Name/PID: _____

COMP520: Written Assignment 3

Q1. **MiniJava Errors**.

Given the following miniJava program:

```
class A {
     boolean p;
     int a;
     int b;
     int c;
     private A d;
     static A[] v;
     void f(int x){
          
     }
}
```

Consider the following error types (this is like a word bank for this assignment):

scan, parse, id, type, none

If you fill in the orange box with the code given. What error type is generated? If it is an error, explain why.

Code	**Error**	**Why?**
a++;		
if (p && p || a >> 2) …		
if (a < b != c)		
// a++;		
c = b + a;		
d.a = d.d.a + 1		
A.v[d.b] = 4;		
/* hi //		
f(d.p);		
A newA = new A(x);		
return true;		
d.b = this.b == 6;		
System.out.println(f(c));		
v[c] = v[c] + 1;		
int x = 6;		

Q2. **Getting familiar with x86.** This next series of questions is to prepare you for PA4. You should use the resources we go over in lecture on Friday and those that are listed on the assignments page.

Concisely describe the bits in the REX prefix. Describe which bit in the REX prefix each flag is, and what that flag does to operands in an instruction

2a. Describe REX.W

2b. Describe REX.R

2a. Describe REX.X

2b. Describe REX.B

Q3. **Memory Layout**. We need to better understand the memory layout of our target operating system. This is a necessary piece of research whenever constructing a compiler.

3a. How is a stack frame constructed and deconstructed? (Hint: This should take two lines for each..)

3b. What is the smallest allowable and compliant size (in bytes) of the following class when instantiated on an x64 system?

```
class A {
   private B b;
   private A a;
}
```

3c. What about this one?

```
class B {
   public int i;
   public A a;
   private B[] b;
}
```

Q4**. Understanding Assembly.** Describe what the following code does in 64-bit mode. You should provide a short explanation for each line.

```
Line 1: mov rcx,0x10
Line 2: xor rax,rax
Line 3: lea rdi,qword ptr[rbp-8]
Line 4: rep stosq
```