

Práctica III

Ejercicios en Assembly

Profesor: Vicente Enrique Machaca Arceda

Carrera: Ingeniería de Software

Curso: Fundamentos de Lenguaje de Programación

Alumno:

Leandro Igor Estrada Santos,
lestradas@ulasalle.edu.pe

Facultad de Ingeniería, Universidad La Salle - Arequipa

Índice

1. Ejercicio 1	3
2. Ejercicio 2	7
3. Ejercicio 3	12
4. Ejercicio 4	16

1. Ejercicio 1

```
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
(spim) load "e1.s"
(spim) run

Type a #1 : 3

Type #2 : 6

+ : 9
- : -3
x : 18
/ : 0.50000000
AVG : 4.50000000(spim) █
```

```

1  .data
2      x1: .asciiz "\nType a #1 : "
3      x2: .asciiz "\nType #2 : "
4      s_text: .asciiz "\n+ : "
5      d_text: .asciiz "\n/ : "
6      x_text: .asciiz "\nx : "
7      r_text: .asciiz "\n- : "
8      a_text: .asciiz "\nAVG : "
9  .text
10 main:
11     li $v0, 4
12     la $a0, x1
13     syscall
14     li $v0, 5
15     syscall
16     move $t1, $v0
17     li $v0, 4
18     la $a0, x2
19     syscall
20     li $v0, 5
21     syscall
22     move $t2, $v0
23     la $a0, s_text
24     li $v0, 4
25     syscall
26     add $t0, $t1, $t2
27     move $a0, $t0
28     li $v0, 1
29     syscall
30     la $a0, r_text
31     li $v0, 4
32     syscall
33     sub $a0, $t1, $t2
34     li $v0, 1
35     syscall
36     la $a0, x_text
37     li $v0, 4
38     syscall
39     mul $a0, $t1, $t2
40     li $v0, 1
41     syscall
42     la $a0, d_text
43     li $v0, 4
44     syscall
45     mtc1 $t1, $f1

```

45	mtc1 \$t1, \$f1
46	cvt.s.w \$f1, \$f1
47	mtc1 \$t2, \$f2
48	cvt.s.w \$f2, \$f2
49	div.s \$f12, \$f1, \$f2
50	li \$v0, 2
51	syscall
52	la \$a0, a_text
53	li \$v0, 4
54	syscall
55	mtc1 \$t0, \$f3
56	cvt.s.w \$f3, \$f3
57	li.s \$f4, 2.0
58	div.s \$f12, \$f3, \$f4
59	li \$v0, 2
60	syscall
61	jr \$ra

2. Ejercicio 2

```
1  .data
2      amnt: .asciiz "\nType numbers amount : "
3      xum: .asciiz "\nType a number: "
4      adi: .asciiz "\n+ : "
5      avg: .asciiz "\na : "
6      max: .asciiz "\n> : "
7      min: .asciiz "\n<: "
8  .text
9  main:
10     li $v0, 4
11     la $a0, amnt
12     syscall
13     li $t1, 0
14     li $v0, 5
15     syscall
16     move $t2, $v0
17     li $a1, 0
18     li $t3, 0
19     li $t9, 10000
20     Loop:
21         beq $t2, $t1, Exit
22         li $v0, 4
23         la $a0, xum
24         syscall
25         li $v0, 5
26         syscall
27         move $t5, $v0
28         beqz $a1, LABEL_IF
29         LABEL_IF_ELSE:
30         add $t1, $t1, 0
```

```

31         b LABEL_IF
32 LABEL_IF:
33         move $t4, $v0
34 end_LABEL_IF:
35         add $t1, $t1, 0
36 bge $t5, $t3, MAYOR_IF
37 MAYOR_IF_ELSE:
38         add $t1, $t1, 0
39         b END_MAYOR_IF
40 MAYOR_IF:
41         move $t3, $t5
42 END_MAYOR_IF:
43         add $t1, $t1, 0
44 ble $t5, $t9, MENOR_IF
45 MENOR_IF_ELSE:
46         add $t1, $t1, 0
47         b END_MENOR_IF
48 MENOR_IF:
49         move $t9, $t5
50 END_MENOR_IF:
51         add $t1, $t1, 0
52 move $a2, $v0
53 add $a1, $a1, $a2
54 add $t1, $t1, 1
55     j Loop
56 Exit:
57 la $a0, adi
58 li $v0, 4
59 syscall
60 move $a0, $a1

```



```

61    li $v0, 1
62    syscall
63    li $v0, 4
64    la $a0, avg
65    syscall
66    mtc1 $a1, $f1
67    cvt.s.w $f1, $f1
68    mtc1 $t2, $f2
69    cvt.s.w $f2, $f2
70    div.s $f12, $f1, $f2
71    li $v0, 2
72    syscall
73    la $a0, max
74    li $v0, 4
75    syscall
76    move $a0, $t3
77    li $v0, 1
78    syscall
79    la $a0, min
80    li $v0, 4
81    syscall
82    move $a0, $t9
83    li $v0, 1
84    syscall
85    jr $ra

```

SQL CONSOLE

OUTPUT

TERMINAL

DEBUG CONSOLE

PROBLEMS

```
Loaded: /usr/lib/spim/exceptions.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
(spim) load "e2.s"
(spim) run

Type numbers amount : 4

Type a number: 3

Type a number: 2

Type a number: 2

Type a number: 3

+ : 10
a : 2.50000000
> : 3
<: 2(spim) █
```


3. Ejercicio 3

```
1  .data
2      lad1: .asciiz "\nL1 : "
3      lad2: .asciiz "\nL2 : "
4      lad3: .asciiz "\nL3 : "
5      invalido: .asciiz "\Invalido"
6      valido: .asciiz "\nValido"
7  .text
8  main:
9      li $v0, 4
10     la $a0, lad1
11     syscall
12     li $v0, 5
13     syscall
14     move $t1, $v0
15     li $v0, 4
16     la $a0, lad2
17     syscall
18     li $v0, 5
19     syscall
20     move $t2, $v0
21     li $v0, 4
22     la $a0, lad3
23     syscall
24     li $v0, 5
```

```

25      syscall
26      move $t3,$v0
27      add $t4, $t1, $t2
28      add $t5, $t2, $t3
29      add $t6, $t1, $t3
30      bge $t3, $t4, TINV
31      bge $t2, $t6, TINV
32      bge $t1, $t5, TINV
33      b TVAL
34  ✓    TVAL:
35      |    li $v0, 4
36      |    la $a0, valido
37      |    syscall
38      |    b FIN
39  ✓    TINV:
40      |    li $v0, 4
41      |    la $a0, invalido
42      |    syscall
43      |    b FIN
44      FIN:
45      jr $ra

```

SQL CONSOLE

OUTPUT

TERMINAL

DEBUG CONSOLE

PROBLEMS

```
Copyright 1990-2010, James R. Larus.  
All Rights Reserved.  
See the file README for a full copyri  
(spim) load "e3.s"  
(spim) run
```

```
L1 : 2
```

```
L2 : 3
```

```
L3 : 2
```

```
Valido(spim) reinitialize
```


4. Ejercicio 4

```
1  ✓ .data
2      xum: .asciiz "\nIngrese un numero: "
3      num: .asciiz "\nEl numero  "
4      esM: .asciiz " si es multiplo de "
5      noesM: .asciiz " no es multiplo de "
6  ✓ .text
7      main:
8          li $t1, 1
9          li $t2, 21
10         li $v0, 4
11         la $a0, xum
12         syscall
13         li $v0,5
14         syscall
15         move $a1, $v0
16  ✓ LLAFE:
17         beq $t2, $t1, Exit
18         div $t1, $a1
19         mfhi $t3
20         beq $t3, 0, Multiplo
21  ✓ NoMultiplo:
22         li $v0, 4
23         la $a0, num
24         syscall
25         move $a0 $t1
26         li $v0, 1
27         syscall
28         move $t1 $a0
29         li $v0, 4
30         la $a0, noesM
```


31			syscall
32			move \$a0 \$a1
33			li \$v0, 1
34			syscall
35			move \$a1 \$a0
36			add \$t1, \$t1, 1
37			j LLAFE
38			Multiplo:
39			li \$v0, 4
40			la \$a0, num
41			syscall
42			move \$a0 \$t1
43			li \$v0, 1
44			syscall
45			move \$t1 \$a0
46			li \$v0, 4
47			la \$a0, esM
48			syscall
49			move \$a0 \$a1
50			li \$v0, 1
51			syscall
52			move \$a1 \$a0
53			add \$t1, \$t1, 1
54			j LLAFE
55		Exit:	
56		jr \$ra	

```
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
(spim) reinitialize
Loaded: /usr/lib/spim/exceptions.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
(spim) load "e4.s"
(spim) run
```

Ingrese un numero: 3

```
El numero 1 no es multiplo de 3
El numero 2 no es multiplo de 3
El numero 3 si es multiplo de 3
El numero 4 no es multiplo de 3
El numero 5 no es multiplo de 3
El numero 6 si es multiplo de 3
El numero 7 no es multiplo de 3
El numero 8 no es multiplo de 3
El numero 9 si es multiplo de 3
El numero 10 no es multiplo de 3
El numero 11 no es multiplo de 3
El numero 12 si es multiplo de 3
El numero 13 no es multiplo de 3
```

SQL CONSOLE	OUTPUT	TERMINAL	DEBUG CONSOLE	PROBLEMS
		El numero 14 no es multiplo de 3		
		El numero 15 si es multiplo de 3		
		El numero 16 no es multiplo de 3		
		El numero 17 no es multiplo de 3		
		El numero 18 si es multiplo de 3		
		El numero 19 no es multiplo de 3		
		El numero 20 no es multiplo de 3(spim) <input type="text"/>		

Unix, Unicode and C++, Woz S.