

Sample questions for CS 318, exam 1 (MIPS assembly)

Most of the questions are multiple choice/true false or fill-in-the-blank. Some involve short answers or a little bit of code. Samples appear below:

1. A byte contains 8 bits. How many bits are in a word?
2. The `$a0` register is used to store a return address from a function call.
T/F
3. If a function, called by the main procedure, is to use `$s2` to store local data, describe what that function should do in order to adhere to the calling convention that we studied?
4. You wish to copy the contents of register `$t1` to `$t2` by using the stack as an intermediate location. Provide the code that does this.
5. Register `$t1` contains an integer. Write code that decrements the value in `$t1` by one.
6. The instruction, `jr`, is used to jump to a given label, like: `"jr loop"`.
T/F.
7. Explain how the instruction `"beq $s1, $s2, done"`, once it has been assembled into machine language, determines the address of `done` when it is executed.
8. The following pushes a single byte onto the stack. T/F:
`lb $s1, ($t0)`
`sb $s1, 4($sp)`
9. Explain what is potentially wrong with the following:
`sw $s1, 2($sp)`
10. Using the following changes the right byte of `$s0` to 11111111. T/F
`ori $s0, $s0, 0xff`

Answers:

1. 32
2. F
3. \$s2 should be pushed on the stack before using it. Then, before returning from the function, the stack should be popped and the value placed in \$s2.
4.

```
sw    $t1, -4($sp)
lw    $t2, -4($sp)
```
5.

```
addi  $t1, $t1, -1
```
6. F
7. The machine instruction stores the number of bytes (offset) that must be added to the pc register to give the address of the location of the label done.
8. F
9. \$sp must always contain a value that is a multiple of 4. The given instruction adds 2 to \$sp to access the stack, but this would not be an address on a word boundary (not a multiple of 4). Invalid.
10. F; this changes the left three bytes of \$s0 to zeros and keeps the right byte as it is currently defined.