

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:	6
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Roll No :	E-05

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 permanentEmployee 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 perform multilevel inheritance using Java.
- Students will be able perform hierarchical inheritance using Java

Learning Outcome:

- Understanding the inheritance concept and reusability of code.

Theory:

Inheritance in java: Inheritance is an important pillar of OOP(Object-Oriented Programming). It is the mechanism in java by which one class is allowed to inherit the features(fields and methods) of another class.

Syntax for Inheritance

To inherit a class we use extends keyword. Here class XYZ is child class and class ABC is parent class. The class XYZ is inheriting the properties and methods of ABC class.

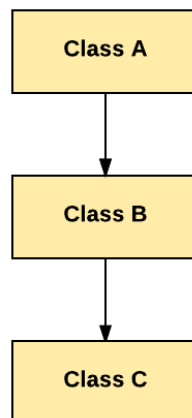
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```
class XYZ extends ABC
{
}
```

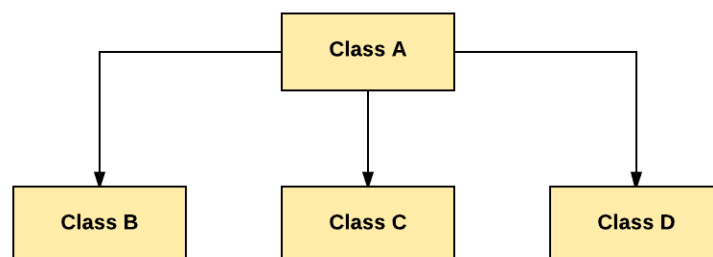
Multilevel Inheritance : In Multilevel Inheritance, one class can inherit from a derived class. Hence, the derived class becomes the base class for the new class.

Class C is subclass of B and B is a of subclass Class A.



Hierarchical Inheritance: In Hierarchical Inheritance, one class is inherited by many sub classes.

Class B, C, and D inherit the same class A.



Program 1:

Algorithm :

- 1) Start
- 2) Create a parent class person and initialize its data members and take input name, age and address.
- 3) Create a derived class of person class – employee class and take input from user of id and salary factor.

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4) Create the derived class of person class – programmer class to take input of hike and technical skills.

5) Create the main class to call the class functionalities and display the results.

```
import java.util.*;

class Person {

String name;

int age;

String address;

public Person() {

name = "";

age = 0;

address = "";

}

void getdata() {

Scanner s = new Scanner(System.in);

System.out.print("enter name: ");

name = s.nextLine();

System.out.println();

System.out.print("enter age: ");

age = s.nextInt();

System.out.println();

System.out.print("enter address: ");

s.nextLine();

address = s.nextLine();

System.out.println();

}

void putdata() {

System.out.println("name is: " + name);
```

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```
System.out.println();

System.out.println("age is:" + age);

System.out.println();

System.out.println("address is: " + address);

System.out.println();

}

}

class employee extends Person {

    int emp_id;

    int salary_factor;

    public employee() {

        emp_id = 0;

        salary_factor = 0;

    }

    void getdetails() {

        Scanner s = new Scanner(System.in);

        System.out.print("enter employee id: ");

        emp_id = s.nextInt();

        System.out.println();

        System.out.print("enter Salary Factor: ");

        salary_factor = s.nextInt();

        System.out.println();

    }

    void putdetails() {

        System.out.println("employee id is ::" + emp_id);

        System.out.println();

        System.out.println("Salary Factor is::" + salary_factor);

        System.out.println();

    }

}
```

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```
}  
  
}  
  
class programmer extends employee {  
  
    int hike;  
  
    String technical_skills = "";  
  
    public programmer() {  
  
        hike = 0;  
  
        technical_skills = "";  
  
    }  
  
    void getd() {  
  
        Scanner s = new Scanner(System.in);  
  
        System.out.print("enter hike: ");  
  
        hike = s.nextInt();  
  
        System.out.println();  
  
        System.out.print("enter technical skills: ");  
  
        s.nextLine();  
  
        technical_skills = s.next();  
  
        System.out.println();  
  
    }  
  
    void putd() {  
  
        System.out.println("hike is ::" + hike);  
  
        System.out.println();  
  
        System.out.println("technical skills is::" + technical_skills);  
  
        System.out.println();  
  
    }  
  
}  
  
public class Multilevel_inh {  
  
    public static void main(String[] args) {
```

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```
programmer r[] = new programmer[4];

r[0] = new programmer();

r[1] = new programmer();

r[2] = new programmer();

for (int i = 0; i<3; i++) {

System.out.println("Enter details of employee " + (i+1) );

r[i].getdata();

r[i].getdetails();

r[i].getd();

r[i].putdata();

r[i].putdetails();

r[i].putd();

}

}

}
```

Output:

Employee 1

```
Problems Javadoc Declaration Console
<terminated> Multilevel_inh [Java Application] C:\Use
Enter details of employee 1
enter name: Siddhant
enter age: 19
enter address: kalyan
enter employee id: 12
enter Salary Factor: 15
enter hike: 12
enter technical skills: Programmer
name is: Siddhant
age is::19
address is: kalyan
employee id is ::12
Salary Factor is::15
hike is ::12
techincal skills is::Programmer
```

Employee 2

```
Enter details of employee 2
enter name: Vedant
enter age: 20
enter address: Thane
enter employee id: 25
enter Salary Factor: 30
enter hike: 20
enter technical skills: Designer
name is: Vedant
age is::20
address is: Thane
employee id is ::25
Salary Factor is::30
hike is ::20
techincal skills is::Designer
Enter details of employee 3
```

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Employee 3

```
Enter details of employee 3
enter name: Aryan
enter age: 18
enter address: Mumbai
enter employee id: 43
enter Salary Factor: 23
enter hike: 40
enter technical skills: programmer
name is: Aryan
age is::18
address is: Mumbai
employee id is ::43
Salary Factor is::23
hike is ::40
techincal skills is::programmer
```

Program 2:

Algorithm :

- 1) Creating the parent class employee and initialize its data members. (EmpId,EmpSalary) and a basic function get details() to print the details.
- 2) Create 2 child class permanent and temporary employee that inherit employee class publically.
- 3) Create generate salary() that return the employee salary + hike in their salary
- 4) In main function, create the object of derived class and print their respective details.

```
import java.util.*;

class Employee
{
Scanner s=new Scanner(System.in);

int emp_id;

int emp_salary;
```

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```
Employee()
{
    System.out.println("enter empid::");
    emp_id=s.nextInt();
    System.out.println("enter empsalary::");
    emp_salary=s.nextInt();
}

void getDetails()
{
    System.out.println("EmployeeID is ::");
    System.out.println("Employee Salary is ::");
}

}

class permanant_Employee extends Employee
{
    int hike;

    permanant_Employee( int increment)
    {
        hike = increment;
    }

    void getDetails()
    {
        System.out.println("EmployeeID is ::" + emp_id);
        System.out.println("Employee total salary is ::" + generate_salary());
    }

    int generate_salary()
    {
        return (emp_salary + hike);
    }
}
```

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```
}  
  
}  
  
class temporary_Employee extends Employee  
{  
    int hike;  
  
    temporary_Employee( int increment)  
    {  
        hike = increment;  
    }  
  
    void getDetails()  
    {  
        System.out.println("EmployeeID is ::" + emp_id);  
        System.out.println("Employee total salary is ::" + generate_salary());  
    }  
  
    int generate_salary()  
    {  
        return (emp_salary + hike);  
    }  
}  
  
public class hierarchical_inh {  
    public static void main(String[] args) {  
        permanent_Employee p = new permanent_Employee(3200);  
        p.getDetails();  
        temporary_Employee t = new temporary_Employee(1600);  
        t.getDetails();  
    }  
}
```

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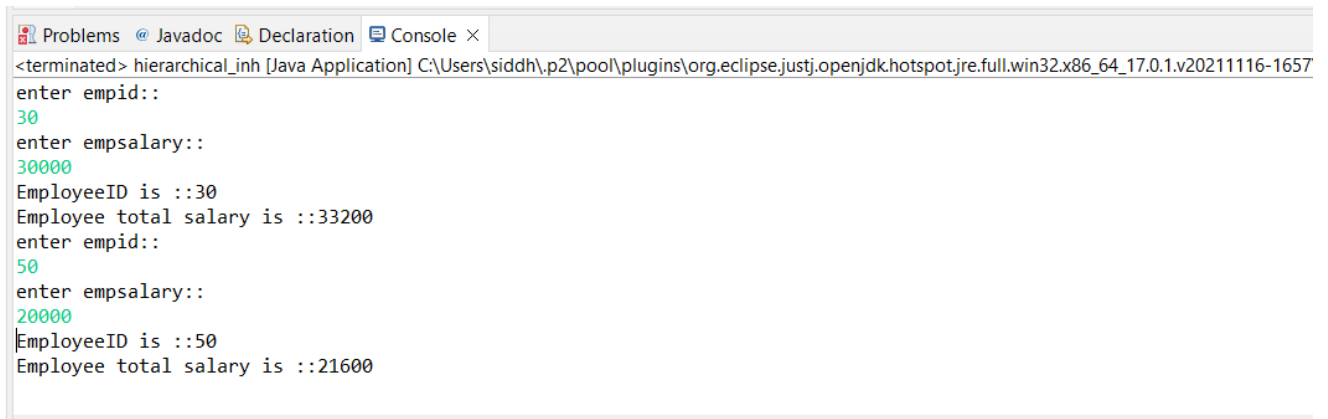
Input Given:

For Permanent Employee:

Id- 30 Salary- 30000

For Temporary Employee:

Id- 50 Salary- 20000



```
<terminated> hierarchical_inh [Java Application] C:\Users\siddh\p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.1.v20211116-1657
enter empid::
30
enter empsalary::
30000
EmployeeID is ::30
Employee total salary is ::33200
enter empid::
50
enter empsalary::
20000
EmployeeID is ::50
Employee total salary is ::21600
```