#### ESTRUCTURA DE COMPUTADORES

#### Grado en Ingeniería Informática

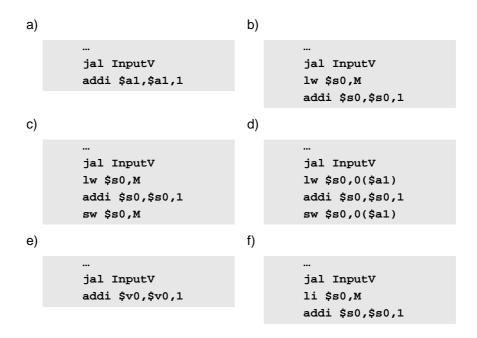
Lab session 9

# Variables and parameter passing: Questions

### **Exercise 1: Parameter passing by reference**

After understanding program "09\_exer\_01.s", load it and run it with the Simulator. Feel free to format it and add comments to make their purpose clearer.

- Where is the value of the read variable? **Experimental technique:** look at the *data segment* window on the simulator.
- If the main program intends to add 1 to variable M that just comes to read with InputV, Which of the following options are correct?



Once you have ended exercise 1 and have verified that the program works, answer the following questions:

- In which memory address R variable is stored?
- Run the program with values M=5 and Q=-5, then look at the program data segment and get the values of variables M, Q y R stored in main memory, what are their addresses?

# **Question pool**

- 1. Indicate with what machine instructions will be translated the pseudoinstruction lw \$t0, var if the address of variable var (that is the value of label var) is:
  - 0x1000
  - 0x100000
  - 0x101000
- 2. Suppose that the address of variable A is 0x10000000. Compare the following two code fragments that are equivalent:

```
      lw $t0, A
      la $t0, A

      addi $t0, $t0, 1
      lw $t1, 0($t0)

      sw $t0, A
      addi $t1, $t1, 1

      sw $t1, 0($t0)
```

Which one of the corresponding machine codes will be shorter?

3. Consider the following code fragment:

```
aacute: .asciiz "á"

lb $t0, aacute
```

What value will have register \$t0 after its execution? What value will have it if instead of 1b we will used 1bu? Which one of the two instructions is more correct in this case?

4. Do the test on the simulator: add instruction addi \$ra,\$ra,-4 at the end of function InputS, just before instruction jr \$ra, and make a program to call it, what happens? Explain the observed behavior.