CS7381 Project 2
MIPS Assembly Code Programming Using MARS Tool

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In the previous project (Project 1), you were introduced to the MARS tool. For this project, you will use the MARS tool to develop and run a MIPS assembly language program.
You will create and run MIPS assembly code for the following high-level language (HLL) code. I have provided both C++ and Python versions of the HLL code.

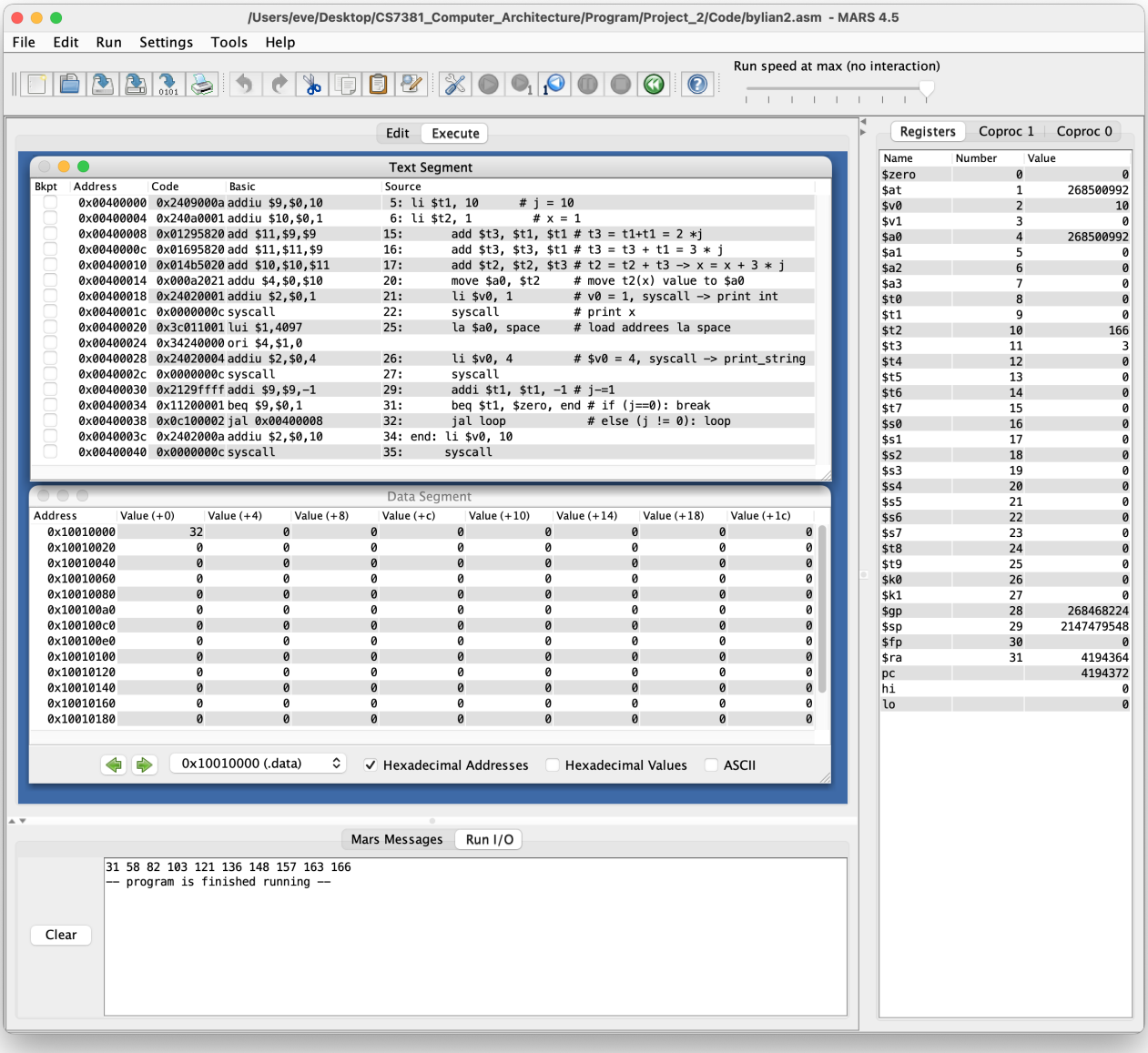
C++ Version

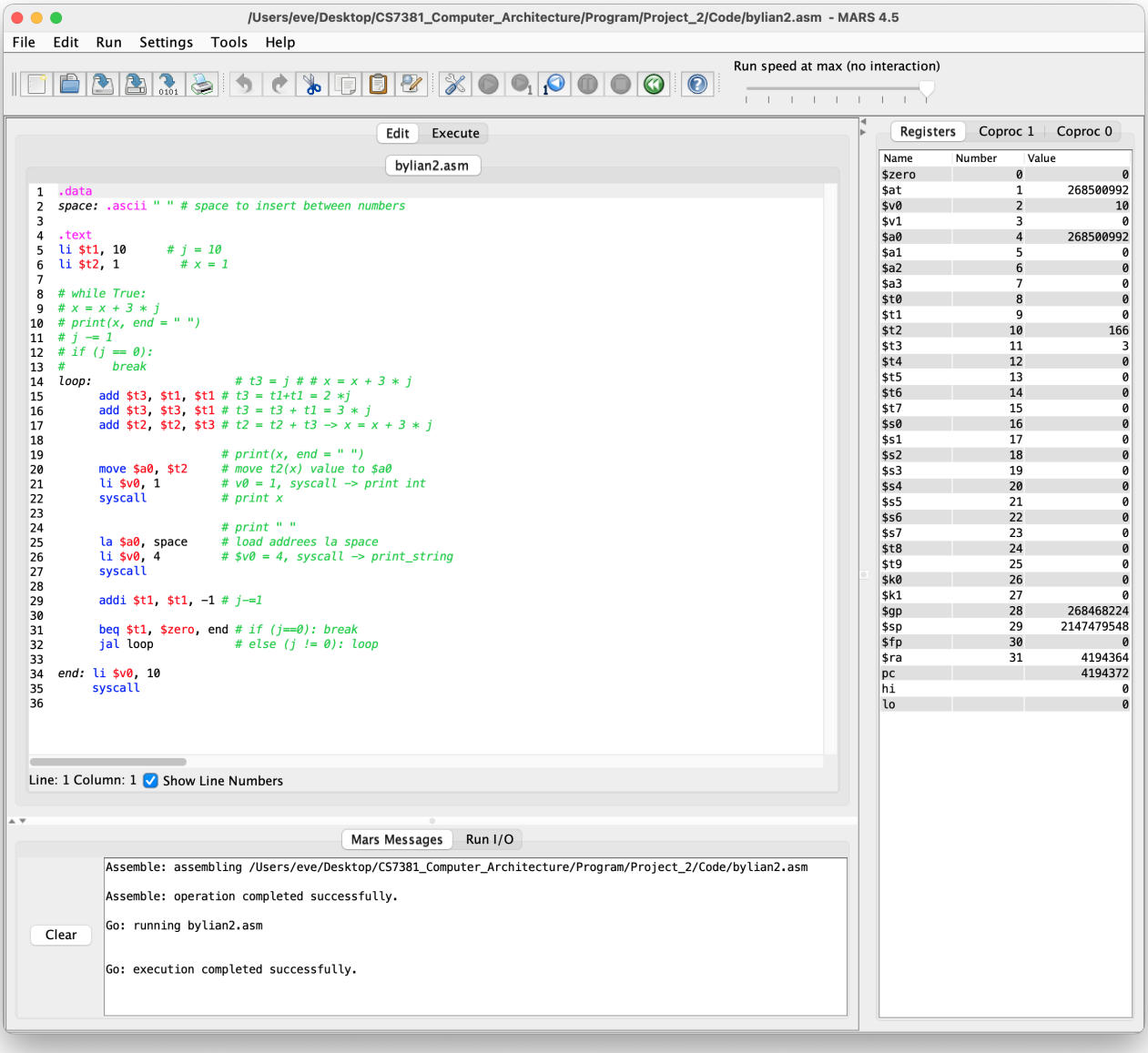
```
int j = 10;
int x = 1;
do
{
      x = x + 3*j;
      cout << x << " ";
      j--;
} while (j > 0);
cout << endl;
```

Java Version

```
j = 10
x = 1
while True:
    x = x + 3 * j
    print(x, end = " ")
    j -= 1
    if (j == 0):
        break
```

Screen shot of the MARS console




/Users/eve/Desktop/CS7381_Computer_Architecture/Program/Project_2/Code/bylian2.asm - MARS 4.5
File Edit Run Settings Tools Help
Run speed at max (no interaction)
Edit Execute
bylian2.asm
1 .data
2 space: .ascii " " # space to insert between numbers
3
4 .text
5 li $t1, 10 # j = 10
6 li $t2, 1 # x = 1
7
8 # while True:
9 # x = x + 3 * j
10 # print(x, end = " ")
11 # j -= 1
12 # if (j == 0):
13 # break
14 loop: # t3 = j # # x = x + 3 * j
15 add $t3, $t1, $t1 # t3 = t1+t1 = 2 *j
16 add $t3, $t3, $t1 # t3 = t3 + t1 = 3 * j
17 add $t2, $t2, $t3 # t2 = t2 + t3 -> x = x + 3 * j
18
19 # print(x, end = " ")
20 move $a0, $t2 # move t2(x) value to $a0
21 li $v0, 1 # v0 = 1, syscall -> print int
22 syscall # print x
23
24 # print " "
25 la $a0, space # load addrees la space
26 li $v0, 4 # $v0 = 4, syscall -> print_string
27 syscall
28
29 addi $t1, $t1, -1 # j-=1
30
31 beq $t1, $zero, end # if (j==0): break
32 jal loop # else (j != 0): loop
33
34 end: li $v0, 10
35 syscall
36
Line: 1 Column: 1 Show Line Numbers
Registers Coproc 1 Coproc 0
Name Number Value
$zero 0 0
$at 1 268500992
$v0 2 10
$v1 3 0
$a0 4 268500992
$a1 5 0
$a2 6 0
$a3 7 0
$t0 8 0
$t1 9 0
$t2 10 166
$t3 11 3
$t4 12 0
$t5 13 0
$t6 14 0
$t7 15 0
$s0 16 0
$s1 17 0
$s2 18 0
$s3 19 0
$s4 20 0
$s5 21 0
$s6 22 0
$s7 23 0
$t8 24 0
$t9 25 0
$k0 26 0
$k1 27 0
$gp 28 268468224
$sp 29 2147479548
$fp 30 0
$ra 31 4194364
pc 4194372
hi 0
lo 0
Mars Messages Run I/O
Clear
Assemble: assembling /Users/eve/Desktop/CS7381_Computer_Architecture/Program/Project_2/Code/bylian2.asm
Assemble: operation completed successfully.
Go: running bylian2.asm
Go: execution completed successfully.