

Computer Organization and Operating System Design  
(CSE 500)

Quiz 2  
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(10 pts)

## Multiple Choice (20 pts)

1. On MIPS, how are function arguments are passed? (2 pts)
  - (a) On the stack
  - ☒ (b) In registers
  - (c) By osmosis
  - (d) Via telepathy
2. On MIPS, where is the current function's return address stored? (2 pts)
  - (a) In the cloud
  - (b) On the stack
  - (c) On the heap
  - ☒ (d) In a register
3. What is the length of MIPS instructions? (2 pts)
  - (a) 1 byte
  - (b) 4 bytes
  - (c) Variable
  - ☒ (d) 32 bytes
4. What is the private work space dedicated to a function called? (2 pts)
  - ☒ (a) Stack Frame
  - (b) Heap
  - (c) Reserve
  - (d) Allocation
5. In the case of nested function calls, where are the return addresses of previous functions (i.e. not the current function) stored? (2 pts)
  - (a) Heap
  - (b) OS Memory
  - (c) Registers
  - ☒ (d) On the stack

6. In the case of nested function calls, where are the arguments that were passed to previous functions (i.e. not the current function) stored? (2 pts)
- (a) Heap
  - (b) OS Memory
  - ☒ (c) Registers
  - (d) On the stack
7. Which of the following is NOT a MIPS instruction format? (2 pts)
- (a) R-format
  - (b) I-format
  - ☒ (c) Z-format
  - (d) J-format
8. Which instruction should be used to return to the calling function? (2 pts)
- (a) `jl $ra`
  - ☒ (b) `jr $ra`
  - (c) `jump $ra`
  - (d) `j $ra`
9. The instruction `addi $sp, $sp, -20` will allocate enough room on the stack to save how many registers? (2 pts)
- ☒ (a) 1
  - (b) 3
  - (c) 5
  - (d) 20
10. Assuming that `x` is stored in register `$s0`, choose the MIPS assembly instruction that performs a right shift of `x` by 20 bits and stores the result back in `x` (e.g. `x = x >> 20`; in C). (2 pts)
- (a) `sll $s0, $s0, 5`
  - (b) `srl $s0, $s0, 5`
  - (c) `sll $s0, $s0, 20`
  - ☒ (d) `srl $s0, $s0, 20`

### Short Answer (20 pts)

For all of the following questions, assume MIPS architecture.

1. Which MIPS instruction format is used for the `sw` instruction? (4 pts)

I FORMAT

2. Which MIPS instruction format is used for the `addi` instruction? (4 pts)

I FORMAT

3. Which MIPS instruction format is used for the `add` instruction? (4 pts)

R FORMAT

4. Which MIPS instruction format is used for the `jal` instruction? (4 pts)

J FORMAT

5. Which MIPS instruction format is used for the `slt` instruction? (4 pts)

R FORMAT