Don Bosco Institute of Technology,
Kurla(W)DepartmentofElectronicsandTele-
CommunicationEngineering
ECL304 - Skill Lab: C++ and Java
ProgrammingSemIII

LabNumber:	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.InherittheEmployeeclasstoprogrammerclasswithtechnicalskillsandhikeattributes. Implement valid methods to input the details from the user in the mainmethodand displayfor3programmers.
2. ToperformHierarchicalInheritanceinJAVA.CreateanEmployeeclasswithattributes EmpID and EmpSalary. Also create necessary methods/constructors to acceptthesevaluesfromtheuser.CreateclassespermenantEmployeeandTemporaryEmploy eewhichwillbederivedclassesofEmployee.Mentionhikeattribute in these derived classes and calculate the total salary using generate_salary()method for respective types of employees. Objects of the derived classes should becreated and salaries for the permanent and temporary employees should be calculatedanddisplayed on the screen.

LearningObjective:

*   Studentswillbe ableto performmultilevel inheritanceusingJAVA.
*   StudentswillbeabletoperformhierarchicalinheritanceusingJAVA

LearningOutcome:

*   Tounderstandhow tousetheprivatemembersusingfriendfunction andfriend class.

CourseOutcome:

ECL304.2	ComprehendbuildingblocksofOOPslanguage,inheritance,packageandinterfaces.

Theory:

*   ExplainindetailsaboutvariousinheritancetypessupportedinJAVA.
    Inheritance is a mechanism of driving a new class from an existing class. The existing (old)classis knownas**base class**or super class **or** parent class**.**Thenew class isknown as a derived class or sub class or child class. The extends keyword indicates that you are makinga new class that derives from an existing class. The meaning of "extends" is to increase thefunctionality.

Faculty:Ms.DeepaliKayande

1. single inheritance: A sub-class is derived from only one super class. It inherits the properties andbehaviorof asingle-parentclass.

2. multi-level inheritance: A class is derived from a class which is also derived from another class iscalled multi-level inheritance. In simple words, we can say that a class that has more than one parentclass is called multi-level inheritance. The classes must be at different levels. Hence, there exists asinglebaseclassandsinglederived class butmultiple intermediatebase classes.

3. hierarchicalinheritance:Ifanumberofclassesarederivedfromasinglebaseclass,itiscalledhierarchicalinheritance**.**

4. hybridinheritance:Itconsistofmorethanone.Hybridinheritanceisthecombinationoftwoormoretypes ofinheritance.

5. Javadoesnotsupportmultipleinheritancesduetoambiguity.

Algorithm:	STEP1: Start
	STEP2:Create classPerson
	STEP3:Defineattributesandmethoddisplay()andgetDetails()STE
	P4:Create childclassEmployee
	STEP 5:Define attriutes salary EmpID and methods display() &
	getDetails()STEP6:Create another childclassProgrammer
	STEP 7:Define attributes hike, skills and methods display() &
	getDetails()STEP8:Inmain class,create3 objectsfor3 programmers
	STEP9:Displayoutput
	STEP10:Stop
| **Program:** | ```java
packageenheritence;

importjava.util.Scanner;

classPerson{
    Scanner in = new
    Scanner(System.in);Stringname;
    String
    address;int
    age;Person()
    {
        name =
        "";address =
        "";age =0;
    }
    voiddisplay()
    {
        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("Ente
        r Employee ID : ");empID =
        in.nextInt();System.out.println("Enter base
        salary : ");salary= in.nextDouble();
    }
    void display()
    {
        super.display();System.out.println("Employe
        eID:"+empID);
        System.out.println("BaseSalary:Rs."+salary);
    }
}
public class Programmer extends Employee
{
    double hike; String
    skills;Programmer()
    {
        hike =
        0;skills="";
    }
    void getDetails()
    {
        super.getDetails();System.out.println("Ente
        r salary hike : ");hike= in.nextDouble();
        System.out.println("Enter technical skills :
        ");in.nextLine();
        skills=in.nextLine();

    }
    void display()
    {
        super.display();
```

```java
            System.out.println("SalaryHike:Rs."+hike);
            System.out.println("Totalsalary:Rs."+(salary+hike));
            System.out.println("Technicalskills:"+skills);
        }

        publicstaticvoidmain(Stringargs[])
        {
            System.out.println("Enterdetailsfor1stprogrammer");
            Programmerobj1=newProgrammer();
            obj1.getDetails();

            System.out.println("Enterdetailsfor2ndprogrammer");
            Programmerobj2=newProgrammer();
            obj2.getDetails();
            ;
            System.out.println("Enterdetailsfor3rdprogrammer");
            Programmerobj3=newProgrammer();
            obj3.getDetails();

            System.out.println("\nDetailsof1stprogrammer");
            obj1.display();
            System.out.println("\nDetailsof2ndprogrammer");
            obj2.display();
            System.out.println("\nDetailsof3rdprogrammer");
            obj3.display();
        }
}
```

Inputgiven:	
	Enter details for 1st programmerEnter name: Raks Enter address: abc Enter age: 12 Enter EmployeeID: 11 Enter basesalary: 1000 Enter salaryhike: 12 Entertechnicalskills: none Enterdetailsfor2ndprogrammer Enter name: ram Enter address: abcd Enter age: 23 Enter EmployeeID: 12 Enter basesalary: 1000 Enter salaryhike:

	12 Enter technical skills :none Enter details for 3rd programmerEnter name: raj Enteraddress: asbd Enterage: 33 Enter Employee ID :13 Enter base salary :1000 Enter salary hike :12 Enter technical skills :none
OutputScreenshot:	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

2.

Algorithm:	STEP1:Start STEP2:createclass employee1,defineattributesandmethodssetdetails()STEP3: createchild classesPermanentEmpand TemperoryEmp STEP4:defineattributesandmethodgeneratesalary() inboththeclassesSTEP5:Create main function STEP 6:Give the user 2 choices of permanent or temporary employeeSTEP 7:create object in main function according to the case selectedSTEP 8: print the output STEP9: Stop
| **Program:** | ```java
import java.util.Scanner;

class employee1
    {int
    EmpID;floatsa
    lary;
    voidsetdetails()
    {
        Scanner t= new
        Scanner(System.in);System.out.println("Ent
        er your ID =");EmpID=
        t.nextInt();System.out.println("Enter your
        Salary =");salary= t.nextFloat();
    }
}

classPermanentEmpextendsemployee1{
    doublehike=0.5;
    voidgeneratesalary()
    {
        System.out.println("SalaryofpermanentemployeeisRs."
+(salary+(salary*hike)));
    }
}

classTemperoryEmpextendsemployee1{
    doublehike=0.2;
    voidgeneratesalary()
    {
        System.out.println("SalaryoftemporaryemployeeisRs."
+(salary+(salary*hike)));
    }
}

publicclassemployee
{
``` |

```java
        publicstaticvoidmain(Stringargs[])
        {
            Scannerin=newScanner(System.in);
            System.out.println("Enter1forPermanentEmployeeand2for
    TemporaryEmployee");
            intchoice=in.nextInt();
            switch(choice)
            {
                case1:
                PermanentEmpp=newPermanentEmp();
                p.setdetails();
                p.generatesalary();
                break;
                case2:
                TemperoryEmpt=newTemperoryEmp();
                t.setdetails();
                t.generatesalary();
                break;
                default:
                System.out.println("Invalidchoice");
            }



        }
    }
```

Input given:	Enter1forPermanentEmployeeand2forTemporaryEmployee 1 EnteryourID= 100 EnteryourSalary= 50000
Output Screenshot:	\<terminated\> employee (1) [Java Application] C:\Users\khant\.p2\pool\plugins\org.ec 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

Faculty:Ms.DeepaliKayande