Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

Lab Number:	**8**
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Title:

1. To perform Multilevel Inheritance in JAVA. Create a Person class representing name, age and address. Inherit person class to employee class with emp ID and salary factor. Inherit the Employee class to programmer class with technical skills and hike attributes. Implement valid methods to input the details from the user in the main method and display for 3 programmers.
2. To perform Hierarchical Inheritance in JAVA. Create an Employee class with attributes EmpID and EmpSalary. Also create necessary methods/constructors to accept these values from the user. Create classes permenantEmployee and TemporaryEmployee which will be derived classes of Employee. Mention hike attribute in these derived classes and calculate the total salary using generate_salary() method for respective types of employees. Objects of the derived classes should be created and salaries for the permanent and temporary employees should be calculated and displayed on the screen.

Learning Objective:

- Students will be able to perform multilevel inheritance using JAVA.
- Students will be able to perform hierarchical inheritance using JAVA

Learning Outcome:

- To understand how to use the private members using friend function and friend class.

Course Outcome:

ECL304.2	Comprehend building blocks of OOPs language, inheritance, package and interfaces.

Theory:

Explain in details about various inheritance types supported in JAVA

Inheritance in Java is a mechanism in which one object acquires all the properties and behaviors of a parent object. It is an important part of OOPs
(Object Oriented programming system).

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The idea behind inheritance in Java is that you can create new classes
that are built upon existing classes. When you inherit from an existing class, you can reuse methods and fields of the parent class. Moreover, you can add new methods and fields in your current class also.
Inheritance represents the IS-A relationship which is also known as a parent-child relationship.

Terms used in Inheritance

Class: A class is a group of objects which have common properties. It is a template or blueprint from which objects are created.

Sub Class/Child Class: Subclass is a class which inherits the other class. It is also called a derived class, extended class, or child class.

Super Class/Parent Class: Superclass is the class from where a subclass inherits the features. It is also called a base class or a parent class.

Reusability: As the name specifies, reusability is a mechanism which facilitates you to reuse the fields and methods of the existing class when you create a new class. You can use the same fields and methods already defined in the previous class.

The **extends keyword** indicates that you are making a new class that derives from an existing class. The meaning of "extends" is to increase the functionality.

In the terminology of Java, a class which is inherited is called a parent or superclass, and the new class is called child or subclass.

Algorithm :	Step 1: Start the program. Step 2: Declare the base class student. Step 3: Declare and define the function get() to get the student details. Step 4: Declare the other class sports. Step 5: Declare and define the function getsm() to read the sports mark. Step 6: Create the class statement derived from student and sports. Step 7: Declare and define the function display() to find out the total and average. Step 8: Declare the derived class object,call the functions get(),getsm() and display().

	Step 9: Stop the program.
Program:	

```
package inheritance;
import java.util.Scanner;

class person{
	Scanner t= new Scanner(System.in);
	String name;
	int age;
	String address;
	void printData() {
		System.out.println("Enter the name,age and address of
the person ");
		name=t.next();
		age=t.nextInt();
		address=t.next();
	}
}
class employee extends person{
	Scanner t= new Scanner(System.in);
	int EmpID;
	float salary;
	void display() {
		System.out.println("Enter the Employee ID and salary ");
		EmpID=t.nextInt();
		salary=t.nextFloat();
	}
}
class programmer extends employee{
	double hike=0.1;
	String tech="Java, Python,C";
	void calc() {
		super.printData();
		super.display();
		System.out.println("The name of the person is "+name);
		System.out.println("The age of the person is "+age);
		System.out.println("The address of the person is
"+address);
		System.out.println("The employee id of the person is
"+EmpID);
		System.out.println("The salary of the person is
"+salary);
		System.out.println("The technical skills are: "+tech);
		System.out.println("The total salary of the employee is
"+(salary+(salary*hike)));
	}
}


public class inheritance {

	public static void main(String[] args) {
		programmer p1=new programmer();
```

	p1.calc();
	programmer p2=new programmer();
	p2.calc();
	programmer p3=new programmer();
	p3.calc();
	
	}
	}

Input given:	-
Output Screenshot :	Enter the name,age and address of the person Disha,12,Vilass road,Mumbai

Algorithm :	Step 1: Start the program. Step 2: Declare the base class emp. Step 3: Define and declare the function get() to get the employee details. Step 4: Declare the derived class salary. Step 5: Declare and define the function get1() to get the salary details. Step 6: Define the function calculate() to find the net pay. Step 7: Define the function display(). Step 8: Create the derived class object. Step 9: Read the number of employees. Step 10: Call the function get(),get1() and calculate() to each employees. Step 11: Call the display(). Step 12: Stop the program.

Program:	package inheritance;
	
	class Employee{
	float salary = 40000;
	void dispSalary()
	{

```
                System.out.println("The Employee salary is : "
+salary);
        }
}

class PermanentEmp extends Employee{
        double hike = 0.5;
        void dispSalary() {
                System.out.println("Hello from PermanentEmp class");
        }
        void incrementSalary()
        {
                dispSalary();
                super.dispSalary();
                System.out.println("The Permanent Employee
incremented salary is :" + (salary+(salary*hike)));

        }
}
class TemporaryEmp extends Employee{
        double hike = 0.35;
        void incrementSalary()
        {
                super.dispSalary();
                System.out.println("The Temporary Employee
incremented salary is :" + (salary+(salary*hike)));
        }

}
public class Hierarchical{
        public static void main(String args[]) {
                PermanentEmp p =new PermanentEmp();
                TemporaryEmp t = new TemporaryEmp();
                p.incrementSalary();
                t.incrementSalary();
        }
}
```

Input given: -

Output Screenshot:

```
Hello from PermanentEmp class
The Employee salary is : 40000.0
The Permanent Employee incremented salary is :60000.0
The Employee salary is : 40000.0
The Temporary Employee incremented salary is :54000.0
```