KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
KING ABDULAZIZ UNIVERSITY
Faculty of Engineering

EE361 Lab

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك عبد العزيز
كلية الهندسة

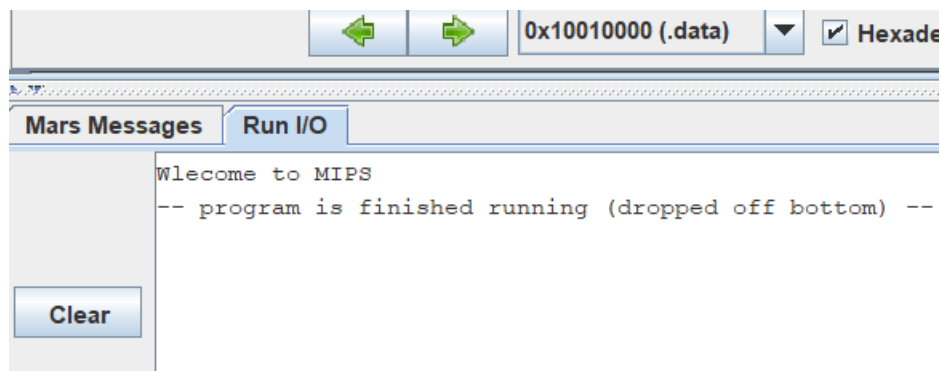---

Name: **Hayan Al-Machnouk**   ID: **1945954**

Section:_____   Date:_____

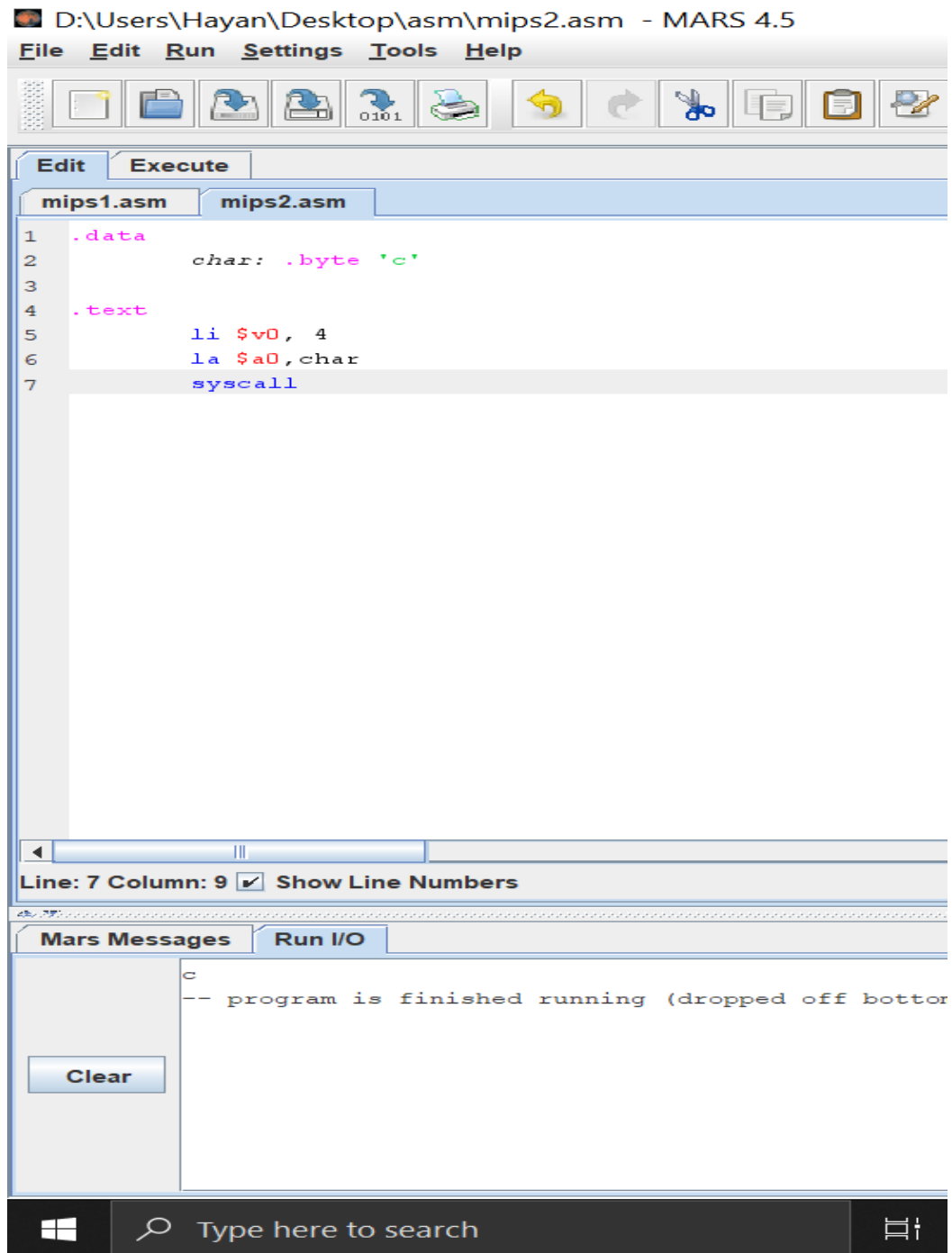# Run and Simulate MIPS programs using MARS

With each program provide its code and output:

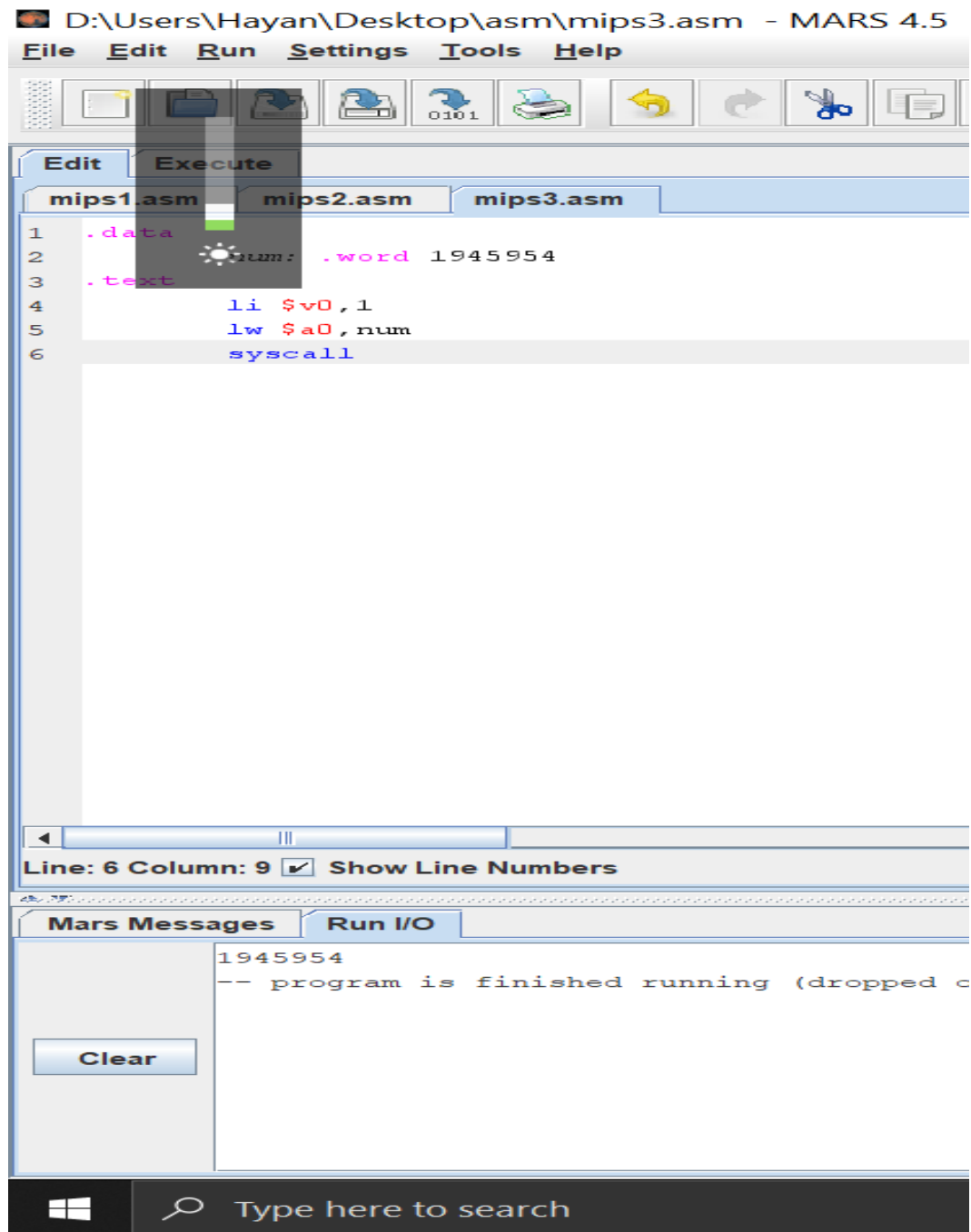1. **Printing a Text/String(e.g "Welcome to MIPS ")**

```
Edit    Execute

mips1.asm

1   .data
2         message: .asciiz "Wlecome to MIPS"
3
4   .text
5         li $v0,4
6         la $a0, message
7
8         syscall
```
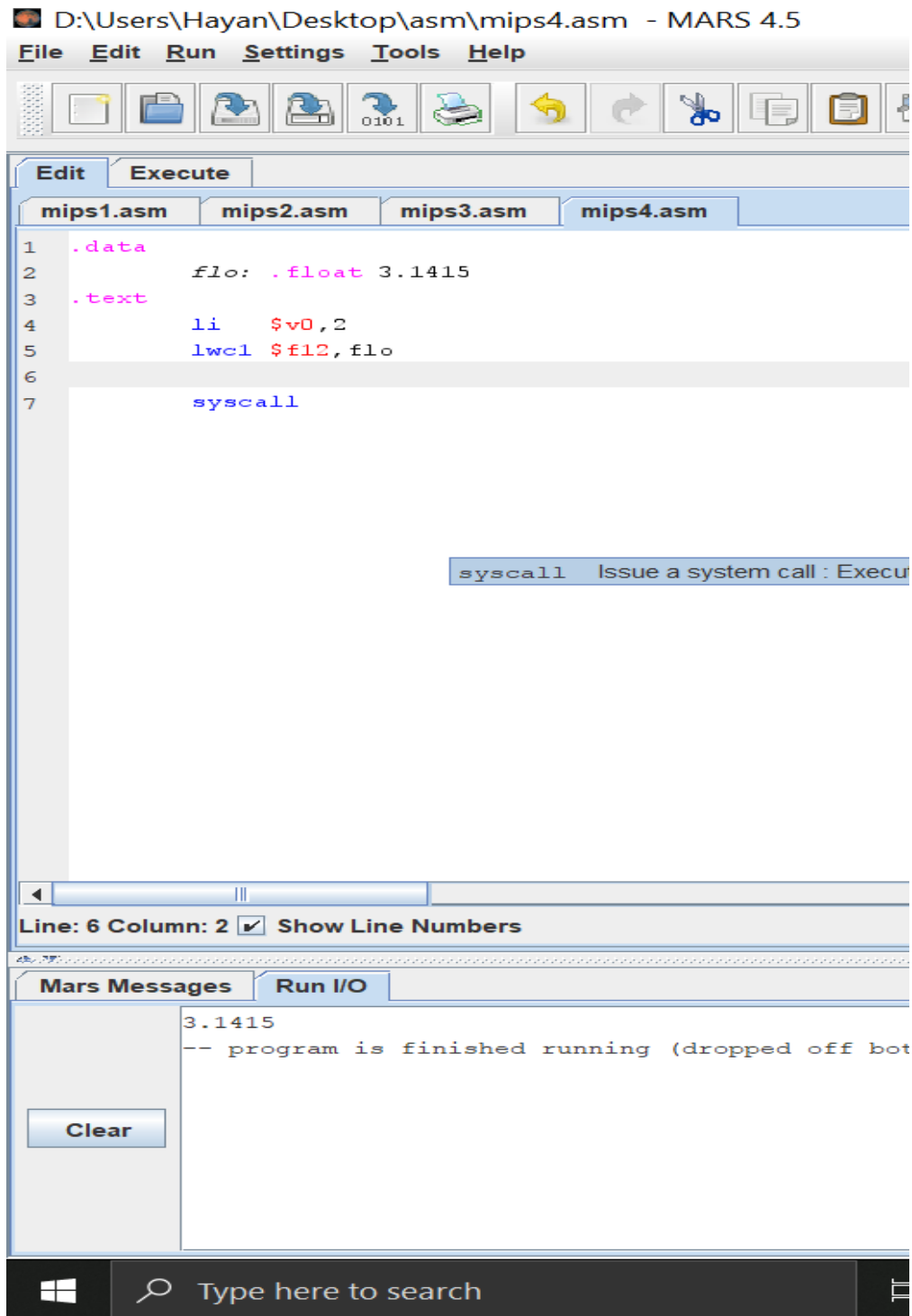
```
0x10010000 (.data)    ▼  ✔ Hexade

Mars Messages   Run I/O

    Wlecome to MIPS
    -- program is finished running (dropped off bottom) --

Clear
```

2. Printing a Character (e.g 'e')


```
.data
        char: .byte 'c'

.text
        li $v0, 4
        la $a0,char
        syscall
```

3. Printing an Integer (e.g. '23')


```
D:\Users\Hayan\Desktop\asm\mips3.asm  - MARS 4.5
File   Edit   Run   Settings   Tools   Help

Edit    Execute

mips1.asm      mips2.asm      mips3.asm

1    .data
2         num:   .word  1945954
3    .text
4         li $v0,1
5         lw $a0,num
6         syscall
```

Line: 6 Column: 9 ☑ Show Line Numbers

Mars Messages   Run I/O

```
1945954
-- program is finished running (dropped o
```

Clear

Type here to search

4. Printing a Float (e.g. '5.202')

D:\Users\Hayan\Desktop\asm\mips4.asm - MARS 4.5

File Edit Run Settings Tools Help

Edit **Execute**

mips1.asm | mips2.asm | mips3.asm | **mips4.asm**

```
1   .data
2           flo:  .float 3.1415
3   .text
4           li    $v0,2
5           lwc1 $f12,flo
6
7           syscall
```

syscall   Issue a system call : Execu

Line: 6 Column: 2 ☑ Show Line Numbers

Mars Messages **Run I/O**

```
3.1415
-- program is finished running (dropped off bot
```

Clear

⊞   🔍 Type here to search

5. Adding Integers(e.g. 8+10)

| mips1.asm | mips2.asm | mips3.asm | mips4.asm | mips5.asm |

```
1    .data
2            n1:  .word 22
3            n2:  .word 91
4    .text
5
6            lw $t1,  n1
7            lw $t2,  n2
8
9            add $t0,  $t1,  $t2
10
11           li $v0,  1
12           move $a0,  $t0
13
14           syscall
```
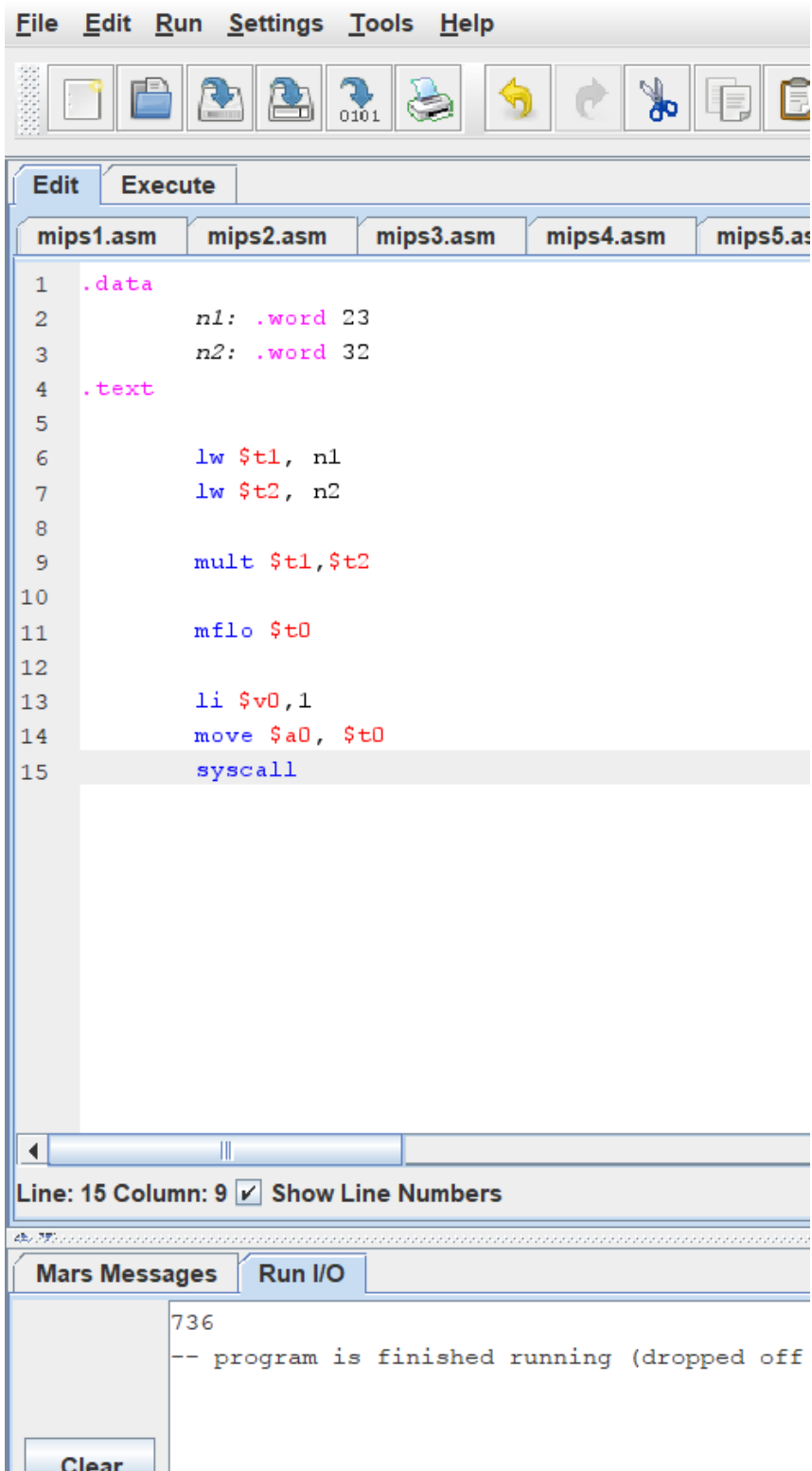
syscall   Issue a system call : Execute the system call specified

Line: 14 Column: 9 ☑ Show Line Numbers

| Mars Messages | Run I/O |

```
113
-- program is finished running (dropped off bottom) --
```

6. Subtracting Integers (e.g. 30-9)

D:\Users\Hayan\Desktop\asm\mips6.asm - MARS 4.5

File   Edit   Run   Settings   Tools   Help

Edit | Execute

mips1.asm | mips2.asm | mips3.asm | mips4.asm | mips5.asm | mips6.asm

```
 1    .data
 2          n1:  .word 22
 3          n2:  .word 91
 4    .text
 5
 6          lw $t1,  n1
 7          lw $t2,  n2
 8
 9          sub $t0,  $t1,  $t2
10
11          li $v0,  1
12          move $a0,  $t0
13
14          syscall
```

Line: 8 Column: 2 ☑ Show Line Numbers

Mars Messages | Run I/O

```
-69
-- program is finished running (dropped off bottom) --
```

7. Multiplying Integers (2 operands)

D:\Users\Hayan\Desktop\asm\mips7.asm - MARS 4.5

File Edit Run Settings Tools Help

Edit | Execute

mips1.asm | mips2.asm | mips3.asm | mips4.asm | mips5.as

```
1    .data
2            n1: .word 23
3            n2: .word 32
4    .text
5
6            lw $t1, n1
7            lw $t2, n2
8
9            mult $t1,$t2
10
11           mflo $t0
12
13           li $v0,1
14           move $a0, $t0
15           syscall
```

Line: 15 Column: 9 ☑ Show Line Numbers

Mars Messages | Run I/O

```
736
-- program is finished running (dropped off
```

Clear

8. Multiplying Integers (3 operands)


```
1   .data
2           n1:  .word 22
3           n2:  .word 91
4   .text
5
6           lw $t1,  n1
7           lw $t2,  n2
8
9           mul $t0,$t1,$t2
10
11          li $v0,1
12          move $a0,  $t0
13          syscall
```
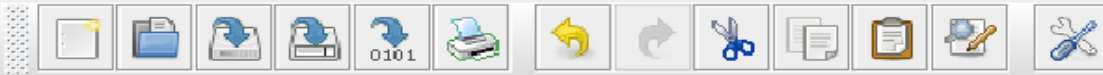
Line: 13 Column: 9 ☑ Show Line Numbers

Mars Messages | **Run I/O**

```
2002
-- program is finished running (dropped off b
```

9. Dividing Integers (e.g. 20/10)

D:\Users\Hayan\Desktop\asm\mips9.asm - MARS 4.5

File Edit Run Settings Tools Help

Edit | Execute

mips1.asm | mips2.asm | mips3.asm | mips4.asm | mips5.asm | mips6.asm

```
 1   .data
 2           n1:  .word 20
 3           n2:  .word 10
 4   .text
 5
 6           lw $t1,  n1
 7           lw $t2,  n2
 8
 9           div $t0,$t1,$t2
10
11           li $v0,1
12           move $a0,  $t0
13           syscall
```

Line: 13 Column: 9 ☑ Show Line Numbers

Mars Messages | Run I/O

```
2
-- program is finished running (dropped off bottom) --
```

10. Division Integers (e.g. 17/2)

Edit | **Execute**

mips1.asm | **mips2.asm** | **mips3.asm** | **mips4.asm** | **mips5.asm** | **mips6.asm**

```
1    .data
2           n1: .word 441
3           m1: .asciiz " Quotient\n"
4           n2: .word 22
5           m2: .asciiz " Remainder\n"
6    .text
7           lw $t1, n1
8           lw $t2, n2
9           div $t1, $t2
10          mflo $s0
11          mfhi $s1
12          li $v0, 1
13          move $a0, $s0
14          syscall
15          li $v0,4
16          la $a0, m1
17          syscall
18          li $v0, 1
19          move $a0, $s1
20          syscall
21          li $v0,4
22          la $a0, m2
23          syscall
```

Line: 23 Column: 9 ✔ Show Line Numbers

Mars Messages | **Run I/O**

```
20 Quotient
1 Remainder

-- program is finished running (dropped off bottom) --
```

Clear

11. Working with a Function

```
 3            m2:  .asciiz " Remainder\n"
 4            m3:  .asciiz " is"
 5     .text
 6            main:
 7                      addi $t1, $zero, 19
 8                      addi $t2, $zero, 3
 9                      div $t1, $t2
10                      mflo $s0
11                      mfhi $s1
12                      li $v0, 1
13                      move $a0, $s0
14                      syscall
15                      jal prcedure
16                      li $v0,4
17                      la $a0, m1
18                      syscall
19                      li $v0, 1
20                      move $a0, $s1
21                      syscall
22                      jal prcedure
23                      li $v0,4
24                      la $a0, m2
25                      syscall
26            li $v0,10
27            syscall
28            prcedure:
29                      li $v0,4
30                      la $a0,m3
31                      syscall
32            jr $ra
```

Line: 31 Column: 3 ☑ Show Line Numbers

| Mars Messages | Run I/O |

Clear

```
6 is Quotient
1 is Remainder
```

12. Function Arguments and Return Values

```
1    .data
2        m1:  .asciiz " Quotient\n"
3        m2:  .asciiz " Remainder\n"
4    .text
5        main:
6                addi $a1, $zero, 42
7                addi $a2, $zero, 22
8                jal divide
9                move $a0, $v0
10               jal dispInt
11               la $a0, m1
12               jal dispMessage
13               move $a0, $v1
14               jal dispInt
15               la $a0, m2
16               jal dispMessage
17        li $v0,10
18        syscall
19
20        dispMessage:
21               li $v0,4
22               syscall
23        jr $ra
24        dispInt:
25               li $v0, 1
26               syscall
27        jr $ra
28        divide:
29               div $a1, $a2
30               mflo $v0
31               mfhi $v1
32        jr $ra
```

Mars Messages | **Run I/O**

```
-- program is finished running --


1 Quotient
20 Remainder


-- program is finished running --
```

Clear