**Quiz 4, COMP 2130, Winter 2013**

Student Name: Student Number:

1. (1 mark) List two main jobs that linkers do for linking object codes.
2. (1 mark) List the two types of libraries and compare them.
3. (1 mark) In virtual addressing what hardware component translates virtual addresses to physical addresses?
4. (1 mark) List the three advantages of using virtual memory.
5. (2 marks) Explain what is wrong in the following code.

x = malloc(M \* sizeof(int));

 ...

free(x);

...

y = malloc(M \* sizeof(int));

for (i = 0; i < M; i++)

 y[i] = x[i]++;

1. (2 marks) Explain what is wrong in the following code, and fix the part.

int search(long \*p, long value)

{

 int i;

 while (\*p >= 0 && \*p != value) {

 p += sizeof(long);

 i++;

 }

 return i;

}

1. (2 marks) What value will z have at the end of the following code:

x = 1000; y = 800;

\*q = y;

\*p = x;

z = \*q;

1. (2 marks) Optimize the following code in two different ways.

 for (i = 0; i < get\_length(data); i++)

 \*sum = \*sum + get\_value(i);

1. (2 marks) Compute the average time (in ms) to access a sector on the following disk:

Rotation rate: 10,000 RPM; average seek time: 5 ms; average number of sectors / track: 500

1. (2 marks) Compare DRAM and SRAM in terms of cost and access time.
2. (2 marks) In the following code, what data references have spatial locality? What data references have temporal locality? (You will need to think all the data references and instruction references.)

x = 0;

for (i = 0; i < N; i++)

 x \*= a[i];

return x;

1. (2 marks) Optimize the following function to initialize all the elements in an array with 0.

#define N 100

#define M 10

typedef struct {

 int x[M];

 int y[M];

} location;

//---------------------

void clear(location loc[], int n, int m)

{

 int i, j;

 for (j = 0; j < m; j++)

 For (i = 0; i < n; i++) {

 loc[i].x[j] = 0;

 loc[i].y[j] = 0;

 }

}