**Assignment 3**

1. Explain polymorphism.

Polymorphism is one of the core concepts of object-oriented programming (OOP) and **describes situations in which something occurs in several different forms**.

1. What is overloading?

Overloading **allows different methods to have the same name, but different signatures where the signature can differ by the number of input parameters or type of input parameters or both**.

1. What is overriding?

Overriding means **having two methods with the same method name and parameters**

1. What does the final mean in this method: public void doSomething(**final** Car aCar){}

A final variable can be explicitly initialized only once. A reference variable declared final can never be reassigned to refer to a different object.

1. 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, static means that it's a variable/method of a class, it belongs to the class

1. What is the difference between interface and abstract class?

A class can extend only one abstract class while a class can implement multiple interfaces.

1. 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?

When a concrete subclass is created, it can call super() in its constructor to initialize its fields.

1. What is a native method?

A native method in Java is a method whose implementation is written in other languages such as c and c++.

1. What is marker interface?

The marker interface in Java interfaces with no field or methods or, in simple words empty interface in java is called a marker interface.

1. Why to override equals and hashCode methods?

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?

A int is a data type that stores 32 bit signed two's compliment integer. On other hand Integer is a wrapper class which wraps a primitive type int into an object.

1. What is serialization?

Serialization in Java allows us to convert an Object to stream that we can send over the network or save it as file or store in DB for later usage.

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.