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 is a mechanism of driving a new class from an existing class. The existing (old) class is known as base class **or** super class **or** parent class**.** The new class is known as a derived class or sub class or child 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.

1. single inheritance: A sub-class is derived from only one super class. It inherits the properties and behavior of a single-parent class.

2. multi-level inheritance**:** A class is derived from a class which is also derived from another class is called multi-level inheritance. In simple words, we can say that a class that has more than one parent class is called multi-level inheritance. The classes must be at different levels. Hence, there exists a single base class and single derived class but multiple intermediate base classes.

3. hierarchical inheritance: If a number of classes are derived from a single base class, it is called hierarchical inheritance**.**

4. hybrid inheritance: It consist of more than one. Hybrid inheritance is the combination of two or more types of inheritance.

5. Java does not support multiple inheritances due to ambiguity.

Algorithm :	STEP 1: Start
	STEP 2:Create class Person
	STEP 3:Define attributes and method display() and getDetails()
	STEP 4:Create child class Employee
	STEP 5:Define attriutes salary EmpID and methods display() & getDetails()
	STEP 6:Create another child class Programmer
	STEP 7:Define attributes hike, skills and methods display() & getDetails()
	STEP 8: In main class, create 3 objects for 3 programmers
	STEP 9:Display output
	STEP 10:Stop
| **Program:** | ```java
package enheritence;
 import java.util.Scanner;

class Person{
    Scanner in = new Scanner(System.in);
    String name;
String address;
    int age;
Person()     {
        name = "";
address = "";         age
= 0;
    }
    void display()
    {
        System.out.println("Name : "+name);
        System.out.println("Age : "+age);
``` |

```java
            System.out.println("Address : "+address);
        }
    void getDetails()
    {
        System.out.println("Enter name : ");
name = in.nextLine();
        System.out.println("Enter    address   :   ");
address = in.nextLine();
        System.out.println("Enter age : ");
age = in.nextInt();
    }
}
class Employee extends Person{
int empID; double salary;
    Employee()
    {
        empID = 0;
salary = 0.0;
    }
    void getDetails()
    {
        super.getDetails();
        System.out.println("Enter Employee ID : ");
empID = in.nextInt();
        System.out.println("Enter base salary : ");
salary = in.nextDouble();
    }
    void display()
    {
        super.display();
        System.out.println("Employee ID : "+empID);
        System.out.println("Base Salary : Rs."+salary);
    }
}
public class Programmer extends Employee
{
    double hike; String skills;
    Programmer()
    {
        hike = 0;
skills = "";
    }
    void getDetails()
    {
        super.getDetails();
        System.out.println("Enter salary hike : ");
hike = in.nextDouble();
        System.out.println("Enter technical skills : ");
in.nextLine();
        skills = in.nextLine();

    }
    void display()
    {
```

```
super.display();
```

```java
            System.out.println("Salary Hike : Rs."+hike);
            System.out.println("Total salary : Rs."+(salary+hike));
            System.out.println("Technical skills : "+skills);
}
    public static void main(String args[])
    {
        System.out.println("Enter details for 1st programmer");
        Programmer obj1 = new Programmer();
obj1.getDetails();

        System.out.println("Enter details for 2nd programmer");
        Programmer obj2 = new Programmer();
obj2.getDetails();
        ;
        System.out.println("Enter details for 3rd programmer");
        Programmer obj3 = new Programmer();
obj3.getDetails();

        System.out.println("\nDetails of 1st programmer");
obj1.display();
        System.out.println("\nDetails of 2nd programmer");
obj2.display();
        System.out.println("\nDetails of 3rd programmer");
obj3.display();
    }
}
```

Input given:	Enter details for 1st programmer Enter name :
	Raks
	Enter address :
	abc
	Enter age :
	12
	Enter Employee ID :
	11
	Enter base salary :
	1000
	Enter salary hike :
	12
	Enter technical skills : none
	Enter details for 2nd programmer Enter name :
	ram
	Enter address :
	abcd
	Enter age :
	23
	Enter Employee ID :
	12
	Enter base salary : 1000
	Enter salary hike :

	12
	Enter technical skills : none
	Enter details for 3rd programmer
	Enter name : raj
	Enter address : asbd
	Enter age :
	33
	Enter Employee ID :
	13
	Enter base salary : 1000
	Enter salary hike :
	12
	Enter technical skills :
	none
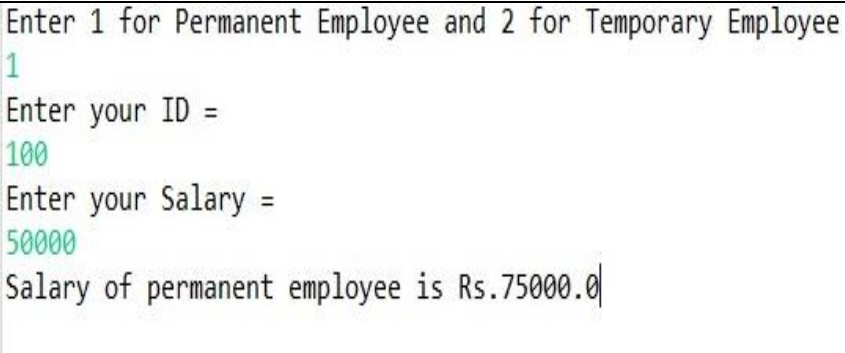
Output Screenshot:	
| | ```
Details of 1st programmer
Name : Raks
Age : 12
Address : abc
Employee ID : 11
Base Salary : Rs.1000.0
Salary Hike : Rs.12.0
Total salary : Rs.1012.0
Technical skills : none

Details of 2nd programmer
Name : ram
Age : 23
Address : abcd
Employee ID : 12
Base Salary : Rs.1000.0
Salary Hike : Rs.12.0
Total salary : Rs.1012.0
Technical skills : none

Details of 3rd programmer
Name : raj
Age : 33
Address : asbd
Employee ID : 13
Base Salary : Rs.1000.0
Salary Hike : Rs.12.0
Total salary : Rs.1012.0
Technical skills : none
``` |

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2.Algorithm :	STEP 1: Start
	STEP 2: create class employee1, define attributes and methods setdetails()
	STEP 3: create child classes PermanentEmp and TemperoryEmp
	STEP 4:define attributes and method generatesalary() in both the classes
	STEP 5:Create main function
	STEP 6:Give the user 2 choices of permanent or temporary employee
	STEP 7:create object in main function according to the case selected
	STEP 8: print the output
	STEP 9: Stop
| **Program:** | ```java
import java.util.Scanner;
 class
employee1 {
int EmpID;
float salary;
void
setdetails()
    {
        Scanner t = new Scanner(System.in);
        System.out.println("Enter your ID =");
        EmpID= t.nextInt();
        System.out.println("Enter your Salary =");
salary= t.nextFloat();
    }
}
class PermanentEmp extends
employee1{     double hike =
0.5;    void generatesalary()
    {
        System.out.println("Salary of permanent employee is Rs."
+(salary + (salary * hike)) );
    }
}
class TemperoryEmp extends
employee1{     double hike =
0.2;    void generatesalary()
    {
        System.out.println("Salary of temporary employee is Rs."
+(salary + (salary * hike)) );
    }
}
public class employee
{
``` |

```java
    public static void main(String args[])
    {
        Scanner in = new Scanner(System.in);
        System.out.println("Enter 1 for Permanent Employee and 2
for Temporary Employee");
        int choice = in.nextInt();
switch(choice)
        {
case 1 :
            PermanentEmp p = new PermanentEmp();
            p.setdetails();

p.generatesalary();
break;                case
2:
            TemperoryEmp t = new TemperoryEmp();
            t.setdetails();

t.generatesalary();
break;
default:
            System.out.println("Invalid choice");
        }




    }
}
```

Input given:	Enter 1 for Permanent Employee and 2 for Temporary Employee 1 Enter your ID = 100 Enter your Salary = 50000
Output Screenshot :	Enter 1 for Permanent Employee and 2 for Temporary Employee 1 Enter your ID = 100 Enter your Salary = 50000 Salary of permanent employee is Rs.75000.0

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