

Name:

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ICS 233, Term 141

Computer Architecture & Assembly Language

Quiz# 3

Date: Sunday, Nov. 2, 2014

Q1. Fill in the blank in each of the following questions:

(1) Assuming variable Array is defined as shown below:

Array: .byte 1, -1, 2, -2, 3, -3, 4, -4

The content of register \$t0 after executing the following sequence of instructions is _____.

```
la $t0, Array
lh $t0, 2($t0)
```

(2) Assume that the instruction `j NEXT` is at address `0x00400094` in the text segment, and the label `NEXT` is at address `0x0040008C`. Then, the address stored in the assembled instruction for the label `NEXT` is _____.

(3) Assume that the instruction `bne $t0, $t1, NEXT` is at address `0x00400094` in the text segment, and the label `NEXT` is at address `0x0040008C`. Then, the address stored in the assembled instruction for the label `NEXT` is _____.

(4) Assuming that `$a0` contains an Alphabetic character, the single instruction _____ will convert an upper case character in `$a0` to a lower case, and a lower case to an upper case. Note that the ASCII code of character 'A' is `0x41` while that of character 'a' is `0x61`.

Q2. Write separate MIPS assembly code fragments to do the following minimizing the number of executed instructions (Pseudo instructions can be used):

- i. Count the number of 0's in register \$a0 and store the result in \$v0. Assume that the number of 0's is larger than the number of 1's in register \$a0. Assume that the content of register \$a0 needs to be preserved.

- ii. Implement the following high-level statement assuming that the registers contain signed numbers:

```
if ( ($s1 > 10 || $s1 <= 100) && $s1 > $s2) {$s3 = 1;}
```