**Assignment 3**

1. Explain polymorphism.
2. What is overloading?
3. What is overriding?
4. What does the final mean in this method: public void doSomething(**final** Car aCar){}
5. Suppose in question 4, the Car class has a method setColor(Color color){…}, inside doSomething method, Can we call aCar.setColor(red);?

Yes

1. Can we declare a static variable inside a method?

No

1. What is the difference between interface and abstract class?
2. Can an abstract class be defined without any abstract methods?

Yes

1. Since there is no way to create an object of abstract class, what’s the point of constructors of abstract class?

In abstract class, we have an instance variable, abstract methods, and non-abstract methods. We need to initialize the non-abstract methods and instance variables, therefore abstract classes have a constructor.

1. What is a native method?

Native methods are **Java™ methods that start in a language other than Java**.

1. What is marker interface?

It is an empty interface (no field or methods). Examples of marker interface are Serializable, Cloneable and Remote interface.

1. Why to override equals and hashCode methods?

You must override hashCode() in every class that overrides equals(). Failure to do so will result in a violation of the general contract for Object.hashCode(), which will prevent your class from functioning properly in conjunction with all hash-based collections, including HashMap, HashSet, and Hashtable.

1. What’s the difference beween int and Integer?

Primitive type and its wrapper class

1. What is serialization?

Serialization in Java is **a mechanism of writing the state of an object into a byte-stream**.

1. Create List and Map. List A contains 1,2,3,4,10(integer) . Map B contains ("a","1") ("b","2") ("c","10") (key = string, value = string)

Question: get a list which contains all the elements in list A, but not in map B.

1. Implement a group of classes that have common behavior/state as Shape. Create Circle, Rectangle and Square for now as later on we may need more shapes. They should have the ability to calculate the area. They should be able to compare using area. Please write a program to demonstrate the classes and comparison. You can use either abstract or interface. Comparator or Comparable interface.