**CO24557: Object Oriented Programming**

**Assignment 3**

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**BE-II Year (CSE)**

//CO24557 Assignment 3 - problem 1

//class Date : sets and shows date given by user

//class DateTest : takes date as input from user and implements the //Date class

import java.util.Scanner;

class Date

{

private int year,month,day ;

public Date(int year,int month,int day)

{

this.year = year;

this.month = month;

this.day = day;

}

public void setYear(int year)

{ this.year = year; }

public void setMonth(int month)

{ this.month = month; }

public void setDay(int day)

{ this.day = day; }

public int getYear()

{ return year; }

public int getMonth()

{ return month; }

public int getDay()

{ return day; }

public void displayDate()

{

System.out.print("\nDate: "+month+"/"+day+"/"+year);

}

}

public class DateTest

{

public static void main(String[] args)

{

int year,month,day;

Scanner stdin = new Scanner(System.in);

System.out.print("\nEnter Year: ");

year = stdin.nextInt();

System.out.print("\nEnter Month: ");

month = stdin.nextInt();

while(month>12||month<=0)

{

System.out.print("Invalid Month!\nEnter month again: ");

month = stdin.nextInt();

}

System.out.print("\nEnter day: ");

day = stdin.nextInt();

while(day>31||day<=0)

{

System.out.print("Invalid Day!\nEnter day again: ");

day = stdin.nextInt();

}

Date date = new Date(year,month,day);

date.displayDate();

System.out.print("\n\nDo you want to change this date(y/n)? ");

char ch = stdin.next().charAt(0);

if(ch=='y'||ch=='Y')

{

System.out.print("\nEnter Year: ");

year = stdin.nextInt();

date.setYear(year);

System.out.print("\nEnter Month: ");

month = stdin.nextInt();

while(month>12||month<=0)

{

System.out.print("\nInvalid Month!\nEnter month again: ");

month = stdin.nextInt();

}

date.setMonth(month);

System.out.print("\nEnter day: ");

day = stdin.nextInt();

while(day>31||day<=0)

{

System.out.print("\nInvalid Day!\nEnter day again: ");

day = stdin.nextInt();

}

date.setDay(day);

System.out.print("\nDate changed succesfully! ");

date.displayDate();

}

}

}

//CO 24557 : Assignment 3 - problem 2

//super class : Car ; sub-classes : Truck,Sedan

class Car

{

int speed;

double regularPrice;

String color;

public Car() {}

public Car(int speed,double regularPrice,String color)

{

this.speed = speed;

this.regularPrice = regularPrice;

this.color = color;

}

double getSalePrice()

{ return regularPrice; }

}

class Truck extends Car

{

int weight;

public Truck() {}

public Truck(int weight,int speed,double regularPrice,String color)

{

super(speed,regularPrice,color);

this.weight = weight;

}

double getSalePrice()

{

if(weight>2000) //10% discount

return super.getSalePrice()-(0.1\*super.getSalePrice());

else //20% discount

return super.getSalePrice()-(0.2\*super.getSalePrice());

}

}

class Ford extends Car

{

int year;

int manufacturerDiscount;

public Ford() {}

public Ford(int year,int discount,int speed,double regularPrice,String color)

{

super(speed,regularPrice,color);

this.year = year;

manufacturerDiscount = discount;

}

double getSalePrice()

{

return super.getSalePrice()-manufacturerDiscount;

}

}

class Sedan extends Car

{

int length;

public Sedan() {}

public Sedan(int length,int speed,double regularPrice,String color)

{

super(speed,regularPrice,color);

this.length = length;

}

double getSalePrice()

{

if(length>20) //5% discount

return super.getSalePrice()-(0.05\*super.getSalePrice());

else //10% discount

return super.getSalePrice()-(0.1\*super.getSalePrice());

}

}

public class MyOwnAutoShop

{

public static void main(String[] args)

{

Sedan car1 = new Sedan(25,230,1250000.0,"Natural silver");

//feet,kmph,Rs.,color

Ford car2 = new Ford(2016,50000,180,510000.0,"Pearl White");

//year,Rs.(discount),kmph,Rs.,color

Ford car3 = new Ford(2018,20000,200,630000.0,"Ocean Blue");

//year,Rs.(discount),kmph,Rs.,color

System.out.print("\n\nCars available in the Auto shop are:");

System.out.print("\n\nCar 1:");

System.out.print("\nType: Sedan");

System.out.print("\nLength: "+car1.length+" feet");

System.out.print("\nSpeed: "+car1.speed+" Kmph");

System.out.print("\nColor: "+car1.color);

System.out.print("\nRegular Price: Rs."+car1.regularPrice);

System.out.print("\nSale Price: Rs."+car1.getSalePrice());

System.out.print("\n\nCar 2:");

System.out.print("\nType: Ford");

System.out.print("\nYear: "+car2.year);

System.out.print("\nSpeed: "+car2.speed+" Kmph");

System.out.print("\nColor: "+car2.color);

System.out.print("\nRegular Price: Rs."+car2.regularPrice);

System.out.print("\nManufacturer discount: Rs."+car2.manufacturerDiscount);

System.out.print("\nSale Price: Rs."+car2.getSalePrice());

System.out.print("\n\nCar 3:");

System.out.print("\nType: Ford");

System.out.print("\nYear: "+car3.year);

System.out.print("\nSpeed: "+car3.speed+" Kmph");

System.out.print("\nColor: "+car3.color);

System.out.print("\nRegular Price: Rs."+car3.regularPrice);

System.out.print("\nManufacturer discount: Rs."+car3.manufacturerDiscount);

System.out.print("\nSale Price: Rs."+car3.getSalePrice());

}

}

//CO24557 Assignment 3 - problem 3

//Guess the number game

import java.util.\*;

class GuessTheNumber

{

public static void main(String[] args)

{

char ch = 'y' ;

while(ch=='y' || ch=='Y')

{

System.out.println("\n GUESS THE NUMBER GAME (1 to 1000) ");

System.out.print("\n1.Easy \n2.Normal \n3.Hard");

System.out.print("\n\n Select the difficulty level: ");

Scanner stdin = new Scanner(System.in);

int level = stdin.nextInt();

int chances = 9;

switch(level)

{

case 1: chances = 13;

break;

case 2: chances = 10;

break;

case 3: chances = 7;

break;

default: System.out.println("\n Wrong choice!");

main(new String[1]);

}

Random rand = new Random();

int key = rand.nextInt(1000)+1;

int i;

for(i=chances;i>0;--i)

{

System.out.printf("\n Enter your Guess(%d chances left): ",i);

int guess = stdin.nextInt();

if(guess == key)

{

System.out.print("\n\n Congratulations! You guessed the number.");

break;

}

if(guess<key)

System.out.println(" Too low. Try again.");

else

System.out.println(" Too High. Try again.");

}

if(i==0)

System.out.print("\n Sorry you lost. The number was "+key);

System.out.print("\n\n Do you want to play again(y/n)? ");

ch = stdin.next().charAt(0);

}

}

}

//CO24557 Assignment 3 - problem 4

//simple bank account activities;2 types of account - saving and //current

import java.util.\*;

abstract class Account

{

String CustomerName;

private int AccountNumber;

private double Balance;

String AccountType;

public Account() {}

public Account(String name,String type,double money)

{

CustomerName = name;

AccountType = type;;

Balance = money;

Random rand = new Random();

AccountNumber = rand.nextInt(10000000)+1000000; //random number between 1000000 to 9999999

}

public double getBalance()

{ return Balance; }

public void setBalance(double money)

{ Balance = money; }

public void deposit(double money,int time)

{

this.calculateInterest(time);

Balance = Balance + money;

System.out.print("\n\nRs."+money+" deposited successfully.");

}

public void withdraw(double money,int time)

{

this.calculateInterest(time);

if(money>this.getBalance() || this.getBalance()<0)

System.out.print("\nCannot withdraw more than your balance in account!");

else

{

Balance = Balance - money;

System.out.print("\n\nRs."+money+" withdrwan successfully.");

}

}

public abstract void calculateInterest(int time);

public void showDetails()

{

System.out.print("\n\nMini Statement:");

System.out.print("\nCustomer Name: "+CustomerName);

System.out.print("\nAccount Type: "+AccountType);

System.out.print("\nAccount Number: "+AccountNumber);

System.out.print("\nAccount Balance: Rs."+Balance);

}

}

class SavingsAccount extends Account

{

public SavingsAccount(String name,String type,double money)

{

super(name,type,money);

}

public void calculateInterest(int time) //compound interest

{

double interest;

while(time>0)

{

interest = this.getBalance()\*0.005; //0.5% interest rate per month

this.setBalance(this.getBalance()+interest);

time--;

}

}

}

class CurrentAccount extends Account

{

public CurrentAccount(String name,String type,double money)

{

super(name,type,money);

}

public void calculateInterest(int time) //simple interest

{

double interest = (this.getBalance()\*0.003\*time)/100; //0.3% interest rate per month

this.setBalance(this.getBalance()+interest);

}

public void withdraw(double money, int time) //withdraw func overridden

{

this.calculateInterest(time);

if(money>this.getBalance() || this.getBalance()<0)

System.out.print("\nCannot withdraw more than your balance in account!");

else

{

this.setBalance(this.getBalance() - money);

System.out.print("\n\nRs."+money+" withdrwan successfully.");

if(this.getBalance()<1000)

{

System.out.print("\nBalance in account is less than RS.1000(min. limit)!\nImposing penalty of Rs.500");

this.setBalance(this.getBalance() - 500);

}

}

}

}

public class AccountTester

{

public static void main(String[] args)

{

String name;

double money = 0;

int time;

int choice = 0;

Scanner input = new Scanner(System.in);

System.out.print("\n\n ----Banking System----");

System.out.print("\n\nSelect Account type: \n1.Current Account \n2.Savings Account");

System.out.print("\n\nChoice: ");

int type = input.nextInt();

input.nextLine(); //flushing buffer

switch(type)

{

case 1: System.out.print("\n\nEnter Customer Name: ");

name = input.nextLine();

int flag=0;

while(flag==0)

{

System.out.print("\nEnter Initial amount to be deposited(Min. limit is Rs.1000): ");

money = input.nextDouble();

if(money<1000)

System.out.print("\nCannot open account for balance less than Rs.1000");

else

flag=1;

}

CurrentAccount account1 = new CurrentAccount(name,"Current Account",money);

while(choice!=4)

{

System.out.print("\n\n ----Account Menu----");

System.out.print("\n\n1.Deposit money");

System.out.print("\n2.Withdraw money");

System.out.print("\n3.Get mini statement");

System.out.print("\n4.exit");

System.out.print("\n\nChoice: ");

choice = input.nextInt();

switch(choice)

{

case 1:System.out.print("\n\nEnter Amount to be deposited: ");

money = input.nextDouble();

System.out.print("\nEnter time since last transaction(in months): ");

time = input.nextInt();

account1.deposit(money,time);

break;

case 2:System.out.print("\n\nEnter Amount to be withdrawn: ");

money = input.nextDouble();

System.out.print("\nEnter time since last transaction(in months): ");

time = input.nextInt();

account1.withdraw(money,time);

break;

case 3:account1.showDetails();

break;

case 4:break;

default: System.out.print("\n\n Wrong Choice! \nTerminating...\n");

System.exit(0);

}

}

break;

case 2: System.out.print("\n\nEnter Customer Name: ");

name = input.nextLine();

System.out.print("\nEnter Initial amount to be deposited(Min. limit is Rs.1000): ");

money = input.nextDouble();

SavingsAccount account2 = new SavingsAccount(name,"Saving Account",money);

while(choice!=4)

{

System.out.print("\n\n ----Account Menu----");

System.out.print("\n\n1.Deposit money");

System.out.print("\n2.Withdraw money");

System.out.print("\n3.Get mini statement");

System.out.print("\n4.exit");

System.out.print("\n\nChoice: ");

choice = input.nextInt();

switch(choice)

{

case 1:System.out.print("\n\nEnter Amount to be deposited: ");

money = input.nextDouble();

System.out.print("\nEnter time since last transaction(in months): ");

time = input.nextInt();

account2.deposit(money,time);

break;

case 2:System.out.print("\n\nEnter Amount to be withdrawn: ");

money = input.nextDouble();

System.out.print("\nEnter time since last transaction(in months): ");

time = input.nextInt();

account2.withdraw(money,time);

break;

case 3:account2.showDetails();

break;

case 4:break;

default: System.out.print("\n\n Wrong Choice! \nTerminating...\n");

System.exit(0);

}

}

break;

default: System.out.print("\n\n Wrong Choice! \nTerminating...\n");

System.exit(0);

}

}

}

//CO24557 Assignment 3 - problem 5

//Employee management system - shows leave balance and salary since //DOJ

import java.util.\*;

import java.time.LocalDate;

import Date.\*; //user-defined package

class Employee

{

double leavesPerMonth;

double initialSalary;

int hike;

public Employee() {}

public void showDetails(MyDate doj,float leaves)

{

LocalDate today = LocalDate.now(); //for today's date

int cur\_year = today.getYear();

int cur\_month = today.getMonthValue();

int yearsOfWork = cur\_year - doj.getYear();

if(cur\_month-doj.getMonth() < 0)

yearsOfWork--;

while(yearsOfWork>0)

{

initialSalary = initialSalary + (initialSalary\*hike/100);

yearsOfWork--;

}

System.out.printf("\n\nSalary of employee per month now: Rs. %.3f lakhs",initialSalary/12);

System.out.print("\nLeaves remaining = "+((leavesPerMonth\*12)-leaves));

}

}

class Manager extends Employee

{

public Manager()

{

initialSalary = 12.0; //in lpa

leavesPerMonth = 2.5;

}

}

class Engineer extends Employee

{

public Engineer() {}

}

class Researcher extends Employee

{

public Researcher()

{

initialSalary = 12.0; //in lpa

}

}

class HR extends Manager

{

public HR()

{

hike = 20; //percentage

}

}

class Technology extends Manager

{

public Technology()

{

hike = 30; //percentage

}

}

class Developer extends Engineer

{

public Developer()

{

initialSalary = 10.0; //in lpa

leavesPerMonth = 3;

hike = 40; //percentage

}

}

class Tester extends Engineer

{

public Tester()

{

initialSalary = 6.0; //in lpa

leavesPerMonth = 2.5;

hike = 10; //percentage

}

}

class Architect extends Engineer

{

public Architect()

{

initialSalary = 12.0; //in lpa

leavesPerMonth = 4;

hike = 50; //percentage

}

}

class DataScience extends Researcher

{

public DataScience()

{

leavesPerMonth = 4;

hike = 50; //percentage

}

}

class Analytics extends Researcher

{

public Analytics()

{

leavesPerMonth = 3;

hike = 40; //percentage

}

}

class Cloud extends Researcher

{

public Cloud()

{

leavesPerMonth = 3;

hike = 40; //percentage

}

}

public class EmployeeManagementSystem

{

public static void main(String[] args)

{

float leaves;

MyDate doj = new MyDate();

Scanner input = new Scanner(System.in);

int ch;

System.out.print("\n\nEnter the employee's date of Joining: ");

doj.getDate();

System.out.print("\n\nEnter the Leaves taken for the current year: ");

leaves = input.nextFloat();

System.out.print("\nSelect the designation of Employee: ");

System.out.print("\n\n1.HR Manager");

System.out.print("\n2.Technology Manager");

System.out.print("\n3.Developer");

System.out.print("\n4.Tester");

System.out.print("\n5.Architect");

System.out.print("\n6.Data Science Researcher");

System.out.print("\n7.Analytics Researcher");

System.out.print("\n8.Cloud Researcher");

System.out.print("\n\nChoice: ");

ch = input.nextInt();

switch(ch)

{

case 1: HR emp1 = new HR();

emp1.showDetails(doj,leaves);

break;

case 2: Technology emp2 = new Technology();

emp2.showDetails(doj,leaves);

break;

case 3: Developer emp3 = new Developer();

emp3.showDetails(doj,leaves);

break;

case 4: Tester emp4 = new Tester();

emp4.showDetails(doj,leaves);

break;

case 5: Architect emp5 = new Architect();

emp5.showDetails(doj,leaves);

break;

case 6: DataScience emp6 = new DataScience();

emp6.showDetails(doj,leaves);

break;

case 7: Analytics emp7 = new Analytics();

emp7.showDetails(doj,leaves);

break;

case 8: Cloud emp8 = new Cloud();

emp8.showDetails(doj,leaves);

break;

default: System.out.print("\nWrong Choice! \nTerminating...\n");

System.exit(0);

}

}

}

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