Name your quiz file **2240/4/quiz4.txt** or **2240/4/quiz4.jpg**

1. What is the advantage of a programming language that supports
   a runtime stack?

        A. Programs will run faster than without it.
        B. A runtime stack is a queue.
        C. Nested procedure calls and recursion are possible.
        D. Multiple programs can run at once.

2. What does this instruction do?

        sw $v0, 4($sp)

        A. Stores a value into a register.
        B. Stores a value into $v0.
        C. Stores the value $v0+4 onto the stack.
        D. Stores a value onto the stack.

3. What does this instruction do?

        addi $sp, $sp, -32

        A. Adds 32 to the stack pointer.
        B. Changes the stack pointer by 8 bytes.
        C. Changes the stack pointer by 32 bytes.
        D. Stores the value -32 onto the stack.

4. What does this instruction do?

        lw $a0, 4($fp)

        A. Stores a value directly into register $fp.
        B. Stores a value directly into register $a0.
        C. Stores four values into $a0 starting at $fp.
        D. Stores a value onto the stack.

5. After the following statement executes, what do you know to be true?

        lw $v0, 4($sp)

        A. The stack pointer will be incremented by 4.
        B. $v0 will contain the value in register $sp.
        C. $sp will be incremented by 1.
        D. $sp did not change.

6. What does this instruction do?

   jr $ra

   A. Jumps to a label named $ra.
   B. Calls a function or procedure.
   C. Jumps to the address stored in a register.
   D. Returns to the statement that it branched from.

7. Your program calls a function. When the function begins, it constructs
   a stack frame, because it might be calling a function itself.
   What register should the function always save on the stack?

8. You are writing a MIPS program that calls a function that begins at
   label **display_value:**. The function expects one argument. Please write the MIPS
   program statements that will call the function while passing the value 125
   as an argument. Just two lines are required.

9. What is the purpose of caller-saved registers?

   A. to protect values that the callee might change.
   B. to pass values from the caller to the callee.
   C. to save values the callee will need.
   D. to calculate space needed by the callee.

10. When a problem is solved by solving ever smaller instances of the same
    problem, it is called...

   A. retention
   B. recursion
   C. iteration
   D. fracturing

11. You wrote a MIPS subroutine that multiplies the values in $a0 and $a1.
    How will you return the product to the caller?