Assignment 3

1. **Explain polymorphism.**
   The most common use of polymorphism in OOP occurs when a parent class reference is used to refer to a child class object.

2. **What is overloading?**
   Overloading occurs when two or more methods in one class have the same method name but different parameters

3. **What is overriding?**
   Overriding occurs when two methods have the same method name and parameters. One of the methods is in the parent class, and the other is in the child class.

4. **What does the final mean in this method: public void doSomething(final Car aCar){}**
   Java always makes a copy of parameters before sending them to methods. This means the final doesn't mean any difference for the calling code. This only means that inside the method the variables can not be reassigned.

5. **Suppose in question 4, the Car class has a method setColor(Color color){…}, inside doSomething method, Can we call aCar.setColor(red);?**
   No.

6. **Can we declare a static variable inside a method?**
   NO.

7. **What is the difference between interface and abstract class?**
   An abstract class allows you to create functionality that subclasses can implement or override. An interface only allows you to define functionality, not implement it.

8. **Can an abstract class be defined without any abstract methods?**
   Yes.

9. **Since there is no way to create an object of abstract class, what's the point of constructors of abstract class?**
   We need to initialize the non-abstract methods and instance variables, therefore abstract classes have a constructor.

10. **What is a native method?**
    This is a non-access modifier that is used to access methods implemented in a language other than Java like C/C++

11. What is marker interface?

A marker interface is an interface that has no methods or constants inside it. It provides run-time type information about objects, so the compiler and JVM have additional information about the object.

12. Why to override equals and hashCode methods?

Create and override the equals and hashCode method of the class.

13. What's the difference beween int and Integer?

Int: Being a primitive data type has got less flexibility. We can only store the binary value of an integer in it.

Integer: Integer is a wrapper class for int data type, it gives us more flexibility in storing, converting and manipulating an int data.

14. What is serialization?

an object can be represented as a sequence of bytes that includes the object's data as well as information about the object's type and the types of data stored in the object.

15. 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.

16. 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.