**Quiz 3, COMP 2130, Winter 2013**

Student Name: Student Number:

1. (6 marks) Assume the following values are stored at the indicated memory address and registers.

Address Value Register Value

0x210 0xF5 %ebx 0x214

0x214 0xC8 %ecx 0x4

0x218 0x210 %edx 0x10

0x21C 0x218 %ebp 0x210

Fill the following table showing the values for the indicated operands:

 Operand Value

 %ecx

 (%ebx)

 4(%ebp, %ecx)

Fill the following table showing the values for the instructions:

 Instruction Value in

 movl (%ebp), %eax %eax

 movl 12(%ebp), %edx (%edx)

 addl (%ebx), %ecx %ecx

1. (3 marks) What value will be in %eax at the end of the following code:

*Initially 8(%ebp) has 10, and 12(%ebp) has 50.*

movl 8(%ebp), %ecx

movl 12(%ebp), %ebx

cmpl %ebx, %ecx # cmpl D, S -> S is compared to D

jge .L2

leal 8(%ebx, %ebx, 5), %eax

jmp .L1

 .L2

addl %ecx, %eax

 .L1

1. (3 marks) A C function fun() has the following code body:

d += \*p;

return d;

The IA32 code implementing this body is as follows:

movl 8(%ebp), %eax # the first parameter

movl 12(%ebp), %edx

addl (%edx), %eax

Write the definition of function fun(), showing the data types and ordering of the parameters p and d.

1. (3 marks) Write a goto version of the following code:

int loop\_while(int a, int b)

{

 int r = 1;

 while(b > a) {

 r \*= (a + b);

 b--;

 }

 return r;

}

1. (5 marks) Translate the following IA32 assembly code into C code. (You need to start with variable declarations.)

 movl $0, %ecx

 movl $32, %edx

.L2:

 movl %edx, %eax

 andl $1, %eax

 addl %eax, %ecx

 decl %edx

 jne .L2