Multilevel Inheritance

A child having a child class.

1) Area & Volume

import java.util.\*;

class Area

{

double r,A;

Area(double r)

{

this.r=r;

}

void cal\_area()

{

A=3.14\*r\*r;

System.***out***.println("Area="+A);

}

}

class volume extends Area

{

double h,v;

volume(double r,double h)

{

super(r);

this.h=h;

}

void cal\_vol()

{

cal\_area();

v=A\*h;

System.***out***.println("Volume="+v);

}

}

class volume1 extends volume

{

double l,v1;

volume1(double r,double h,double l)

{

super(r,h);

this.l=l;

}

void cal\_vol1()

{

cal\_vol();

v1=v\*l;

System.***out***.println("Volume1="+v1);

}

}

public class AreaClass

{

public static void main(String[]args)

{

double r, h, l;

Scanner sc = new Scanner(System.***in***);

System.***out***.println("Enter r , h & l");

r=sc.nextDouble();

h=sc.nextDouble();

l=sc.nextDouble();

volume1 v1 =new volume1(r,h,l);

v1.cal\_vol1();

}

}

Output:

Enter r, h & l

1.5 3 7

Area=7.0649999999999995

Volume=21.195

Volume1=148.365

2)Student (id, name) display () Marks(id,name,m1,m2,m3)show(){m1m2m3super.display();} Result(id,name,m1,m2,m3)

import java.util.\*;

class Student

{

int id;

String name;

Student(int id, String name)

{

this.id=id;

this.name=name;

}

void display()

{

System.***out***.println("ID="+id);

System.***out***.println("Name="+name);

}

}

class Marks extends Student

{

int m1, m2, m3;

String name;

Marks(int id, String name, int m1, int m2, int m3)

{

super(id,name);

this.m1=m1;

this.m2=m2;

this.m3=m3;

}

void show()

{

super.display();

System.***out***.println("First subject mark="+m1);

System.***out***.println("Second subject mark="+m2);

System.***out***.println("Third subject mark="+m3);

}

}

class Result extends Marks

{

int total, per;

Result(int id, String name, int m1, int m2, int m3)

{

super(id, name, m1, m2, m3);

}

int cal\_total()

{

super.show();

total=m1+m2+m3;

return total;

}

double cal\_per()

{

per=total/3;

return per;

}

void cal\_class()

{

if(per>=75 && per<=100)

{

System.***out***.println("Class A");

}

else if(per>=65 && per<75)

{

System.***out***.println("Class B");

}

else if(per>=50 && per<65)

{

System.***out***.println("Class C");

}

else if(per>=35 && per<50)

{

System.***out***.println("Class D");

}

else

{

System.***out***.println("Fail");

}

}

}

public class StudentClass

{

public static void main(String[]args)

{

int id, m1, m2, m3;

String name;

Scanner sc = new Scanner(System.***in***);

System.***out***.println("Enter student id,name,m1,m2,m3");

id=sc.nextInt();

name=sc.next();

m1=sc.nextInt();

m2=sc.nextInt();

m3=sc.nextInt();

Result r = new Result(id,name,m1,m2,m3);

System.***out***.println("Total="+r.cal\_total());

System.***out***.println("Percentage="+r.cal\_per());

r.cal\_class();

}

}

Output:

101 Ash 78 54 90

ID=101

Name=Ash

First subject mark=78

Second subject mark=54

Third subject mark=90

Total=222

Percentage=74.0

Class B

3) Write a program for multilevel inheritance such that the country is inherited from the continent. State is inherited from the country. Display the place, state, country and continent.

import java.util.\*;

class Continent

{

int continentId;

String continentName;

double continentArea;

Continent(int continentId,String continentName,double continentArea)

{

this.continentId=continentId;

this.continentName=continentName;

this.continentArea=continentArea;

}

void displayContinent()

{

System.***out***.println("Continent Id:"+continentId);

System.***out***.println("Continent Name:"+continentName);

System.***out***.println("Continent Area:"+continentArea);

}

}

class Country extends Continent

{

int countryId;

String countryName;

double countryArea;

Country(int continentId,String continentName,double continentArea,int countryId,String countryName,double countryArea)

{

super(continentId,continentName,continentArea);

this.countryId=countryId;

this.countryName=countryName;

this.countryArea=countryArea;

}

void displayCountry()

{

super.displayContinent();

System.***out***.println("Country Id:"+countryId);

System.***out***.println("Country Name:"+countryName);

System.***out***.println("Country Area:"+countryArea);

}

}

class State extends Country

{

int stateId;

String stateName,stateLanguage;

double stateArea;

State(int continentId,String continentName,double continentArea,int countryId,String countryName,double countryArea,int stateId,String stateName,String stateLanguage,double

stateArea)

{

super(continentId,continentName,continentArea,countryId,countryName,countryArea);

this.stateId=stateId;

this.stateName=stateName;

this.stateLanguage=stateLanguage;

this.stateArea=stateArea;

}

void displayState()

{

super.displayCountry();

System.***out***.println("State Id:"+stateId);

System.***out***.println("State Name:"+stateName);

System.***out***.println("State Language"+stateLanguage);

System.***out***.println("State Area:"+stateArea);

}

}

class City extends State

{

int cityId,cityPopulation;

String cityName;

double cityArea;

City(int continentId,String continentName,double continentArea,int countryId,String countryName,double countryArea,int stateId,String stateName,String stateLanguage,double

stateArea,int cityId,String cityName,int cityPopulation,double cityArea)

{

super(continentId,continentName,continentArea,countryId,countryName,countryArea,stateId,stateName,stateLanguage,stateArea);

this.cityId=cityId;

this.cityName=cityName;

this.cityPopulation=cityPopulation;

this.cityArea=cityArea;

}

void displayCity()

{

super.displayState();

System.***out***.println("City Id:"+cityId);

System.***out***.println("City Name:"+cityName);

System.***out***.println("City Population"+cityPopulation);

System.***out***.println("City Area:"+cityArea);

}

}

class Place extends City

{

String placeName;

double placeArea;

Place(int continentId,String continentName,double continentArea,int countryId,String

countryName,double countryArea,int stateId,String stateName,String stateLanguage,double

stateArea,int cityId,String cityName,int cityPopulation,double cityArea,String placeName,double

placeArea)

{

super(continentId,continentName,continentArea,countryId,countryName,countryArea,stateId,

stateName,stateLanguage,stateArea,cityId,cityName,cityPopulation,cityArea);

this.placeName=placeName;

this.placeArea=placeArea;

}

void displayPlace()

{

super.displayCity();

System.***out***.println("Place Name:"+placeName);

System.***out***.println("Place Area:"+placeArea);

}

}

public class CountryClass

{

public static void main(String[] args)

{

int continentId,countryId,stateId,cityId,cityPopulation;

String continentName,countryName,stateName,stateLanguage,cityName,placeName;

double continentArea,countryArea,stateArea,cityArea,placeArea;

Scanner sc=new Scanner(System.***in***);

System.***out***.println("Enter Contient Id,Name,Area");

continentId=sc.nextInt();

continentName=sc.next();

continentArea=sc.nextDouble();

System.***out***.println("Enter Country Id,Name,Area");

countryId=sc.nextInt();

countryName=sc.next();

countryArea=sc.nextDouble();

System.***out***.println("Enter State Id,Name,Langugae,Area");

stateId=sc.nextInt();

stateName=sc.next();

stateLanguage=sc.next();

stateArea=sc.nextDouble();

System.***out***.println("Enter City Id,Name,Population,Area");

cityId=sc.nextInt();

cityName=sc.next();

cityPopulation=sc.nextInt();

cityArea=sc.nextDouble();

System.***out***.println("Enter Place Name,Area");

placeName=sc.next();

placeArea=sc.nextDouble();

Place p=new

Place(continentId,continentName,continentArea,countryId,countryName,countryArea,stateId,stateName,

stateLanguage,stateArea,cityId,cityName,cityPopulation,cityArea,placeName,placeArea);

p.displayPlace();

}

}

Output:

Enter Contient Id,Name,Area

1

Asia

12321000

Enter Country Id,Name,Area

91

India

34210000

Enter State Id,Name,Langugae,Area

7

Maharashtra

HindiMarathi

231000

Enter City Id,Name,Population,Area

12

Pune

7890000

5467890

Enter Place Name,Area

ABCChowk

50

Continent Id:1

Continent Name:Asia

Continent Area:1.2321E7

Country Id:91

Country Name:India

Country Area:3.421E7

State Id:7

State Name:Maharashtra

State LanguageHindiMarathi

State Area:231000.0

City Id:12

City Name:Pune

City Population7890000

City Area:5467890.0

Place Name:ABCChowk

Place Area:50.0

Hierarchical Inheritance

1) Employee (eid, ename, designation)

PartTime (n\_hr, hr\_rate, salary)

FullTime (n\_day, day\_rate, salary)

import java.util.Scanner;

class Emp

{

double id;

String name,desg;

Emp(Double id,String name,String desg)

{

this.id=id;

this.name=name;

this.desg=desg;

}

public void display()

{

System.***out***.println("id:"+id);

System.***out***.println("name :"+name);

System.***out***.println("Designation :"+desg);

}

}

class part\_time extends Emp

{

double hr\_rate,sal;

int n\_hr;

part\_time(Double id,String name,String desg,int n\_hr,double hr\_rate)

{

super( id,name,desg);

this.n\_hr=n\_hr;

this.hr\_rate=hr\_rate;

}

public void cal\_sal()

{

System.***out***.println("No of hr:"+n\_hr);

System.***out***.println("Hr rate:"+hr\_rate);

sal=(n\_hr\*hr\_rate);

System.***out***.println("Salary:"+sal);

}

}

class Full\_time extends Emp

{

double day\_rate,sal;

int n\_day;

Full\_time(Double id,String name,String desg,int n\_day,double day\_rate)

{

super(id,name,desg);

this.n\_day=n\_day;

this.day\_rate=day\_rate;

}

public void cal\_sal()

{

System.***out***.println("No of hr:"+n\_day);

System.***out***.println("Hr rate:"+day\_rate);

System.***out***.println("Salary:"+(n\_day\*day\_rate));

}

}

public class EmployeeClass

{

public static void main(String[] args)

{

double id;

String name,desg;

double hr\_rate;

int n\_hr,ch;

double day\_rate;

int n\_day;

Scanner sc=new Scanner(System.***in***);

do

{

System.***out***.println("1:Accept details of part time empl");

System.***out***.println("2:Accept details of full time empl");

System.***out***.println("3:Exit");

System.***out***.println("enter u r choice");

ch = sc.nextInt();

switch(ch)

{

case 1:

System.***out***.println("Enter id,name & desg,n0f hr,hr rate");

id=sc.nextDouble();

name=sc.next();

desg=sc.next();

n\_hr=sc.nextInt();

hr\_rate=sc.nextDouble();

part\_time p1=new part\_time(id, name, desg, n\_hr, hr\_rate);

p1.display();

p1.cal\_sal();

break;

case 2:

System.***out***.println("Enter id,name & desg,n0f day,day rate");

id=sc.nextDouble();

name=sc.next();

desg=sc.next();

n\_day=sc.nextInt();

day\_rate=sc.nextDouble();

Full\_time f1=new Full\_time(id, name, desg, n\_day, day\_rate);

f1.display();

f1.cal\_sal();

break;

case 3:

System.*exit*(0);

break;

default:System.***out***.println("Invalid choice");

}

}while(ch<=3);

}

}

Output:

1:Accept details of part time empl

2:Accept details of full time empl

3:Exit

enter u r choice

1

Enter id,name & desg,n0f hr,hr rate

101 Ash CEO 2 1500

id:101.0

name :Ash

Designation :CEO

No of hr:2

Hr rate:1500.0

Salary:3000.0

1:Accept details of part time empl

2:Accept details of full time empl

3:Exit

enter u r choice

3

2) Write a Java program to create a superclass Vehicle having members Company and price. Derive 2 different classes LightMotorVehicle (members– mileage) and HeavyMotorVehicle (members– capacity-in-tons). Accept the information for n vehicles and display the information in appropriate form. While taking data, ask the user about the type of vehicle first.(n no of object)

mport java.util.\*;

class Vehicle

{

String company;

double price;

Vehicle(String company,double price)

{

this.company=company;

this.price=price;

}

void display()

{

System.***out***.println("Company:"+company);

System.***out***.println("Price:"+price);

}

}

class LightMotorVehicle extends Vehicle

{

int mileage;

LightMotorVehicle(String company,double price,int mileage)

{

super(company,price);

this.mileage=mileage;

}

void show()

{

super.display();

System.***out***.println("Mileage:"+mileage);

}

}

class HeavyMotorVehicle extends Vehicle

{

double capacity;

HeavyMotorVehicle(String company,double price,double capacity)

{

super(company,price);

this.capacity=capacity;

}

void show()

{

super.display();

System.***out***.println("Capacity in tons:"+capacity);

}

}

public class VehicleClass

{

public static void main(String[] args)

{

String company;

double price,capacity;

int mileage,size,i,ch;

Scanner sc=new Scanner(System.***in***);

do{

System.***out***.println("1.Light Motor Vehicle\n2.Heavy Motor Vehicle\n3.Exit");

System.***out***.println("Enter U R choice");

ch=sc.nextInt();

switch(ch){

case 1:

System.***out***.println("Enter array size");

size=sc.nextInt();

LightMotorVehicle []lv = new LightMotorVehicle[size];

for(i=0;i<size;i++)

{

System.***out***.println("Enter vehicle Company,Price,Mileage");

company=sc.next();

price=sc.nextDouble();

mileage=sc.nextInt();

lv[i] = new LightMotorVehicle(company,price,mileage);

lv[i].show();

}

break;

case 2:

System.***out***.println("Enter array size");

size=sc.nextInt();

HeavyMotorVehicle []hv = new HeavyMotorVehicle[size];

for(i=0;i<size;i++)

{

System.***out***.println("Enter vehicle Company,Price,capacity in tons");

company=sc.next();

price=sc.nextDouble();

capacity=sc.nextDouble();

hv[i] = new HeavyMotorVehicle(company,price,capacity);

hv[i].show();

}

break;

case 3:System.*exit*(0);

break;

default:System.***out***.println("Invalid type");

break;

}

}while(ch<=3);

}

}

Output:

1.Light Motor Vehicle

2.Heavy Motor Vehicle

3.Exit

Enter U R choice

1

Enter array size

1

Enter vehicle Company,Price,Mileage

Hero 85000 65

Company:Hero

Price:85000.0

Mileage:65

1.Light Motor Vehicle

2.Heavy Motor Vehicle

3.Exit

Enter U R choice

3

3)Write a program which has class Movie (title, amount, no\_of\_ticket) and inherit Following classes TaxedMovie (tax, finalAmount) and TaxFreeMovie (finalAmount). Use calculate TicketAmount () method in both subclasses. Create objects of TaxedMovie and TaxFreeMovie in the main class using superclass reference print movies info with final amount for both the objects.

import java.util.\*;

class Movie

{

String title;

double amount;

int noOfTicket;

Movie(String title, double amount, int noOfTicket)

{

this.title=title;

this.amount=amount;

this.noOfTicket=noOfTicket;

}

void display()

{

System.***out***.println("Movie Name:"+title);

System.***out***.println("Amount:"+amount);

System.***out***.println("Number of tickets:"+noOfTicket);

}

}

class TaxedMovie extends Movie

{

double tax=0.18, finalAmount;

TaxedMovie(String title, double amount, int noOfTicket)

{

super(title, amount, noOfTicket);

}

double total\_amt()

{

super.display();

finalAmount=noOfTicket\*amount;

finalAmount=finalAmount+(finalAmount\*tax);

return finalAmount;

}

}

class TaxFreeMovie extends Movie

{

double finalAmount;

TaxFreeMovie(String title,double amount,int noOfTicket)

{

super(title,amount,noOfTicket);

}

double total\_amt()

{

super.display();

finalAmount=noOfTicket\*amount;

return finalAmount;

}

}

public class MoviesTicketClass

{

public static void main(String[] args)

{

String title;

double amount,finalAmount;

int noOfTicket,ch;

Scanner sc=new Scanner(System.***in***);

do{

System.***out***.println("1.Taxed Movie\n2.Tax Free Movie\n3.Exit");

System.***out***.println("Enter U R choice");

ch=sc.nextInt();

switch(ch)

{

case 1:System.***out***.println("Enter Movie name,amount,no of tickets");

title=sc.next();

amount=sc.nextDouble();

noOfTicket=sc.nextInt();

TaxedMovie tax=new TaxedMovie(title,amount,noOfTicket);

System.***out***.println("Total amount:"+tax.total\_amt());

break;

case 2:

System.***out***.println("Enter Movie name,amount,no of tickets");

title=sc.next();

amount=sc.nextDouble();

noOfTicket=sc.nextInt();

TaxFreeMovie tfm=new TaxFreeMovie(title,amount,noOfTicket);

System.***out***.println("Totalamount:"+tfm.total\_amt());

break;

case 3:System.*exit*(0);

break;

default:System.***out***.println("Invalidchoice");

break;

}

}while(ch<=3);

}

}

Output:

1.Taxed Movie

2.Tax Free Movie

3.Exit

Enter U R choice

1

Enter Movie name,amount,no of tickets

Kalki2898AD 250 2

MovieName:Kalki2898AD

Amount:250.0

Numberof tickets:2

Total amount:590.0

1.Taxed Movie

2.Tax Free Movie

3.Exit

Enter U R choice

3

4) Create an class “order” having members id, description. Create two subclasses “Purchase Order” and “Sales Order” having members vendor name and customer name respectively. Define methods accept and display in all cases. Create 3 objects each of Purchase Order and Sales Order and accept and display details.

import java.util.\*;

class Order

{

int id;

String description;

void accept(Scanner sc)

{

System.***out***.print("Enter Order ID: ");

id = sc.nextInt();

sc.nextLine();

System.***out***.print("Enter Order Description: ");

description = sc.nextLine();

}

void display()

{

System.***out***.println("Order ID: " + id);

System.***out***.println("Order Description: " + description);

}

}

class PurchaseOrder extends Order

{

String vendorName;

void accept(Scanner sc)

{

super.accept(sc);

System.***out***.print("Enter Vendor Name: ");

vendorName = sc.nextLine();

}

void display()

{

super.display();

System.***out***.println("Vendor Name: " + vendorName);

}

}

class SalesOrder extends Order

{

String customerName;

void accept(Scanner sc)

{

super.accept(sc);

System.***out***.print("Enter Customer Name: ");

customerName = sc.nextLine();

}

void display()

{

super.display();

System.***out***.println("Customer Name: " + customerName);

}

}

public class OrderClass

{

public static void main(String[] args)

{

Scanner sc = new Scanner(System.***in***);

PurchaseOrder[] purchaseOrders = new PurchaseOrder[3];

SalesOrder[] salesOrders = new SalesOrder[3];

System.***out***.println("Enter details for Purchase Orders:");

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

{

purchaseOrders[i] = new PurchaseOrder();

purchaseOrders[i].accept(sc);

}

System.***out***.println("\nEnter details for Sales Orders:");

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

{

salesOrders[i] = new SalesOrder();

salesOrders[i].accept(sc);

}

System.***out***.println("\nDisplaying Purchase Orders:");

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

{

System.***out***.println("Purchase Order " + (i + 1) + ":");

purchaseOrders[i].display();

System.***out***.println();

}

System.***out***.println("Displaying Sales Orders:");

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

{

System.***out***.println("Sales Order " + (i + 1) + ":");

salesOrders[i].display();

System.***out***.println();

}

sc.close();

}

}

Output:

Enter details for Purchase Orders:

Enter Order ID: 1

Enter Order Description: ABC

Enter Vendor Name: Xyz

Enter Order ID: 2

Enter Order Description: ABC

Enter Vendor Name: xyz

Enter Order ID: 3

Enter Order Description: ABC

Enter Vendor Name: xyz

Enter details for Sales Orders:

Enter Order ID: 1

Enter Order Description: ABC

Enter Customer Name: XYZ

Enter Order ID: 2

Enter Order Description: ABC

Enter Customer Name: XYZ

Enter Order ID: 3

Enter Order Description: ABC

Enter Customer Name: XYZ

Displaying Purchase Orders:

Purchase Order 1:

Order ID: 1

Order Description: ABC

Vendor Name: Xyz

Purchase Order 2:

Order ID: 2

Order Description: ABC

Vendor Name: xyz

Purchase Order 3:

Order ID: 3

Order Description: ABC

Vendor Name: xyz

Displaying Sales Orders:

Sales Order 1:

Order ID: 1

Order Description: ABC

Customer Name: XYZ

Sales Order 2:

Order ID: 2

Order Description: ABC

Customer Name: XYZ

Sales Order 3:

Order ID: 3

Order Description: ABC

Customer Name: XYZ