EGC442 Problem Set 5 Dr. Izadi

First Name:_____ Last Name: _____

Assume $s3 has 5000, and words addressed 5000..5006 have the data shown:
5000: 0x99
5001: 0x77
5002: 0x23
5003: 0x4E
5004: 0x2A
5005: 0x84
5006: 0xFE

1) What address will be computed by:
   lw $t0, 2($s3)

2) What value will be put in $t0 by:
   lw $t0, 0($s3)

3) What value will be put in $t1 by:
   lw $t1, 2($s3)

4) Assume $s2 has 5001. What value will be put in $t2 by:
   lw $t2, 1($s2)

5) Each word consists of _____ bytes.
   - 1
   - 4
   - 8

6) Does every byte in memory have a unique address?
   - Yes
   - No

7) An array A has a base address of 2000. A[0] is thus at address 2000. What is the address of A[1]?
   - 2000
   - 2001
   - 2004

8) An array A has a base address of 2000. What is the address of A[9]?
   - 2009
   - 2036
   - 2040

9) Assuming $s3 has 5000, is the following an acceptable instruction?
lw $t0, 3($s3)
   - Yes
   - No

10) Consider the 32-bit binary number 11100000 00000000 00000000 00000001, stored in the word with address 5000. For a big-endian architecture, what value is stored in byte 5003?
   - 11100000
   - 00000000
   - 00000001

11) If $s3 has 900, what address does this instruction compute?
sw $t0, 20($s3)

12) If $s3 has 900, $t0 has 77, and memory locations 900, 904, and 908 have 10, 15, 20 respectively, what do those locations have after the following instruction?

sw $t0, 4($s3)

13) Determine the machine code for add $t5, $s0, $s1

14) Determine the machine code for lw $t0, 32($s3)

15) What type of instruction is add?
   - R-type
   - I-type

16) What type of instruction is addi (add immediate)?
   - R-type
   - I-type

17) What type of instruction is sw (store word)?
   - R-type
   - I-type

18) For both add and addi instructions, field 3 (rt) represents a register.
   - True
   - False

19) Because I-type instructions involve a constant, an I-type instruction uses more bits.

- True
- False

20) Translate addi $t7, $t4, 5 to the corresponding MIPS machine language code.

21) Opcode 35 indicates a _____ instruction.

22) Opcode 0 and a funct field of 34 indicates a(n) _____ instruction.

23) Which MIPS instruction does the following represent?

op	rs	rt	rd	shamt	funct
0	8	9	10	0	34

- sub $t0, $t1, $t2
- add $t2, $t0, $t1
- sub $t2, $t1, $t0
- sub $t2, $t0, $t1