Student Name - _____

Advance Java Midterm - CIS 35B - Total points - 60. Time allowed 90 mins.
Open book and notes.

Ques 1 – 10 points

The following program contains code to handle different kinds of exceptions. Read it carefully in order to answer the questions that follow.

```
public class Exceptional {
    public static void main(String args[]) {
        int w,x,y,z;
        w = x = y = z = -6;
        try {
            int[] someData = {0, 11, 71, 35, 99, 45};
            int[] myArray = null;
            int[] noData = {};
            System.out.println("Test 1:");
            w = foo(myArray, 2);
            System.out.println("Test 2:");
            x = foo(someData, 3);
            System.out.println("Test 3:");
            y = foo(someData, 5);
            System.out.println("Test 4:");
            z = foo(noData, 0);
        } catch (Exception e) {
            System.out.println("Hmmm... what happened?");
        }
        System.out.println("w="+w + "  x="+x + "  y="+y + "  z="+z);
    }

    public static int foo(int[] a, int n) throws Exception {
        int result = 0;
        try {
            for (int i = 0; i < n; i++)
               result += a[i];
               result = i +  a.length;
             return result;
        } catch (ArrayIndexOutOfBoundsException aioobe) {
            System.out.println("Oops!");
        } catch (NullPointerException npe) {
            System.out.println("Oh, my goodness!");
        } catch (ArithmeticException ae) {
            System.out.println("Bad news.");
            throw ae;
        } finally {
            System.out.println("result = " + result);
        }
        return result;
    }
}
```

a. Provide the output that would result from executing the above program.
b. Suppose the line return result; was moved into the finally clause just after the println statement. Would the output be different? If so, write how it would differ. If not, explain why not.

Answer - Syntax error -

If braces are added in the for loop then the answer would be -
Test 1:
Oh, my goodness!

```
result = 0
Test 2:
result = 8
Test 3:
result = 10
Test 4:
result = 0
w=0  x=8  y=10  z=0

If return result was moved, then the result would be -
Test 1:
Oh, my goodness!
result = 0
Test 2:
result = 8
Test 3:
result = 10
Test 4:
result = 0
w=0  x=8  y=10  z=0
```

Ques 2 – 10 points

a. How can Generics be used to implement Polymorphism. Demonstrate with a coded example.

Any generic with a different type passed for same methods (without overloading or overriding is polymorphism.

Ques 3 - 10 points

Is the following piece of code correct? If not how would you go about writing a swap in Java?

```
public void swap(Object a, Object b) {
 Object temp = a;
 a = b;
 b = temp;
}
```

Nope - Pass an array.

Ques 4 – 10 points

1. Explain the three main elements that signify overhead for Hashing in Java.
2. Can we create objects using an Interface? If so, provide an example
3. Can we add static methods in an interface?
4. What is the behavior of overriding static methods in a concrete class?

Ques 5– 10 points

Suppose in Java you had the following class hierarchy:

```
class A {}
class B extends A {}
class D extends B {}
class C extends A {}
class E extends D {}
```

and suppose you had the following overloaded method definitions:

```
static void f(A a, D d) {}
static void f(B b, A a) {}
static void f(C c, D d) {}
```

Now consider the following invocations of f:

```
f(new A(), new E()); //calls - static void f(A a, D d) {}
f(new C(), new A()); //Error
f(new C(), new E()); //calls - static void f(C c, D d) {}
f(new B(), new D()); //Error
```

For each of these invocations, explain which f is called and why, or, if a call represents an error, explain why it is an error and whether the error is reported by the compiler or the runtime system.

Ques 6 - 10 points

a. Create a custom template called Resume with at least two parameter that can be passed to template, with at least two complete features that can be used with any of the two parameters

```
public class Resume<T, X> {
	// T stands for "Type"
	private T t;
	private X a;

	Resume(T t, X a) {
		this.t = t;
		this.a = a;
	}

	public void printresume(T t) {
		this.t = t;
	}

	public void setValues(T t, X a) {
		this.t = t;
		this.a = a;

	}
}
```

b. When creating an API, what is the significance of internal and external data types?

Lab 2 - Think of external and internal data types and its advantages.