CCCN 221 – Computer Architecture

LAB#3-4 Task3

Task Date: As per BB **Submission Date: As per BB**

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Note: Student must attach the code and the screenshot of the Final output using MIPS or Qtsmpm.

Marks:

Exercises	1	Total
Allocated	4	4
Obtained		
CLO, PLO, SO	3.1, V3, S05	

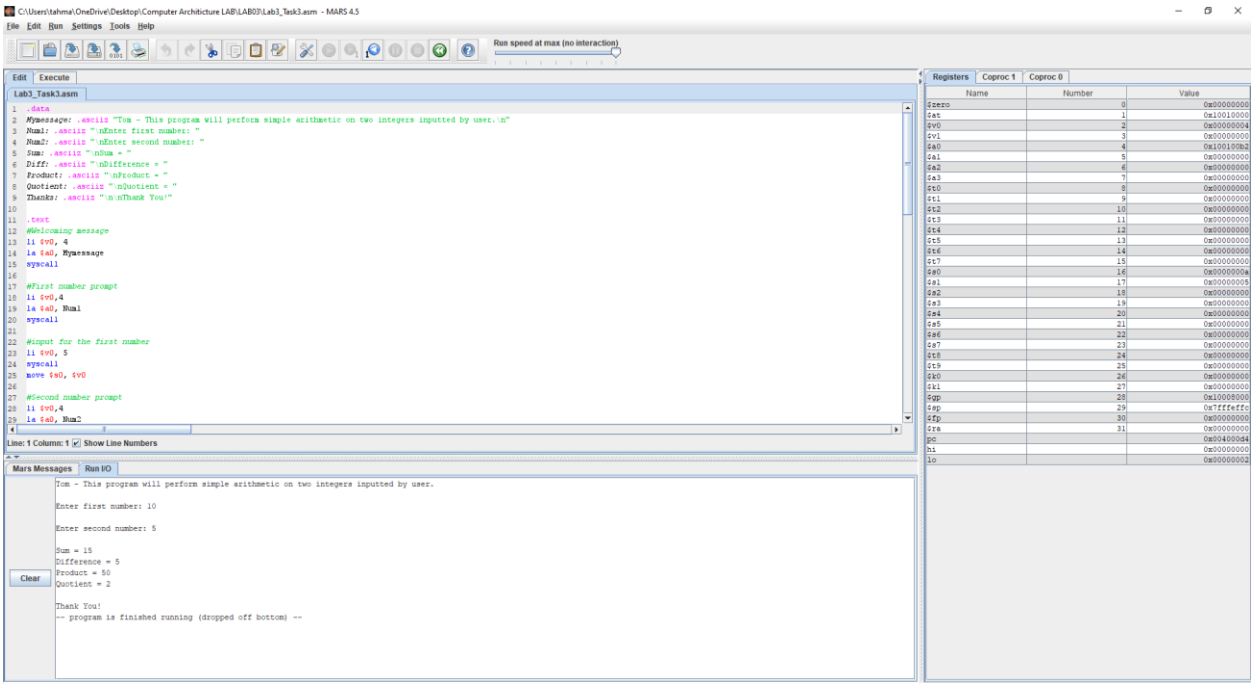
Q1: Lab Task

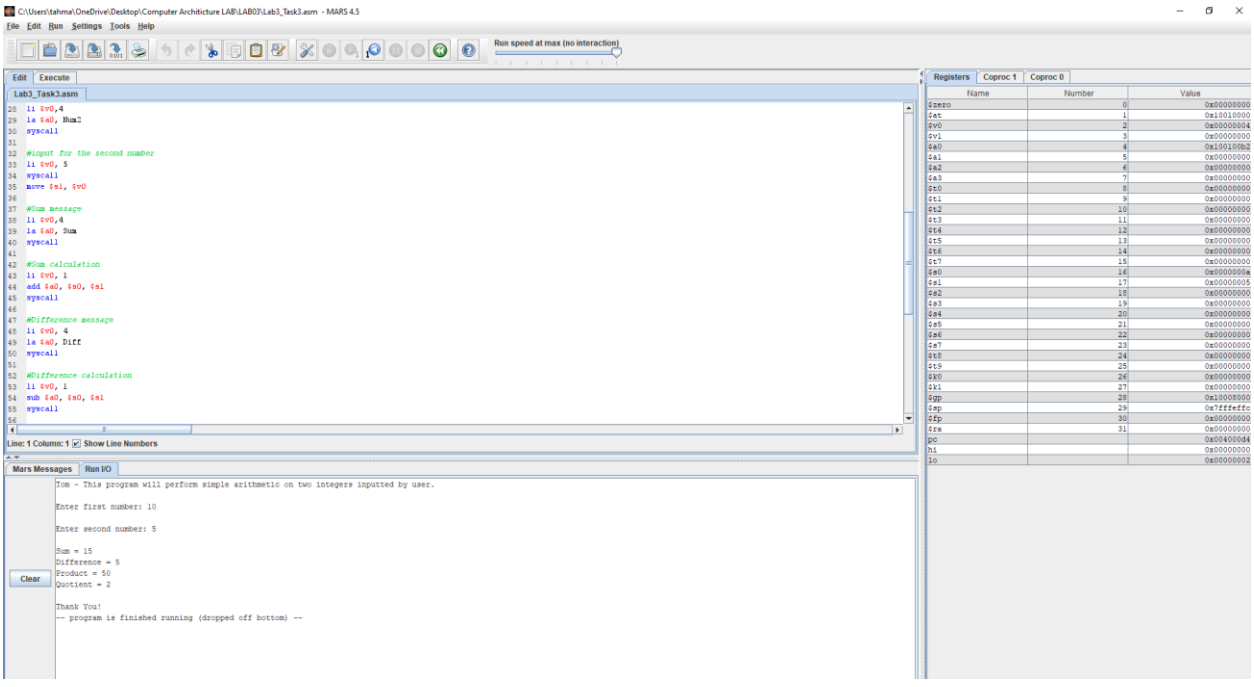
Implement the following assembly program in Mars MIPS that performs the following tasks in sequence:

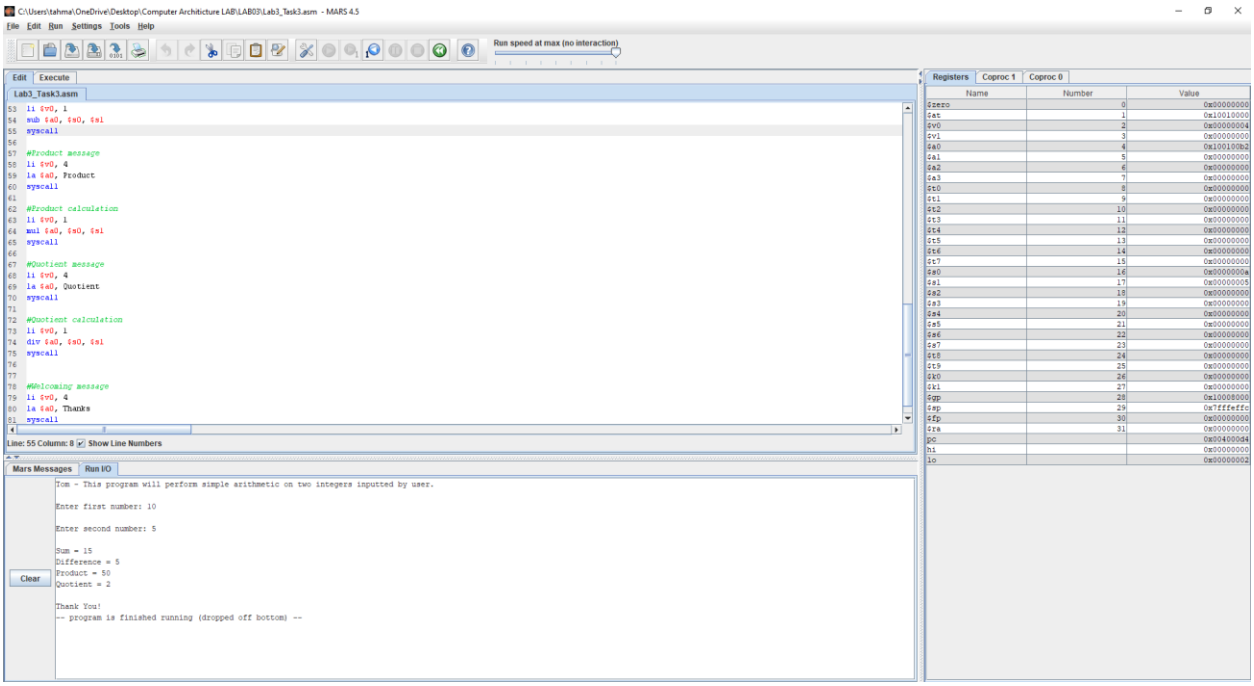
- Print an introduction that includes: **your name** and a short description of the program.
- Ask the user to enter two integers and save these in two registers.
- Perform **addition, subtraction, multiplication**, and **division** (integer quotient) on two integers.
- Display the results of **addition, subtraction, multiplication, and division**.
- Print "**Thank You!"** in the end.

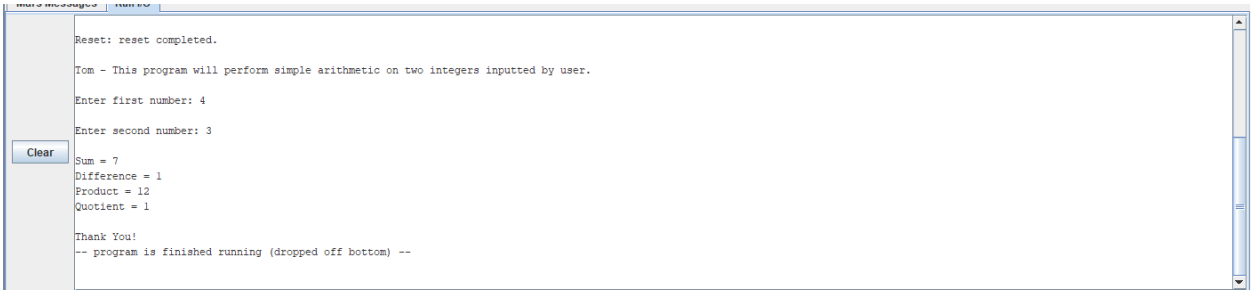
Output Sample

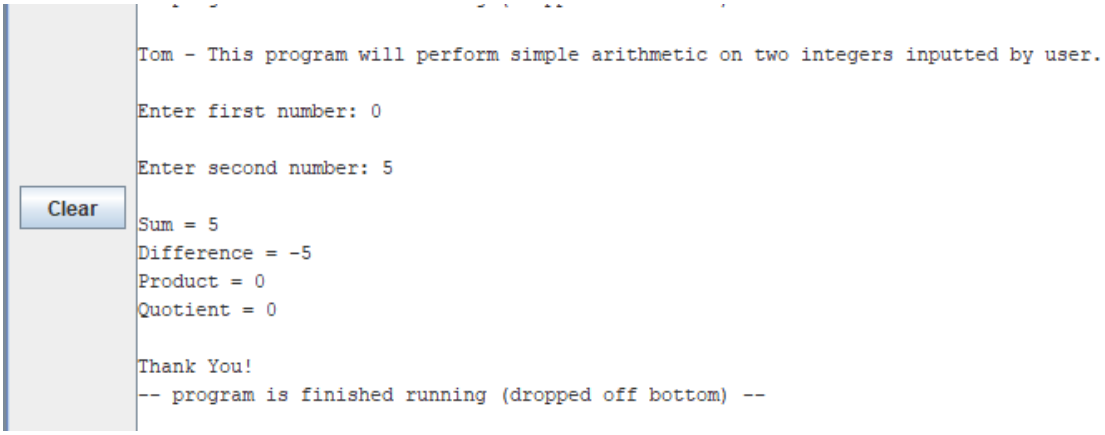
```
Ali – This program will perform simple arithmetic on two integers inputted by user.

Enter first Number: 9
Enter second number: 3
Sum = 12
Difference = 6 (OR)
Product = 27 (OR)
Quotient = 3 (OR)

Thank You!
```


C:\Users\tahma\OneDrive\Desktop\Computer Architicture LAB\LAB03\Lab3_Task3.asm - MARS 4.5
File Edit Run Settings Tools Help
Run speed at max (no interaction)
Edit Execute
Lab3_Task3.asm
.data
Mymessage: .asciiz "Tom - This program will perform simple arithmetic on two integers inputted by user.\n"
Num1: .asciiz "\nEnter first number: "
Num2: .asciiz "\nEnter second number: "
Sum: .asciiz "\nSum = "
Diff: .asciiz "\nDifference = "
Product: .asciiz "\nProduct = "
Quotient: .asciiz "\nQuotient = "
Thanks: .asciiz "\n\nThank You!"
.text
#Welcoming message
li $v0, 4
la $a0, Mymessage
syscall
#First number prompt
li $v0,4
la $a0, Num1
syscall
#input for the first number
li $v0, 5
syscall
move $s0, $v0
#Second number prompt
li $v0,4
la $a0, Num2
Line: 1 Column: 1 Show Line Numbers
Mars Messages Run I/O
Tom - This program will perform simple arithmetic on two integers inputted by user.
Enter first number: 10
Enter second number: 5
Sum = 15
Difference = 5
Product = 50
Quotient = 2
Thank You!
-- program is finished running (dropped off bottom) --
Clear
Registers Coproc 1 Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000004
$v1 3 0x00000000
$a0 4 0x100100b2
$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 0x0000000a
$s1 17 0x00000005
$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
hi 0x00000000
lo 0x00000002


C:\Users\tahma\OneDrive\Desktop\Computer Architicture LAB\LAB03\Lab3_Task3.asm - MARS 4.5
File Edit Run Settings Tools Help
Run speed at max (no interaction)
Edit Execute
Lab3_Task3.asm
li $v0,4
la $a0, Num2
syscall
#input for the second number
li $v0, 5
syscall
move $s1, $v0
#Sum message
li $v0,4
la $a0, Sum
syscall
#Sum calculation
li $v0, 1
add $a0, $s0, $s1
syscall
#Difference message
li $v0, 4
la $a0, Diff
syscall
#Difference calculation
li $v0, 1
sub $a0, $s0, $s1
syscall
Line: 1 Column: 1 Show Line Numbers
Mars Messages Run I/O
Tom - This program will perform simple arithmetic on two integers inputted by user.
Enter first number: 10
Enter second number: 5
Sum = 15
Difference = 5
Product = 50
Quotient = 2
Thank You!
-- program is finished running (dropped off bottom) --
Clear
Registers Coproc 1 Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000004
$v1 3 0x00000000
$a0 4 0x100100b2
$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 0x0000000a
$s1 17 0x00000005
$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
hi 0x00000000
lo 0x00000002


C:\Users\tahma\OneDrive\Desktop\Computer Architicture LAB\LAB03\Lab3_Task3.asm - MARS 4.5
File Edit Run Settings Tools Help
Run speed at max (no interaction)
Edit Execute
Lab3_Task3.asm
li $v0, 1
sub $a0, $s0, $s1
syscall
#Product message
li $v0, 4
la $a0, Product
syscall
#Product calculation
li $v0, 1
mul $a0, $s0, $s1
syscall
#Quotient message
li $v0, 4
la $a0, Quotient
syscall
#Quotient calculation
li $v0, 1
div $a0, $s0, $s1
syscall
#Welcoming message
li $v0, 4
la $a0, Thanks
syscall
Line: 55 Column: 8 Show Line Numbers
Mars Messages Run I/O
Tom - This program will perform simple arithmetic on two integers inputted by user.
Enter first number: 10
Enter second number: 5
Sum = 15
Difference = 5
Product = 50
Quotient = 2
Thank You!
-- program is finished running (dropped off bottom) --
Clear
Registers Coproc 1 Coproc 0
Name Number Value
$zero 0 0x00000000
$at 1 0x10010000
$v0 2 0x00000004
$v1 3 0x00000000
$a0 4 0x100100b2
$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 0x0000000a
$s1 17 0x00000005
$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 0x00400094
hi 0x00000000
lo 0x00000002


Reset: reset completed.
Tom - This program will perform simple arithmetic on two integers inputted by user.
Enter first number: 4
Enter second number: 3
Sum = 7
Difference = 1
Product = 12
Quotient = 1
Thank You!
-- program is finished running (dropped off bottom) --
Clear


Tom - This program will perform simple arithmetic on two integers inputted by user.
Enter first number: 0
Enter second number: 5
Sum = 5
Difference = -5
Product = 0
Quotient = 0
Thank You!
-- program is finished running (dropped off bottom) --
Clear

```
.data
Mymessage: .asciiz "Tom - This program will perform simple arithmetic on two integers inputted by user.\n"
Num1: .asciiz "\nEnter first number: "
Num2: .asciiz "\nEnter second number: "
Sum: .asciiz "\nSum = "
Diff: .asciiz "\nDifference = "
Product: .asciiz "\nProduct = "
Quotient: .asciiz "\nQuotient = "
Thanks: .asciiz "\n\nThank You!"

.text
#Welcoming message
li $v0, 4
la $a0, Mymessage
syscall

#First number prompt
li $v0,4
la $a0, Num1
syscall

#input for the first number
li $v0, 5
syscall
move $s0, $v0

#Second number prompt
li $v0,4
la $a0, Num2
syscall
```

```
#input for the second number
li $v0, 5
syscall
move $s1, $v0

#Sum message
li $v0,4
la $a0, Sum
syscall

#Sum calculation
li $v0, 1
add $a0, $s0, $s1
syscall

#Difference message
li $v0, 4
la $a0, Diff
syscall

#Difference calculation
li $v0, 1
sub $a0, $s0, $s1
syscall

#Product message
li $v0, 4
la $a0, Product
syscall

#Product calculation
```

```
li $v0, 1
mul $a0, $s0, $s1
syscall

#Quotient message
li $v0, 4
la $a0, Quotient
syscall

#Quotient calculation
li $v0, 1
div $a0, $s0, $s1
syscall


#Welcoming message
li $v0, 4
la $a0, Thanks
syscall
```