CS 3843 Computer Organization Fall 2013

Quiz 4 Name (Last, First)_____, _____

(9 points) Problem 1: please determine whether the following instruction is TRUE or FALSE, and if FALSE, and what's wrong with each line?

1) movl (%eax), 0x4(%esp) TURE ( ) FALSE (X)

   If FALSE, explain why?

   Ans: Cannot have both source and destination be memory address.

2) movb $0xFF, (%al) TURE ( ) FALSE (X)

   If FALSE, explain why?

   Ans: Cannot use %al as address register

3) movl %eax, 0xF(%edx) TURE (X) FALSE ( )

   If FALSE, explain why?

4) movl %cx, (%edx) TURE ( ) FALSE (X)

   If FALSE, explain why?

   Ans: Mismatch between instruction suffix and register ID.

5) movl %ecx, %dx TURE ( ) FALSE (X)

   If FALSE, explain why?

   Ans: Destination operand incorrect size.

6) movl %eax, $0xFFD TURE ( ) FALSE (X)

   If FALSE, explain why?

   Ans: Cannot have immediate as destination

(11 points) Problem 2: Based on the assembly code, (a) (5 points – 1 point per line) comment each assembly instruction and (b) (6 points) fill in the missing portion of the C code.

The portion of the generated assembly code implementing these expressions is as follows:

x at %ebp +8, *y* at %ebp+12, *z* at %ebp +16

```
1. movl   12(%ebp),  %eax    // y into %eax
2. xorl   8(%ebp), %eax      // %eax = y^x
```

```
3. sall    $3, %eax          //  %eax << 3
4. notl    %eax              // %eax = ~%eax
5. subl    16(%ebp), %eax    //  %eax = %eax - z
```

The expression of the C code:

```
1.  int arith (int x, int y, int z) {
2. {
3.      int t1 = ___x^y_____________(4 points);
4.      int t2 = ___t1<<3_________ (4 points);
5.      int t3 = ___~t2_____________(4 points);
6.      int t4 = ____t3-z___________(3 points);
7.      return t4;
8.      }
```