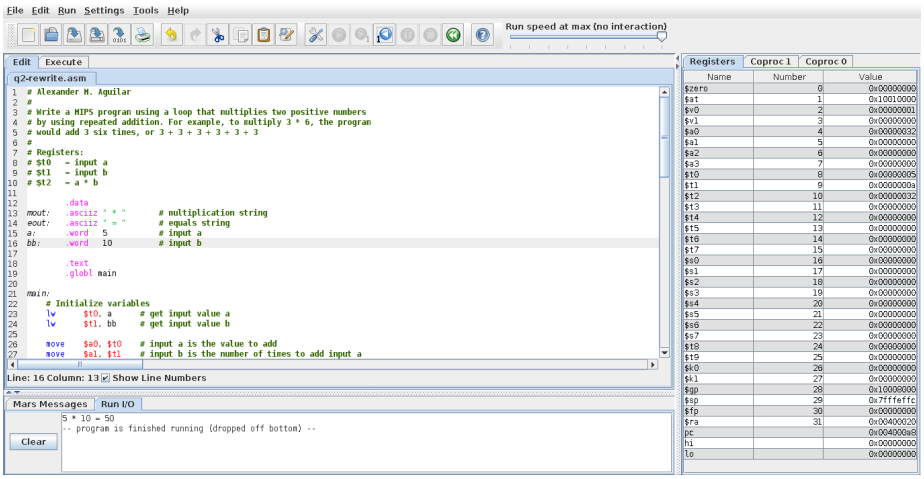
MIPS Lab Submission II

Alexander M. Aguilar

April 29, 2020

1 Question 2 Rewrite




```
1   # Alexander M. Aguilar
2   #
3   # Write a MIPS program using a loop that multiplies two positive numbers
4   # by using repeated addition. For example, to multiply 3 * 6, the program
5   # would add 3 six times, or 3 + 3 + 3 + 3 + 3 + 3
6   #
7   # Registers:
8   # $t0    = input a
9   # $t1    = input b
10  # $t2    = a * b
11
12          .data
13  mout:   .asciiz " * "       # multiplication string
14  eout:   .asciiz " = "       # equals string
15  a:      .word   5           # input a
```

```
16  bb:     .word   10          # input b
17
18          .text
19          .globl main
20
21  main:
22      # Initialize variables
23      lw      $t0, a      # get input value a
24      lw      $t1, bb     # get input value b
25
26      move    $a0, $t0    # input a is the value to add
27      move    $a1, $t1    # input b is the number of times to add input a
28      li      $v0, 0      # set the resulting sum to 0
29
30      jal     multiply    # a * b
31      nop
32
33      move    $t2, $v0    # store multiplication result
34
35      j       done
36      nop
37
38  # Multiplication subroutine
39  #
40  # $a0             - number to add
41  # $a1             - number of times to add
42  # return $v0    - result of multiplication
43  multiply:
44      sub     $sp, $sp, 4     # push the return address
45      sw      $ra, ($sp)
46
47      beqz    $a1, mcomplete  # if $a1 == 0, return
48
49      addu    $v0, $v0, $a0   # sum += input a
50      subi    $a1, $a1, 1     # a1--
51
52      # recursive call
53      jal     multiply
54      nop
55
56  mcomplete:
57      lw      $ra, ($sp)      # pop return address
58      add     $sp, $sp, 4
59
60      jr      $ra             # return to caller
61      nop
62
63  done:
```

```
64      # Finished, print results in the format of a * b = sum
65      li      $v0, 1
66      move    $a0, $t0
67      syscall
68
69      li      $v0, 4
70      la      $a0, mout
71      syscall
72
73      li      $v0, 1
74      move    $a0, $t1
75      syscall
76
77      li      $v0, 4
78      la      $a0, eout
79      syscall
80
81      li      $v0, 1
82      move    $a0, $t2
83      syscall
```