

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

### Lab Program 2-

Develop a JAVA program that prints all real sol. 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.

```
import java.util.*;
class Roots {
{ public static void main (String[] args)
{
    int a, b, c, f = 0;
    double D;
    Scanner sc = new Scanner (System.in);
    System.out.println("\nEnter the values of a, b, c: ");
    a = sc.nextInt();
    b = sc.nextInt();
    c = sc.nextInt();
    D = (b*b) - (4*a*c);
    if (D == 0)
    { System.out.println("Roots are real and equal");
      f = 1;
    }
    else if (D > 0)
    { System.out.println("Roots are real and unequal");
      f = 1;
    }
    else if (D < 0)
    { System.out.println("Roots are imaginary");
    }
    if (f == 1)
    { double x1 = ((-b + Math.sqrt(D)) / (2*a));
      double x2 = ((-b - Math.sqrt(D)) / (2*a));
      System.out.println("Roots are: " + x1 + ", " + x2);
    }
}
}
```

```
Command Prompt
Microsoft Windows [Version 10.0.18363.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\shivani>cd desktop
C:\Users\shivani\Desktop>cd JA
C:\Users\shivani\Desktop\JA>javac Roots.java
C:\Users\shivani\Desktop\JA>java Roots

Enter the values of a,b,c:
1
2
-3
Roots are real and unequal
Roots are:1.0,-3.0

C:\Users\shivani\Desktop\JA>
```

## 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.

## Lab Program - 2

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

```
import java.util.Scanner;
```

```
class Student {
```

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

```
    String USN;
```

```
    String Name;
```

```
    int credits[] = new int[5];
```

```
    float marks[] = new float[5];
```

```
    int point[] = new int[5];
```

```
    float SGPA;
```

```
    int totalCredits = 0;
```

```
    void getDetails() {
```

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

```
        USN = sc.nextLine();
```

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

```
        Name = sc.nextLine();
```

```
        for (int i = 0; i < 5; i++) {
```

```
            System.out.println("Enter Credits for Subject " + (i+1) + ":");
```

```
            credits[i] = sc.nextInt();
```

```
            totalCredits += credits[i];
```

```
            System.out.println("Enter Marks for Subject " + (i+1) + ":");
```

```
            marks[i] = sc.nextFloat();
```

```
        }
```

```
    }
```

```
    void showDetails() {
```

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



```

System.out.println("Enter student name: " + Name);
for (int i=0; i<5; i++){
    System.out.println("Subject" + (i+1) + "-Credits: " +
        credits[i] + "-Marks: " + marks[i]);
}
System.out.println("SGPA of " + Name + " is: " +
    (float) (SGPA / total credits));
}
void calcSGPA() {
    for (int i=0; i<5; i++){
        if (marks[i] > 100) {
            System.out.println("Error: Marks are above 100");
            return;
        }
        else if (marks[i] >= 90)
        {
            points[i] = 10;
        }
        else if (marks[i] >= 80)
        {
            points[i] = 9;
        }
        else if (marks[i] >= 70)
        {
            points[i] = 8;
        }
        else if (marks[i] >= 60)
        {
            points[i] = 7;
        }
        else if (marks[i] >= 50)
        {
            points[i] = 5;
        }
        else if (marks[i] >= 40)
        {
            points[i] = 4;
        }
        else
    }
}

```

```

    {
        points[i] = 0;
    }
    SGPA += (points[i] * credits[i]);
}
}
}

public class Lab2
{
    public static void main(String args[])
    {
        Student stu1 = new Student();
        stu1.getDetails();
        stu1.calcSGPA();
        stu1.showDetails();
    }
}

```

```
Command Prompt
Microsoft Windows [Version 10.0.18363.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\shivani>cd desktop
C:\Users\shivani\Desktop>cd JA
C:\Users\shivani\Desktop\JA>javac Lab2.java
C:\Users\shivani\Desktop\JA>java Lab2
Enter student USN:
150
Enter student Name:
shivani
Enter Credits for Subject 1:
3
Enter Marks for Subject 1:
75
Enter Credits for Subject 2:
2
Enter Marks for Subject 2:
79
Enter Credits for Subject 3:
3
Enter Marks for Subject 3:
89
Enter Credits for Subject 4:
5
Enter Marks for Subject 4:
88
Enter Credits for Subject 5:
3
Enter Marks for Subject 5:
87
Student USN: 150
Enter student name: shivani
Subject 1 - Credits: 3 - Marks: 75.0
Subject 2 - Credits: 2 - Marks: 79.0
Subject 3 - Credits: 3 - Marks: 89.0
Subject 4 - Credits: 5 - Marks: 88.0
Subject 5 - Credits: 3 - Marks: 87.0
SGPA of shivani is: 8.6875
```

## 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 a toString( ) method that could display the complete details of the book. Develop a Java program to create n book objects.

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

```
import java.util.*;  
class BOOKS
```

```
{  
    String name, author;  
    double price;  
    int num-pages;
```

```
    public BOOKS()  
{  
    this.name = " ";  
    this.author = " ";  
    this.price = 0.0;  
    this.num-pages = 0;  
}
```

```
    public void DETAILS()  
{  
    Scanner ob = new Scanner(System.in);  
    System.out.println("ENTER THE NAME OF THE BOOK\n");  
    name = ob.nextLine();  
    System.out.println("ENTER THE NAME OF THE AUTHOR");  
    author = ob.nextLine();  
    System.out.println("ENTER THE PRICE OF THE BOOK");  
    price = ob.nextDouble();  
    System.out.println("ENTER THE NUMBER OF PAGES OF THE BOOK");  
    num-pages = ob.nextInt();  
}
```



YOUVA  
Date: \_\_\_\_\_

```

public void ToString()
{
    System.out.println("---- DETAILS OF THE BOOK ----");
    System.out.println("NAME OF THE BOOK : "+name);
    System.out.println("NAME OF THE AUTHOR : "+author);
    System.out.println("PRICE OF THE BOOK : "+price);
    System.out.println("NO. OF PAGES OF THE BOOK : "+num_pages);
}

public static void main(String args[])
{
    int i=0,n;
    BOOKS obj = new BOOKS();
    Scanner ob1 = new Scanner(System.in);
    System.out.println("ENTER THE NUMBER OF BOOKS");
    n = ob1.nextInt();
    for (i=1; i<=n; i++)
    {
        obj.DETAILS();
        obj.ToString();
    }
}

```

```
Command Prompt
Microsoft Windows [Version 10.0.18363.1882]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\shivani>cd desktop
C:\Users\shivani\Desktop>cd JA
C:\Users\shivani\Desktop\JA>javac BOOKS.java
C:\Users\shivani\Desktop\JA>java BOOKS
ENTER THE NUMBER OF BOOKS
2
ENTER THE NAME OF THE BOOK
Alchemist
ENTER THE NAME OF THE AUTHOR
Paulo Coelho
ENTER THE PRICE OF THE BOOK
450
ENTER THE NUMBER OF PAGES OF THE BOOK
590
----DETAILS OF THE BOOK----
NAME OF THE BOOK:Alchemist
NAME OF THE AUTHOR:Paulo Coelho
PRICE OF THE BOOK:450.0
NO. OF PAGES OF THE BOOK:590
ENTER THE NAME OF THE BOOK
Fault in our Stars
ENTER THE NAME OF THE AUTHOR
John Green
ENTER THE PRICE OF THE BOOK
550
ENTER THE NUMBER OF PAGES OF THE BOOK
450
----DETAILS OF THE BOOK----
NAME OF THE BOOK:Fault in our Stars
NAME OF THE AUTHOR:John Green
PRICE OF THE BOOK:550.0
NO. OF PAGES OF THE BOOK:450
```

## 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.

#### 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 & 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.

```
abstract class Shape
{
    int a=8, b=6;
    abstract void printArea();
}
class Rectangle extends Shape
{
    int area-rectangle;
    void printArea()
    {
        area-rectangle = a*b;
        System.out.println("Area of rectangle = " + area-rectangle);
    }
}
class Triangle extends Shape
{
    float area-triangle;
    void printArea()
    {
        area-triangle = (float)(0.5*a*b);
        System.out.println("Area of triangle = " + area-triangle);
    }
}
```

```

class Circle extends Shape
{
    float area_circle-1, area_circle-2;
    void printArea()
    {
        area_circle-1 = (float) (3.14*a*a);
        area_circle-2 = (float) (3.14*b*b);
        System.out.println("Area of circle 1 = "+area_circle-1);
        System.out.println("Area of circle 2 = "+area_circle-2);
    }
}

class abstract_areas
{
    public static void main(String args[])
    {
        Rectangle r = new Rectangle();
        r.printArea();
        Triangle t = new Triangle();
        t.printArea();
        Circle c = new Circle();
        c.printArea();
    }
}

```

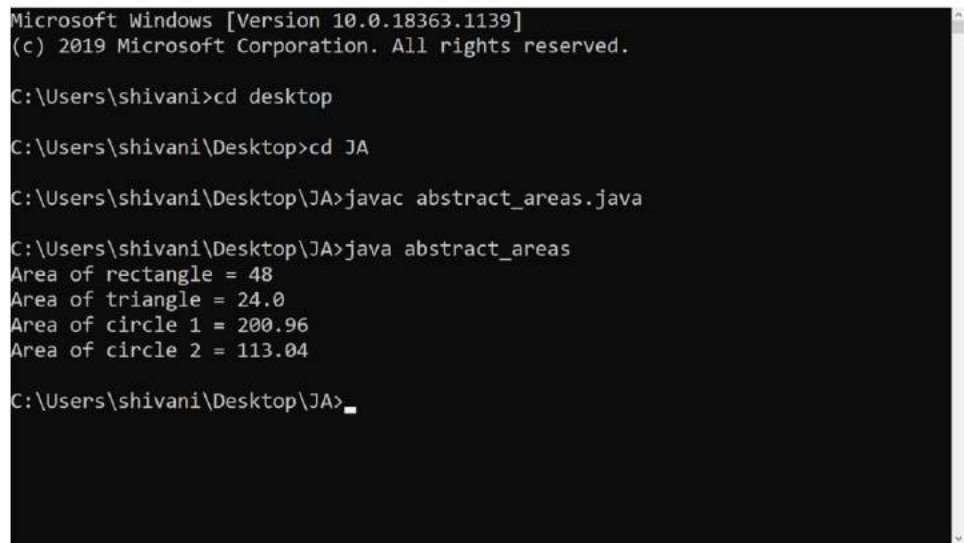


```

        area_circle_2 = (float)(3.14*b*b);
        System.out.println("Area of circle 1 = " + area_circle_1);
        System.out.println("Area of circle 2 = " + area_circle_2);
    }
}

class abstract_areas
{
    public static void main(String args[])
    {
        Rectangle r = new Rectangle();
        r.printArea();
        Triangle t = new Triangle();
        t.printArea();
        Circle c = new Circle();
        c.printArea();
    }
}

```



```

Microsoft Windows [Version 10.0.18363.1139]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\shivani>cd desktop
C:\Users\shivani\Desktop>cd JA
C:\Users\shivani\Desktop\JA>javac abstract_areas.java
C:\Users\shivani\Desktop\JA>java abstract_areas
Area of rectangle = 48
Area of triangle = 24.0
Area of circle 1 = 200.96
Area of circle 2 = 113.04
C:\Users\shivani\Desktop\JA>_

```

**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

16M19C8150

## LAB PROGRAM-5

Develop a Java program to create a class Bank ---  
update the balance

```
import java.util.*;
class Account
{
    String name, type;
    int acc-no;
    double amount;
    Scanner in = new Scanner(System.in);
    void type(int choice)
    {
        if (choice == 1)
            type = "Savings Account";
        if (choice == 2)
            type = "Current Account";
    }
    void input()
    {
        System.out.println("Enter the Name, Account number & Balance");
        name = in.next();
        acc-no = in.nextInt();
        amount = in.nextDouble();
    }
    void deposit()
    {
        System.out.println("Enter the amount to be deposited");
        double x = in.nextDouble();
        amount = amount + x;
    }
}
```

```

void display()
{
    System.out.println("Name: "+name);
    System.out.println("Account number: "+acc-no);
    System.out.println("Type: "+type);
    System.out.println("Balance: "+amount);
}

class Savings-acc extends Account
{
    double a, cinterest;
    int r, t;
    Scanner in = new Scanner(System.in);
    void withdrawl()
    {
        System.out.println("Enter amount to be withdrawn:");
        double amtw = in.nextDouble();
        if (amtw <= amount)
            amount = amount - amtw;
        else
            System.out.println("Invalid amount");
    }
    void comp-interest()
    {
        System.out.println("Enter the rate and time:");
        r = in.nextInt();
        t = in.nextInt();
        a = amount * Math.pow(1 + (r * 0.01), t);
        cinterest = a - amount;
    }
    void display
    {
        super.display();
        System.out.println("Compound Interest after "+t+" years: "+ciinterest);
        System.out.println("Amount after "+t+" years: "+a);
    }
}

```

```

class Current_acc extends Account
{
    double min=10000;
    void input()
    {
        super.input();
    }
    void service_charge()
    {
        if (amount < min)
            amount = amount - 500;
    }
    void display()
    {
        super.display();
    }
}

class BankDemo
{
    public static void main (String args[])
    {
        Scanner in = new Scanner (System.in);
        System.out.println ("Choose type of account.");
        System.out.println ("1. Savings account.");
        System.out.println ("2. Current account.");
        int choice = in.nextInt();
        if (choice == 1)
        {
            Savings_acc b = Savings_acc();
            b.type (choice);
            b.input();
            System.out.println ("Do you want to deposit or  
withdraw? \n 1. Deposit \n 2. Withdraw \n");
        }
    }
}

```



```

int ch = in.nextInt();
if (ch == 1)
    b.deposit();
else if (ch == 2)
    b.withdrawal();
else
    System.out.println("Invalid choice");
b.comp-interest();
b.display();
}
else if (choice == 2)
{
    Current-acc b = new Current-acc();
    b.type(choice);
    b.input();
    b.deposit();
    b.service-change();
    b.display();
}
else
    System.out.println("Invalid choice");
}
}

```



```

else if(choice==2)
{
    Current_acc b=new Current_acc();
    b.type(choice);
    b.input();
    b.deposit();
    b.service_charge();
    b.display();
}
else
    System.out.println("Invalid choice");
}
}
}

```

```

Microsoft Windows [Version 10.0.17134.110]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\shikhar\Desktop>
C:\Users\shikhar\Desktop>cd .\34
C:\Users\shikhar\Desktop\34>javac bankdemo.java
C:\Users\shikhar\Desktop\34>java bankdemo
Enter type of account:
1. Savings account
2. Current account
Enter the Name,Account number and Balance:
Shikhar
88777777
100000
Enter the amount to be deposited or withdrawn:
1. Deposit
2. Withdraw
1
Enter the amount to be deposited:
10000
Enter the rate and time:
4
Now Display
Account Number:88777777
Type:Savings Account
Balance:100000.0
Compound Interest after 8 years: 80043.622920247
Interest after 4 years: 20000.000000000002
C:\Users\shikhar\Desktop\34>
The system cannot find the path specified.
C:\Users\shikhar\Desktop\34>java bankdemo.java
Enter type of account:
1. Savings account
2. Current account
2
Enter the Name,Account number and Balance:
Shikhar
88777777
100000
Enter the amount to be deposited:
10000
Enter the rate and time:
4
Now Display
Account Number:88777777
Type:Current Account
Balance:70000.0
C:\Users\shikhar\Desktop\34>

```