

LAB PROGRAM-1

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

SOURCE CODE:

```
import java.util.Scanner;
import static java.lang.Math.sqrt;
class Lab1{
    public static void main(String args[]){
        Scanner ss=new Scanner(System.in);
        double a,b,c,d,r1,r2;
        int temp;
        System.out.println("Enter the three co-efficients a,b,c of the quadratic
equation");
        a=ss.nextDouble();
        b=ss.nextDouble();
        c=ss.nextDouble();
        d=((b*b)-(4*a*c));
        if(d==0)
        {
            temp=1;
        }
        else if(d>0)
        {
            temp=2;
        }
        else
```

```
{  
temp=3;  
}  
switch(temp)  
{  
case 1:System.out.println("The roots are real and equal");  
r1=r2=(-b/(2*a));  
System.out.println("The roots are "+r1+" and "+r2+"");  
break;  
case 2:System.out.println("The roots are real and distinct");  
r1=(-b+sqrt(d))/(2*a);  
r2=(-b-sqrt(d))/(2*a);  
System.out.println("The roots are "+r1+" and "+r2+"");  
break;  
case 3:System.out.println("The roots are imaginary,that is there are no real  
solutions to the given quadratic equation");  
break;  
default:System.out.println("Invalid input");  
break;  
}  
}  
}
```

OBSERVATION:

OOJ Lab-1

- * Develop a JAVA program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$.

Read in a, b, c and use the quadratic formula.

If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.

→ Algorithm:-

1) START

2) Read a, b, c (coefficients of the quadratic equation)

3) Calculate $d = b^2 - 4ac$

4) If ($d = 0$)

→ Calculate $r_1(\text{root 1}) = \frac{(-b)}{2a}$

→ Calculate $r_2(\text{root 2}) = \frac{(-b)}{2a}$

→ Display real and equal roots (r_1, r_2)

5) else if ($d > 0$)

→ Calculate $r_1(\text{root 1}) = \frac{(-b + \sqrt{d})}{2a}$

→ Calculate $r_2(\text{root 2}) = \frac{(-b - \sqrt{d})}{2a}$

→ Display real and distinct roots (r_1, r_2)

6) else if ($d < 0$)

→ Display no real solution

7) STOP

→ Program :-

```
import java.util.Scanner;
import static java.lang.Math.sqrt;
class Lab1 {
    public static void main (String args[]) {
        Scanner ss = new Scanner (System.in);
        double a, b, c, d, r1, r2;
        int temp;
        System.out.println ("Enter the three
coefficients a, b, c of the quadratic equation");
        a = ss.nextDouble ();
        b = ss.nextDouble ();
        c = ss.nextDouble ();
        d = ((b * b) - (4 * a * c));
        if (d == 0)
            {
                temp = 1;
            }
        else if (d > 0)
            {
                temp = 2;
            }
    }
}
```

(~~if~~ ~~int~~ ~~else~~) ~~int~~ temp; ~~float~~

}
temp = 3;
}

switch (temp)
{

case 1: System.out.println ("The roots are
real and equal ");

$$x_1 = x_2 = (-b / (2 * a));$$

System.out.println ("The roots are "+x1+"
and "+x2+");

break;

case 2: System.out.println ("The roots are real
and distinct ");

$$x_1 = (-b + \sqrt{d}) / (2 * a);$$

$$x_2 = (-b - \sqrt{d}) / (2 * a);$$

System.out.println ("The roots are "+x1+"
and "+x2+");

break;

case 3: System.out.println ("The roots are
imaginary, that is there are no real solutions to
given quadratic equation ");

break;

default: System.out.println ("Invalid input");

break;

i = good

}

{good} distinct

}

new Stack("B") stack, two, intype : 1 less

{"longer than less"

$$((o^+s) | d-) = LR = LR$$

"first" new Stack("B") stack, two, intype

{"(w' + LR)" less

; good,

old one Stack("B") stack, two, intype : less.

{"less than less"

$$(o^+s) | ((b) type + d-) = LR$$

$$(o^+s) | ((b) type - d-) = LR$$

"first" new Stack("B") stack, two, intype

{"(" "first" less

; good,

new Stack("B") stack, two, intype : Error.

at least one less or less with at least one pair.

{"rest type stack type, new type

; good,

OUTPUT:

```
C:\Users\win10\Documents\Java lab programs>java Lab1
Enter the three co-efficients a,b,c of the quadratic equation
1
2
3
The roots are imaginary,that is there are no real solutions to the given quadratic equation
```

```
C:\Users\win10\Documents\Java lab programs>java Lab1
Enter the three co-efficients a,b,c of the quadratic equation
4
8
4
The roots are real and equal
The roots are -1.0 and -1.0
```

```
C:\Users\win10\Documents\Java lab programs>java Lab1
Enter the three co-efficients a,b,c of the quadratic equation
5
10
2
The roots are real and distinct
The roots are -0.2254033307585166 and -1.7745966692414832
```

LAB PROGRAM-2

Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

SOURCE CODE:

```
import java.util.*;
class Student {
    private String usn;
    private String name;
    private int credits[];
    private int marks[];
    private int n;
    void accept()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter student details");
        System.out.println("USN:");
        usn=s.next();
        System.out.println("Name:");
        name=s.next();
        System.out.println("Enter the number of subjects:");
        n=s.nextInt();
        credits=new int[n];
        marks=new int[n];
        System.out.println("Enter credits and marks attained by the student in each subject");
        for(int i=0;i<n;i++)
    }
```

```
{  
    credits[i]=s.nextInt();  
    marks[i]=s.nextInt();  
}  
}  
  
void display()  
{  
    System.out.println("Student details:");  
    System.out.println("USN:"+usn);  
    System.out.println("Name:"+name);  
    System.out.println("Marks in each subject:");  
    for(int i=0;i<n;i++)  
    {  
        System.out.println("Subject "+(i+1)+":"+marks[i]);  
    }  
}  
  
double calculate()  
{  
    int tcp=0,tc=0;  
    for(int i=0;i<n;i++)  
    {  
        tc=tc+credits[i];  
        if(marks[i]>=50)  
        {  
            tcp=tcp+((marks[i]/10)+1)*credits[i]);  
        }  
    }  
}
```

```
else if(marks[i]>=40 && marks[i]<50)
{
    tcp=tcp+(4*credits[i]);
}
}
return (double)tcp/tc;
}
}

class StudentMain
{
    public static void main(String ss[])
    {
        Student s1=new Student();
        s1.accept();
        s1.display();
        System.out.println("SGPA: "+s1.calculate());
    }
}
```

OBSERVATION:

OOJ Lab program-2.

* Develop a java program to create a class Student with members id, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

* Algorithm :-

- 1) START
- 2) READ the members id, name, credits, marks in the method accept()
- 3) DISPLAY the student details in the method display()
- 4) CALCULATE the SGPA of the student in the method calculate() using array of credits and marks
- 5) In Student Main class, the obj is created and the default constructor of class Student is called.
- 6) The other methods of class Student is also called/invoke in the main class.
- 7) SGPA is DISPLAYED from the return value of calculate.
- 8) STOP.

→ CODE :-

```
import java.util.*;
```

```
class Student {
```

```
    private String usn;
```

```
    private String name;
```

```
    private int credits[];
```

```
    private int marks[];
```

```
    private int n;
```

```
void accept ()
```

```
{
```

```
Scanner s = new Scanner (System.in);
```

```
System.out.println ("Enter student details");
```

```
System.out.println ("USN : ");
```

```
usn = s.next();
```

```
System.out.println ("Name : ");
```

```
name = s.next();
```

```
System.out.println ("Enter the number of subjects : ");
```

```
n = s.nextInt();
```

```
credits = new int [n];
```

```
marks = new int [n];
```

```
System.out.println ("Enter credits and marks  
attained by the student in each subject");  
for (int i=0; i<n; i++) {  
    credits[i] = s.nextInt();  
    marks[i] = s.nextInt();  
}  
void display () {  
    System.out.println ("Student details : ");  
    System.out.println ("USN: " + usn);  
    System.out.println ("Name: " + name);  
    System.out.println ("Marks in each subject : ");  
    for (int i=0; i<n; i++) {  
        System.out.println ("Subject " + (i+1) + ": " +  
            marks[i]);  
    }  
}
```

```
double calculate()
{
    int tdp = 0, tc = 0;
    for (int i=0; i<n; i++)
    {
        tc = tc + credits[i];
        if (marks[i] >= 40)
        {
            tdp = tdp + ((marks[i]/10) + 1) *
                credits[i];
        }
        else if (marks[i] >= 40 & marks[i] < 50)
        {
            tdp = tdp + (4 * credits[i]);
        }
    }
    return (double) tdp / tc;
}
```

class StudentMain

```
public static void main (String ss[])
{
```

```
    Student st = new Student();
```

```
    si.accept();
    si.display();
    System.out.println("SGPA: " + si.calculate());
}

}
```

OUTPUT:

```
C:\Users\win10\Documents\Java lab programs>javac StudentMain.java
C:\Users\win10\Documents\Java lab programs>java StudentMain
Enter student details
USN:
1BM19CS100
Name:
Niharika
Enter the number of subjects:
5
Enter credits and marks attained by the student in each subject
4 77
5 78
3 74
4 75
4 77
Student details:
USN:1BM19CS100
Name:Niharika
Marks in each subject:
Subject 1:77
Subject 2:78
Subject 3:74
Subject 4:75
Subject 5:77
SGPA: 8.0
```

LAB PROGRAM-3

Create a class Book which contains four members: name, author, price, num pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

SOURCE CODE:

```
import java.util.*;
class Book {
    String name;
    String author;
    int price;
    int num_pages;
    Book()
    {}
    Book(String name,String author,int price,int num_pages)
    {
        this.name=name;
        this.author=author;
        this.price=price;
        this.num_pages=num_pages;
    }
    void accept()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter the name of the book");
    }
}
```

```
name=s.next();
System.out.println("Enter the author of the book");
author=s.next();
System.out.println("Enter the price of the book");
price=s.nextInt();
System.out.println("Enter the number of pages of the book");
num_pages=s.nextInt();
}
public String toString()
{
return ("Name: "+name + "\n" + "Author: "+author + "\n" + "Price: "+price +
"\n" +"Number of pages: "+num_pages );
}
}
class BookMain1 {
public static void main(String ss[])
{
Scanner a=new Scanner(System.in);
Book b1=new Book("Heights","Anne",299,345);
System.out.println("Sample input:\n"+b1);
System.out.println("Enter the number of books");
int n=a.nextInt();
Book b[]=new Book[n];
for(int i=0;i<n;i++)
{
b[i]=new Book();
System.out.println("\nEnter the details of book"+(i+1));
```

```
b[i].accept();
}
for(int i=0;i<n;i++)
{
System.out.println("\nDetails of book "+(i+1));
System.out.println(b[i]);
}
}
}
```

OBSERVATION:

OOJ Lab Program - 03.

* Create a class Book which contains four members: name, author, price, num-pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a `toString()` method that would display the complete details of the book. Develop a java program to create n book objects

CODE:-

```
import java.util.*;  
class Book {  
    String name;  
    String author;  
    int price;  
    int num-pages;  
    Book()  
    {}  
    Book(String name, String author, int price,  
        int num-pages)
```

{

this.name = name;

this.author = author;

this.price = price;

this.num_pages = num_pages;

}

void accept()

{

Scanner s = new Scanner(System.in);

System.out.println("Enter the name of the book");

name = s.next();

System.out.println("Enter the author of the book");

author = s.nextLine();

System.out.println("Enter the price of the book");

price = s.nextInt();

 System.out.println("Enter the number of pages of
the book");

num_pages = s.nextInt();

}

public String toString()

{

 return ("Name :" + name + "\n" + "Author :" + author + "\n" +
"Price :" + price + "\n" + "Number of pages :" + num_pages);

```
}

}

class BookMain {
    public static void main (String ss[])
    {
        Scanner a = new Scanner(System.in);
        Book b1 = new Book ("Heights", "Anne",
                           299, 345);

        System.out.println ("Sample input :\n"+b1);
        System.out.println ("Enter the number of books");
        int n=a.nextInt();
        Book b[] = new Book[n];
        for (int i=0; i<n; i++)
        {
            b[i] = new Book ();
            System.out.println ("\nEnter the details of book "
                               +(i+1));
            b[i].accept();
        }
        for (int i=0; i<n; i++)
        {
            System.out.println ("\nDetails of book "+(i+1));
        }
    }
}
```

```
System.out.println(b[i]);
```

```
}
```

```
}
```

```
}
```

OUTPUT:

```
C:\Users\win10\Documents\Java lab programs>javac BookMain1.java
```

```
C:\Users\win10\Documents\Java lab programs>java BookMain1
```

```
Sample input:
```

```
Name: Heights
```

```
Author: Anne
```

```
Price: 299
```

```
Number of pages: 345
```

```
Enter the number of books
```

```
3
```

```
Enter the details of book1
```

```
Enter the name of the book
```

```
Sunshine
```

```
Enter the author of the book
```

```
John
```

```
Enter the price of the book
```

```
100
```

```
Enter the number of pages of the book
```

```
788
```

```
Enter the details of book2
```

```
Enter the name of the book
```

```
Crystal
```

```
Enter the author of the book
```

```
Henry
```

```
Enter the price of the book
```

```
200
```

```
Enter the number of pages of the book
```

```
500
```

```
Enter the details of book3
```

```
Enter the name of the book
```

```
King
```

```
Enter the author of the book
```

```
Rahul
```

```
Enter the price of the book
```

```
900
```

```
Enter the number of pages of the book
```

```
100
```

Details of book 1

Name: Sunshine

Author: John

Price: 100

Number of pages: 788

Details of book 2

Name: Crystal

Author: Henry

Price: 200

Number of pages: 500

Details of book 3

Name: King

Author: Rahul

Price: 900

Number of pages: 100

LAB PROGRAM-4

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

SOURCE CODE:

```
import java.util.*;
abstract class Shape
{
int a,b;
abstract void printArea();
}
class Rectangle extends Shape
{
void printArea()
{
Scanner ss=new Scanner(System.in);
```

```
System.out.println("Enter length and breadth of the rectangle");
a=ss.nextInt();
b=ss.nextInt();
double area;
area=(double)a*b;
System.out.println("The area of Recatngle is "+area);
}
}
class Triangle extends Shape
{
void printArea()
{
Scanner ss=new Scanner(System.in);
System.out.println("Enter base length and height of the triangle");
a=ss.nextInt();
b=ss.nextInt();
double area;
area=(double)0.5*a*b;
System.out.println("The area of Triangle is "+area);
}
}
class Circle extends Shape
{
void printArea()
{
Scanner ss=new Scanner(System.in);
```

```
System.out.println("Enter radius of the circle");
a=ss.nextInt();
double area;
area=(double)3.14*a*a;
System.out.println("The area of Circle is "+area);
}
}
class Shapemain
{
public static void main(String args[])
{
int ch;
Scanner ss=new Scanner(System.in);
Rectangle r=new Rectangle();
Triangle t=new Triangle();
Circle c=new Circle();
while(true){
System.out.println("Enter the choice of shape whose area has to be
calculated");
System.out.println("1.Rectangle\n2.Triangle\n3.Circle\n4.Exit");
ch=ss.nextInt();
switch(ch)
{
case 1:
r.printArea();
break;
```

```
case 2:  
t.printArea();  
break;  
case 3:  
c.printArea();  
break;  
case 4:  
System.exit(0);  
break;  
default:  
System.out.println("Invalid choice!");  
}  
}  
}  
}
```

OBSERAVATION:

OOJ

OOJ Lab Exercises - 4 and 5
[xlik 8]

→) Lab-4 :-

CODE :-

```
import java.util.*;
abstract class Shape
{
    int a,b;
    abstract void printArea();
}
class Rectangle extends Shape
{
    void printArea()
    {
        Scanner ss= new Scanner(System.in);
        System.out.println("Enter length and breadth of the
rectangle ");
        a=ss.nextInt();
        b=ss.nextInt();
        double area;
        area=(double) a*b;
        System.out.println("The area of Rectangle is "+area);
    }
}
```

```
        }  
    }  
  
class Triangle extends Shape  
{  
    void printArea()  
{  
        Scanner ss = new Scanner (System.in);  
        System.out.println ("Enter base length and  
height of the triangle");  
        a=ss.nextInt();  
        b=ss.nextInt();  
        double area;  
        area = (double) 0.5*a*b;  
        System.out.println ("The area of triangle is "+area);  
    }  
  
    }  
  
class Circle extends Shape  
{  
    void printArea()  
{  
        Scanner ss = new Scanner (System.in)  
        System.out.println ("Enter radius of the circle");  
        a=ss.nextInt();  
        double area;  
        area = (double) 3.14*a*a;
```

```
System.out.println ("The area of Circle is "
+ area);
```

{

}

```
class ShapeMain
```

```
{ public static void main (String args [])
```

```
{ int ch;
```

```
Scanner ss = new Scanner (System.in);
```

```
Rectangle r = new Rectangle ();
```

```
Triangle t = new Triangle ();
```

```
Circle c = new Circle ();
```

```
while (true) {
```

```
System.out.println ("Enter the choice of shape whose  
area has to be calculated");
```

```
System.out.println ("1. Rectangle\n2. Triangle\n3. Circle  
4. Exit");
```

```
ch = ss.nextInt();
```

```
switch (ch)
```

{

```
case 1:
```

```
r.printArea ();
```

```
break;
```

case 2:

t.printArea();

break;

case 3:

c.printArea();

break;

case 4:

System.exit(0);

break;

default:

System.out.println("Invalid choice!");

}

}

}

}

OUTPUT:

```
C:\Users\win10\Documents\Java lab programs>javac Shapemain.java

C:\Users\win10\Documents\Java lab programs>java Shapemain
Enter the choice of shape whose area has to be calculated
1.Recatngle
2.Triangle
3.Circle
4.Exit
1
Enter length and breadth of the rectangle
4 5
The area of Recatngle is 20.0
Enter the choice of shape whose area has to be calculated
1.Recatngle
2.Triangle
3.Circle
4.Exit
2
Enter base length and height of the triangle
7 9
The area of Triangle is 31.5
Enter the choice of shape whose area has to be calculated
1.Recatngle
2.Triangle
3.Circle
4.Exit
3
Enter radius of the circle
8
The area of Circle is 200.96
Enter the choice of shape whose area has to be calculated
1.Recatngle
2.Triangle
3.Circle
4.Exit
4
```

LAB PROGRAM-5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks: • Accept deposit from customer and update the balance. • Display the balance. • Compute and deposit interest • Permit withdrawal and update the balance • Check for the minimum balance, impose penalty if necessary and update the balance

SOURCE CODE:

```
import java.util.Scanner;
abstract class Account {
    String cName, accType;
    long accNo;
    double bal;
    final double minBal = 1000.0;
    Account(String cName, long accNo, double bal, String accType) {
        this.accNo = accNo;
        this.cName = cName;
        this.bal = bal;
        this.accType = accType;
    }
    abstract void addBal(double amt);
    abstract void dispBal();
    abstract void withBal(double amt);
}
class Curr_acct extends Account {
```

```
Curr_acct(String cName, long accNo, double bal) {  
super(cName, accNo, bal, "Current");  
System.out.println("Name: "+cName+"\taccno: "+accNo+"\tbl: "+bal+"\ttype:  
"+accType);  
}  
void addBal(double amt){  
this.bal += amt;  
}  
void dispBal(){  
System.out.println("Your balance is: " + this.bal);  
}  
void checkBal() {  
if (this.bal < minBal) {  
System.out.println("Insufficient balance, penalty imposed");  
this.bal -= this.bal * 0.02;  
}  
}  
void withBal(double amt){  
this.bal -= amt;  
checkBal();  
}  
}
```

```
class Sav_acct extends Account {  
    Sav_acct(String cName, long accNo, double bal) {  
        super(cName, accNo, bal, "Savings");  
        System.out.println("name: " + cName + "\taccno: " + accNo + "\tbl: " + bal +  
            "\tttype: " + accType);  
    }  
    void addBal(double amt){  
        this.bal += amt;  
        addIntr();  
    }  
    void addIntr() {  
        this.bal += this.bal * 0.07;  
    }  
    void dispBal(){  
        System.out.println("Your balance is: " + this.bal);  
    }  
    void withBal(double amt){  
        this.bal -= amt;  
    }  
}
```

```
}

class Bank {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Double amt;
        System.out.println("Enter your details:");
        System.out.println("Name:");
        String x=sc.next();
        System.out.println("Account Number:");
        long y=sc.nextLong();
        for(;;)
        {
            System.out.println("Type of account:\n1.Current account\n2.Savings
account\n3.Exit");
            int t=sc.nextInt();
            if(t==1){
                System.out.println("The current account provides cheque book facility but no
interest.");
                Curr_acct c = new Curr_acct(x, y, 50000);
                for(;;)
                {
```

```
System.out.println("1:Deposit\n2:Display Balance\n3:Withdraw\n4:Exit");
int ch = sc.nextInt();
switch (ch) {
    case 1:
        System.out.println("Enter the amount to be added:");
        amt = sc.nextDouble();
        c.addBal(amt);
        break;
    case 2:
        c.dispBal();
        break;
    case 3:
        System.out.println("Enter the amount to be withdrawn:");
        amt = sc.nextDouble();
        c.withBal(amt);
        break;
    case 4:System.exit(0);
    default:System.out.println("Invalid choice! Try again");
}
}
}
```

```
else if(t==2){  
System.out.println("The savings account provides compound interest and  
withdrawal facilities but no cheque book facility.");  
Sav_acct s = new Sav_acct(x, y, 5000);  
for(;;) {  
System.out.println("1:Deposit\n2:Display Balance\n3:Withdraw\n4:Exit");  
int ch = sc.nextInt();  
switch (ch) {  
case 1:  
System.out.println("Enter the amount to be added:");  
amt = sc.nextDouble();  
s.addBal(amt);  
break;  
case 2:  
s.dispBal();  
break;  
case 3:  
System.out.println("Enter the amount to be withdrawn:");  
amt = sc.nextDouble();  
s.withBal(amt);  
break;  
case 4:System.exit(0);  
default:System.out.println("Invalid choice! Try again");  
}  
}
```

```
    }
}
else if(t==3)
System.exit(0);
else
System.out.println("Invalid choice! Try again");
}
}
}
```

OBSERVATION:

*) Lab-5:-

```
import java.util.*;  
abstract class Account {  
    String cName, accType;  
    long accNo;  
    double bal;  
    final double minBal = 1000.0;  
    Account (String cName, long accNo, double bal,  
             String accType)  
    {  
        this.accNo = accNo;  
        this.cName = cName;  
        this.bal = bal;  
        this.accType = accType;  
    }  
    abstract void addBal (double amt);  
    abstract void dispBal();  
    abstract void withBal (double amt);  
}  
class Curr.acct extends Account {  
    Curr.acct (String cName, long accNo,  
              double bal)
```

```
{  
    super(cName, accNo, bal, "current");  
    System.out.println("Name : " + cName + " \t"  
        + accNo + "\t" + bal + "\t" + type);  
}  
  
void addBal (double amt) {  
    this.bal += amt;  
}  
  
void dispBal() {  
    System.out.println("your balance is : " +  
        this.bal);  
}  
  
void checkBal () {  
    if (this.bal < minBal) {  
        System.out.println ("Insufficient balance, penalty  
imposed");  
        this.bal -= this.bal * 0.02;  
    }  
}  
  
void withdraw (double amt) {  
    this.bal -= amt;  
    checkBal();  
}  
}
```

```
class SavAcc extends Account {
    SavAcc (String cName, long accNo, double bal) {
        super (cName, accNo, bal, "Savings");
        System.out.println ("name : " + cName + "\t"
                            + accNo + "\t" + bal + "\t" + type);
    }
    void addBal (double amt) {
        this.bal += amt;
        addInt();
    }
    void addInt() {
        this.bal += this.bal * 0.07;
    }
    void dispBal() {
        System.out.println ("Your balance is " + this.bal);
    }
    void withBal (double amt) {
        this.amt -= amt;
    }
}
```

```
class Bank {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        Double amt;
        System.out.println ("Enter your details:");
        System.out.println ("Name : ");
        String x = sc.next();
        System.out.println ("Account Number : ");
        long y = sc.nextLong();
        for (;;) {
            System.out.println ("Type of account :\n1. Current account\n2. Savings account\n3. Exit");
            int t = sc.nextInt();
            if (t == 1) {
                System.out.println ("The current account provides cheque book facility but no interest");
                Curr_act c = new Curr_act (x, y, 5000);
                for (;;) {
                    System.out.println ("1. Deposit\n2. Display Balance\n3. Withdraw\n4. Exit");

```

```
int ch = sc.nextInt();
switch (ch) {
    case 1:
        System.out.println ("Enter the amount to be
added");
        amt = sc.nextDouble();
        c.addBal(amt);
        break;
    case 2:
        c.dispBal();
        break;
    case 3:
        System.out.println ("Enter the amount to be
withdrawn");
        amt = sc.nextDouble();
        c.withBal(amt);
        break;
    case 4:
        System.exit (0);
    default:
        System.out.println ("Invalid choice! Try again");
}
```

else if ($t == 2$) {

System.out.println ("The savings account
provides compound interest and withdrawal
facilities but no cheque book facility");

Sav acct s = new Sav acct (x, y, 5000);

for (;;) {

System.out.println ("1. Deposit 2. Display Balance

3. Withdrawal 4. Exit");

int ch = sc.nextInt();

switch (ch) {

case 1:

System.out.println ("Enter the amount to be
added");

amt = sc.nextDouble();

s.addBal (amt); break;

case 2: c.dispBal();

break;

case 3: System.out.println ("Enter the amount to
be withdrawn");

amt = sc.nextDouble();

c.withBal (amt);

break;

case 4: System.exit(0);

default:

System.out.println("Invalid choice! Try again");

}

}

}

else if (t == 3)

System.exit(0);

else

System.out.println("Invalid choice! Try again");

}

}

}

OUTPUT:

```
C:\Users\win10\Documents\Java lab programs>java Bank
Enter your details:
Name:
fgh
Account Number:
789
Type of account:
1.Current account
2.Savings account
3.Exit
2
The savings account provides compound interest and withdrawal facilities but no cheque book facility.
name: fgh      accno: 789      bal: 5000.0      type: Savings
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
1
Enter the amount to be added:
1000
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 6420.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
3
Enter the amount to be withdrawn:
100
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 6320.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
4
```

```
C:\Users\win10\Documents\Java lab programs>java Bank
Enter your details:
Name:
abc
Account Number:
123
Type of account:
1.Current account
2.Savings account
3.Exit
1
The current account provides cheque book facility but no interest.
Name: abc      accno: 123      bal: 50000.0    type: Current
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
1
Enter the amount to be added:
1000
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 51000.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
3
Enter the amount to be withdrawn:
50500
Insufficient balance, penalty imposed
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
2
Your balance is: 490.0
1:Deposit
2:Display Balance
3:Withdraw
4:Exit
4
```