**Assignment 3**

1. Explain polymorphism.
   - when we have many classes that are related to each other by inheritance. **Polymorphism** uses those methods to perform different tasks. This allows us to perform a single action in different ways.

2. What is overloading?
   define more than one method with the same name in a class with different signatures

3. What is overriding?
   allows a subclass or child class to provide a specific implementation of a method that is already provided by one of its super-classes or parent classes.

4. What does the final mean in this method: public void doSomething(final Car aCar){}
   inside the method the variables cannot 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);?
   - Yes, not the reference but the attribute

6. Can we declare a static variable inside a method?
   - Not , static variable are class level variables

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

| abstract class | interface |
|---|---|
| both declaration and definition part | only a declaration part |
| No multiple inheritance | Multiple inheritance is achieved |
| Constructor | No Constructor |
| static members | No static members |
| | Only public access modifier |
| only one can be used in a class | Multiple interface can be used in a class |

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,

10. What is a native method?
    - Java™ methods that start in a language other than Java. Native methods can access system-specific functions and APIs that are not available directly in Java.

11. What is marker interface?
    - an interface that has no methods or constants inside it.

12. Why to override equals and hashCode methods?
    - we want to check the objects based on the property.

13. What's the difference between int and Integer?
    - int is a primitive data type while Integer is a Wrapper class.

14. What is serialization?
    To convert an object's state to a byte stream so that the byte stream can be reverted back into a copy of 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.