**COMP 2130, Fall 2012**

**Quiz 4, November 16, 2012**

Student Name: Student Number:

1. (1 mark) List two jobs that linkers do.
2. (1 mark) List the three types of object files.
3. (2 marks) A C function fun() has the following code body:

\*p += d;

return;

The IA32 code implementing this bod is as follows:

movl 12(%ebp), %edx

movl 8(%ebp), %eax; // the first parameter

addl %edx, (%eax);

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

1. (2 marks) Write a goto version of the following code:

int absdiff(int a, int b)

{

 int c;

 if (a < b)

 c = b – a;

 else

 c = a – b;

 return c;

}

1. (2 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. (2 marks) What values will be in %eax, %ecx, and 12(%ebp) at the end of the following code:

*Initially 8(%ebp) has 5, and 12(%ebp) has 2.*

movl 8(%ebp), %edx

movl %edx, %eax

movl 12(%ebp), %ecx

addl %ecx, %eax

decl %eax

subl %eax, 12(%ebp)

1. (2 marks) What values will be in %eax at the end of the following code:

*Initially 8(%ebp) has 5, and 12(%ebp) has 2.*

movl 8(%ebp), %ecx

movl 12(%ebp), %ebx

cmpl %ebx, %ecx // cmpl D, S -> S – D is compared

jle .L2

movl %ebx, %eax

jmp .L1

 .L2

movl %ecx, %eax

 .L1

1. (2 marks) Translate the following C code into IA32 assembly code:

// *Use %eax for r, %ebx for x, and %ecx for y.*

r = y – x;

if (x > y)

 r = x – y;

1. Bonus question: For the following user defined data type,

struct Node {

 char name[128];

 struct Node \*left, \*right;

}

1. (2 marks) Write a function that

allocates the memory space for **Node**,

reads a name from the user and saves the name into the memory space,

initializes **left** and **right** with **NULL**, and

returns the reference of the memory space.

1. (1 mark) Write a function that has a parameter of **struct Node\***, and prints the name in the node pointed by the parameter.