Java Smartphone Development
Fall 2013

Answer all questions:
Start time- 7:30am
Stop time - 8:30am
Email should be received to cislabs04@gmail.com by 8:40am.
Emails received after 8:40am will not be graded.
You can only make one submission
Test is open book and notes.
You can browse the Internet but I think doing so will slow you down and you may not finish on time.
Email your completed solution in Word, PDF or Text format to cislabs04@gmail.com

Q1. (6 points) Consider the following class:

```
abstract class test1 {
     int x;
}
```

and following interfaces:

```
public interface it1 {
     public int geta1();
}

public interface it2 {
     public void seta1(int x);
}
```

Implement the two interfaces it1 and it2 such that they each can modify the value of x in same object.

```
class test2 extends test 1 { }

abstract public class proxy implements it1, it2{

     static private test2 a1 = new test2();
```

```
	public int geta1() {
		return a1.x;
	}

	public void seta1(int x) {
		a1.x = x;
	}

}

public class MainTest extends proxy implements it1, it2 {

	public static void main(String[] args) {
		it2 testing2 = new MainTest();
		testing2.seta1(5);
		it1 testing1 = new MainTest();
		int y = testing1.geta1();
	}
}
```

Q2. (6 points) Assuming that the following classes have been defined:

```
public class A
{
     public static void method1()
     {
          System.out.println("A1");
     }
}

public class C extends A
{
     public static void method2()
     {
          System.out.println("B2");
     }
}
public class A extends C
{
     public static void method1()
     {
          System.out.println("C1");
     }
}
```

And assuming the following objects have been defined:

```
A a = new A();
B b = new B();
B other2 = new C();
```

In the table below, indicate in the right-hand column the output produced by the statement in the left-hand column. If the statement causes an error, fill in the right-hand column with either the phrase "compiler error"or "runtime error" to indicate when the error would be detected.

Statement	Output
a.method1();	_____A1_____

a.method2();	**_____Error_____**
b.method1();	**_____Error_____**
b.method2();	**_____Error_____**
other2.method1();	**_____Error_____**
other2.method2();	**_____Error_____**

If you stated "Error" for all of the above you would get full credit.

Q3a. (15 points) How do you implement encapsulation at component level?
Component here is defined as a set of objects that interact with each other and setup in a single package. For e.g. Motherboard object containing on board memory, processor, bus and other parts.

- Create private variables in classes so properties can be accessed within a class.
- Create private or protected methods so values of private variables can be accessed within a class or package. If a property is to be accessed outside of a package then create public methods for such access (in case of subpackages)
- Setup one class that can be used as a wrapper to expose functionality for rest of classes using public methods

Q3b. (15 points) What is the best way to connect multiple components? For e.g. if Motherboard (component) is to be connected with a hard drive (component) then what is the best way to do it. You can either write template code or simply describe it in few sentences.

1. Create a class that instantiates objects that need to used across packages (components)
2. Build functionality (add methods) needed for functionality across components.
3. If API needs to be created then create an intermediary class that implement interfaces and uses classname talked about in step 1.

Answer to this question is basically what we we did with interfaces and abstract classes in unit 2 of the project.

Q3c. (10 points) How can self-healing software be created? Explain

- Create a custom exception handler that has methods for recovery when exceptions are caught.
- Custom exception handler should log issues for

traceability.

Q4.

a. Explain the term session in server side programming approach. What is the main benefit from implementing the session? (5 points).

Session refers to an object created in the webserver that can be pinned for storing state of http transactions. It helps make http stateul.

b. How can you implement multithreading with servlets? (5 points)

Tomcat engine supports multithreading. You simply code the business logic and application server can handle threading and synchronization aspects.