Experiment No.1

Title: Implementations of Classes and Objects in Java
Aim: Understanding the concepts of classes and objects in the Java environment.

Theory:

In object-oriented programming technique, we design a program using objects and classes.
An object in Java is the physical as well as a logical entity, whereas, a class in Java is a logical entity only.

What is an object in Java

An entity that has state and behavior is known as an object e.g., chair, bike, marker, pen, table, car, etc. It can be physical or logical (tangible and intangible). The example of an intangible object is the banking system.
An object has three characteristics:

- **state:** represents the data (value) of an object.
- **Behavior:** represents the behavior (functionality) of an object such as deposit, withdraw, etc.
- **Identity:** An object identity is typically implemented via a unique ID. The value of the ID is not visible to the external user. However, it is used internally by the JVM to identify each object uniquely.

An object is an instance of a class. A class is a template or blueprint from which objects are created. So, an object is the instance(result) of a class.

Object Definitions:

- An object is *a real-world entity*.
- An object is *a runtime entity*.
- The object is *an entity which has state and behavior*.
- The object is *an instance of a class*.

What is a class in Java

A class is a group of objects which have common properties. It is a template or blueprint from which objects are created. It is a logical entity. It can't be physical.
A class in Java can contain:

- **Fields**
- **Methods**
- **Constructors**
- **Blocks**
- **Nested class and interface**

Syntax to declare a class:

```
1. class <class_name>{
2.     field;
3.     method;
4. }
```

Scanner class:

- The Scanner class is a class in java.util, which allows the user to read values of various types. There are far more methods in class Scanner than you will need in this course. We only cover a small useful subset, ones that allow us to read in numeric values from either the keyboard or file without having to convert them from strings and determine if there are more values to be read.
- Class Constructors:
- There are two constructors that are particularly useful: one takes an InputStream object as a parameter and the other takes a FileReader object as a parameter.
- Scanner in = new Scanner(System.in); // System.in is an InputStream
- Scanner inFile = new Scanner(new FileReader("myFile"));
- Numeric and String Methods

Method	*Returns*
int nextInt()	Returns the next token as an int. If the next token is not an integer, InputMismatchException is thrown.
long nextLong()	Returns the next token as a long. If the next token is not an integer, InputMismatchException is thrown.
float nextFloat()	Returns the next token as a float. If the next token is not a float or is out of range, InputMismatchException is thrown.
double nextDouble()	Returns the next token as a long. If the next token is not a float or is out of range, InputMismatchException is thrown.
String next()	Finds and returns the next complete token from this scanner and returns it as a string; a token is usually ended by whitespace such as a blank or line break. If not token exists, NoSuchElementException is thrown.
String nextLine()	Returns the rest of the current line, excluding any line separator at the end.
void close()	Closes the scanner.

```
class Rectangle{
 int length;
 int width;
 void insert(int l, int w){
  length=l;
  width=w;
 }
 void calculateArea(){System.out.println(length*width);}
}
class TestRectangle1{
 public static void main(String args[]){
  Rectangle r1=new Rectangle();
  Rectangle r2=new Rectangle();
  r1.insert(11,5);
  r2.insert(3,15);
  r1.calculateArea();
  r2.calculateArea();
}
}
```

Problem Statement:

Create a class called Employee that includes three pieces of information as instance variables- first name, a last name and a monthly salary. Your class should have a constructor that initializes the three instance variables. Provide a set and a get method for each instance variable. If the monthly salary is not positive, set it to 0.0. Write a test application named EmployeeTest that demonstrates class Employee's capabilities. Create two Employee objects and display each object's yearly salary. Then give each Employee a 10% raise and display each Employee's yearly salary again.

```
import java.util.*;

class Employee
{
	String first_name;
	String last_name;
	double sal;
	public Employee()
	{
		first_name=null;
		last_name=null;
		sal=0.0;
	 }

	public String getfirst_name()
	{
		return first_name;
	}

	public String getlast_name()
	{
		return last_name;
	}

	public double getsal()
	{
		return sal;
	}


	public void setfirst_name(String first)
	{
		first_name=first;
	}

	public void setlast_name(String last)
	{
		last_name=last;
```

```
	}

	public void setsal(double salary)
	{
		sal=salary;
	}
}

public class Employee_test
{
	public static void main(String[] args)
	{
		Employee e1=new Employee();
		Employee e2=new Employee();

		Scanner in=new Scanner(System.in);

		String first;
		String last;
		double salary;

			System.out.println("Enter first name of first employee");
			first=in.next();
			e1.setfirst_name(first);

			System.out.println("Enter last name of first employee");
			last=in.next();
			e1.setlast_name(last);

			System.out.println("Enter monthly salary of first employee");
			salary=in.nextDouble();
			e1.setsal(salary);


		System.out.println("Enter first name of Second employee");
			first=in.next();
			e2.setfirst_name(first);
		System.out.println("Enter last name of second employee");
			last=in.next();
			e2.setlast_name(last);
		System.out.println("Enter monthly salary of second employee");
			salary=in.nextDouble();
			e2.setsal(salary);


	System.out.println("First Employee's Full name and Salary");
	System.out.println(e1.getfirst_name()+" "+e1.getlast_name()+ " "+e1.getsal()*12 +"\n");
```

```
        System.out.println("Second Employee's Full name and Salary");
                System.out.println(e2.getfirst_name()+" "+e2.getlast_name()+" "+e2.getsal()*12 +"\n");

        System.out.println("After incresing salary by 10%");
                System.out.println(e1.getfirst_name()+""+e1.getlast_name()+" "+e1.getsal()*12*1.10+"\n");
                System.out.println(e2.getfirst_name()+""+e2.getlast_name()+" "+e2.getsal()*12*1.10+"\n");
        }
}
```

Conclusion: Thus we implement the simple java program using Classes , Objects , constructor and Scanner class