**Assignment 3**

1. Explain polymorphism.

Polymorphism is the ability of an object to take multiple forms. Polymorphism allows the same action performed in different ways.

1. What is overloading?

Overloading allows different methods with the same name to have different signatures.

1. What is overriding?

Overriding allows a child class to provide a specific implementation of a method that is already provided by the parent class. The methods need to have same name and same signature but different implementations.

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

The value of aCar must not be changed within the method body.

1. Suppose in question 4, the Car class has a method setColor(Color color){…}, inside doSomething method, Can we call aCar.setColor(red);?

Yes. Final is only applied on the reference to the aCar object. The object itself can be modified.

1. Can we declare a static variable inside a method? no
2. What is the difference between interface and abstract class?

Interface must not have specific implementations. Interface cannot have constructor. A class can implement multiple interfaces.

Abstract class can have non-abstract classes. A class can extend only one abstract class.

1. Can an abstract class be defined without any abstract methods? yes
2. Since there is no way to create an object of abstract class, what’s the point of constructors of abstract class?

Non-abstract methods in abstract class may need to be initialized for child classes, so constructor is needed.

1. What is a native method?

Native methods are methods in a language other than Java, sometimes needed to access system-specific functions and APIs.

1. What is marker interface?

A marker interface is an interface with no methods or constants. It is only used to provide additional information about the object to JVM.

1. Why to override equals and hashCode methods?

The equals and hashCode methods inherited from object may not function as what we expected the object to be. Overriding the functions allows us to compare the objects as expected.

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

Int is a primitive type. Integer is the wrapper class for int.

1. What is serialization?

Serialization is the process of converting the state of an object into a byte stream so that the byte stream can be reverted back into a copy of the object.

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.