Name: KEY **Id#**

ICS 233, Term 081

Computer Architecture & Assembly Language

Quiz# 3

Date: Wednesday, Nov. 26, 2008

Q.1. Consider the definitions given in the data segment below. Determine what is printed by each of the following sequence of MIPS instructions:

```
.data
   Msg1: .ascii "Welcome to "
   Msg2: .ascii "ICS "
   X:    .byte 0x32, 0x33, 0x33, 0
```

1.
```
la $a0, Msg1
li $v0, 4
syscall
```
Welcome to ICS 233

2.
```
la $a0, X
lb $a0, ($a0)
li $v0, 1
syscall
```
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3.
```
la $a0, X+1
lb $a0, ($a0)
li $v0, 11
syscall
```
3

Q.2. Determine the output produced by the following program. What functionality is the code implementing?

```
1.      li      $a0, 21
2.      li      $a1, 14
3.      jal     myfunction
4.      addu    $a0, $v0, $zero
5.      li      $v0, 1
6.      syscall
7.      j end
myfunction:
8.      bnez    $a1, else
9.      addu    $v0, $zero, $a0
10.     jr      $ra
else:
11.     addiu   $sp, $sp, -4
12.     sw      $ra, ($sp)
13.     addu    $t0, $zero, $a0
14.     addu    $a0, $zero, $a1
15.     remu    $a1, $t0, $a1     # $a1= $t0 % $a1 (i.e. remainder)
16.     jal     myfunction
17.     lw      $ra, ($sp)
18.     addi    $sp, $sp, 4
19.     jr      $ra
end:
```

The program will display 7, which is the greatest common divisor of the two numbers passed to the procedure.

Syscall Services

Service	$v0	Arguments / Result
Print Integer	1	$a0 = integer value to print
Print String	4	$a0 = address of null-terminated string
Print Char	11	$a0 = character to print