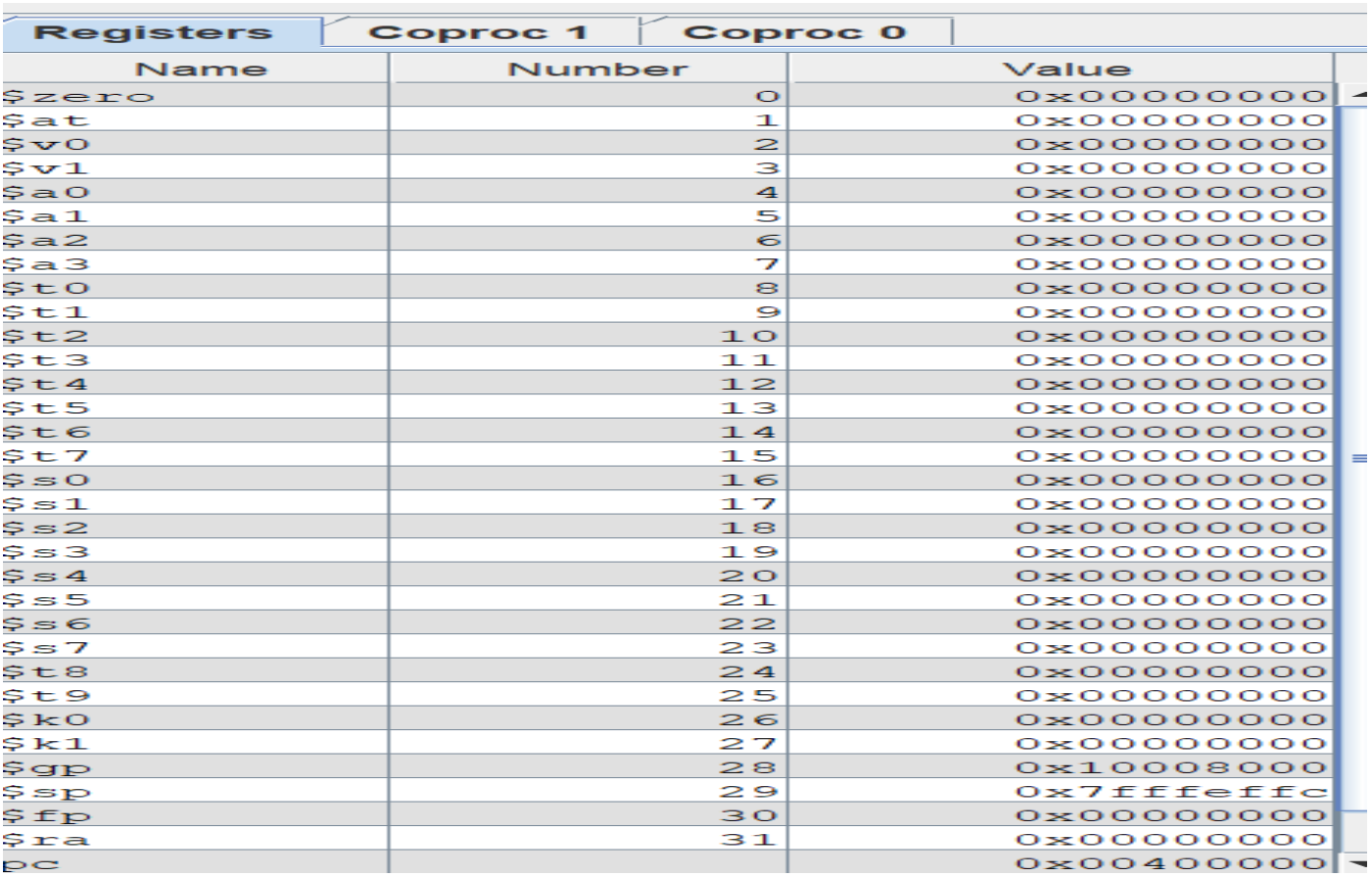
syscall

Consule: -





Register : -



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	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	0x00000000
$t9	25	0x00000000
$k0	26	0x00000000
$k1	27	0x00000000
$gp	28	0x10008000
$sp	29	0x7fffeffc
$fp	30	0x00000000
$ra	31	0x00000000
pc		0x00400000