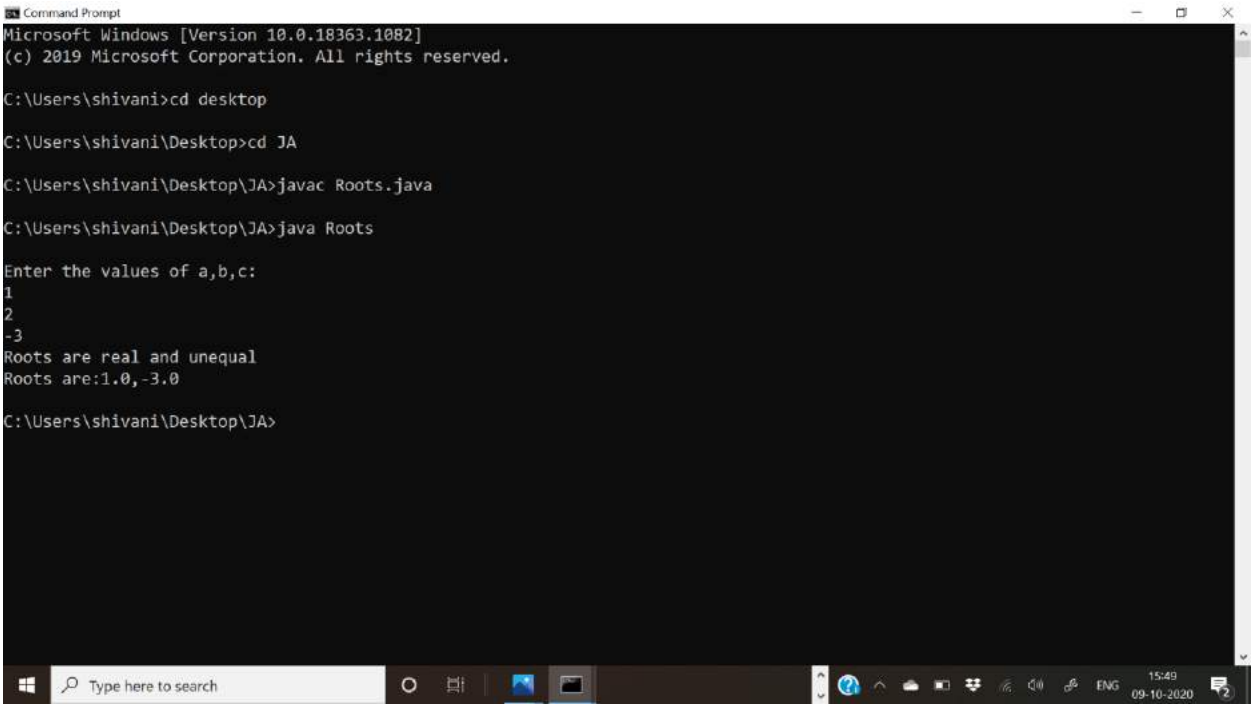
LAB PROGRAM 1 :

Develop a Java program that prints all real solutions to the quadratic equation ax2 +bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2-4ac is negative, display a message stating that there are no real solutions.

Lab Program 1-

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 discriminate 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("\n Enter 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 r1 = ((-b+ Math.sqrt(D))/2*a));
  double r2 =((-b-Math.sqrt(D))/2*a));
  System.out.println("Roots are: "+r1+", "+r2);
}
}
}
```



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.

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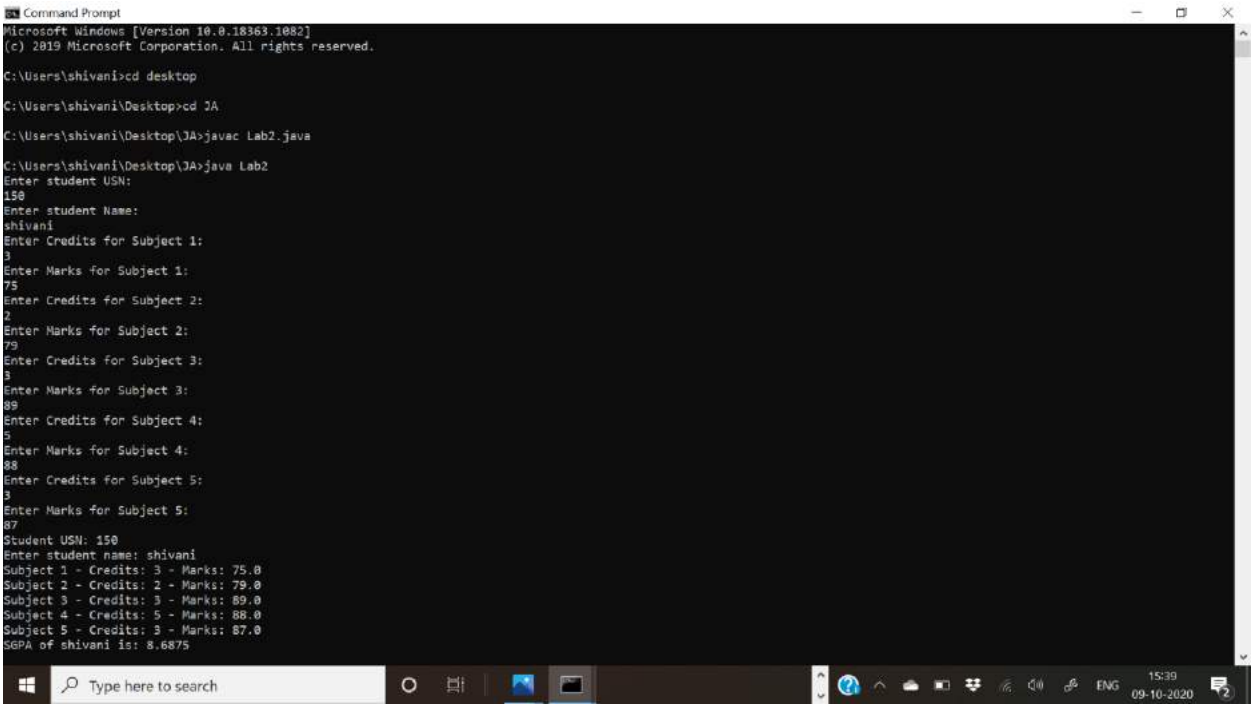
Lab Program - 2

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();
    }
}
```



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.

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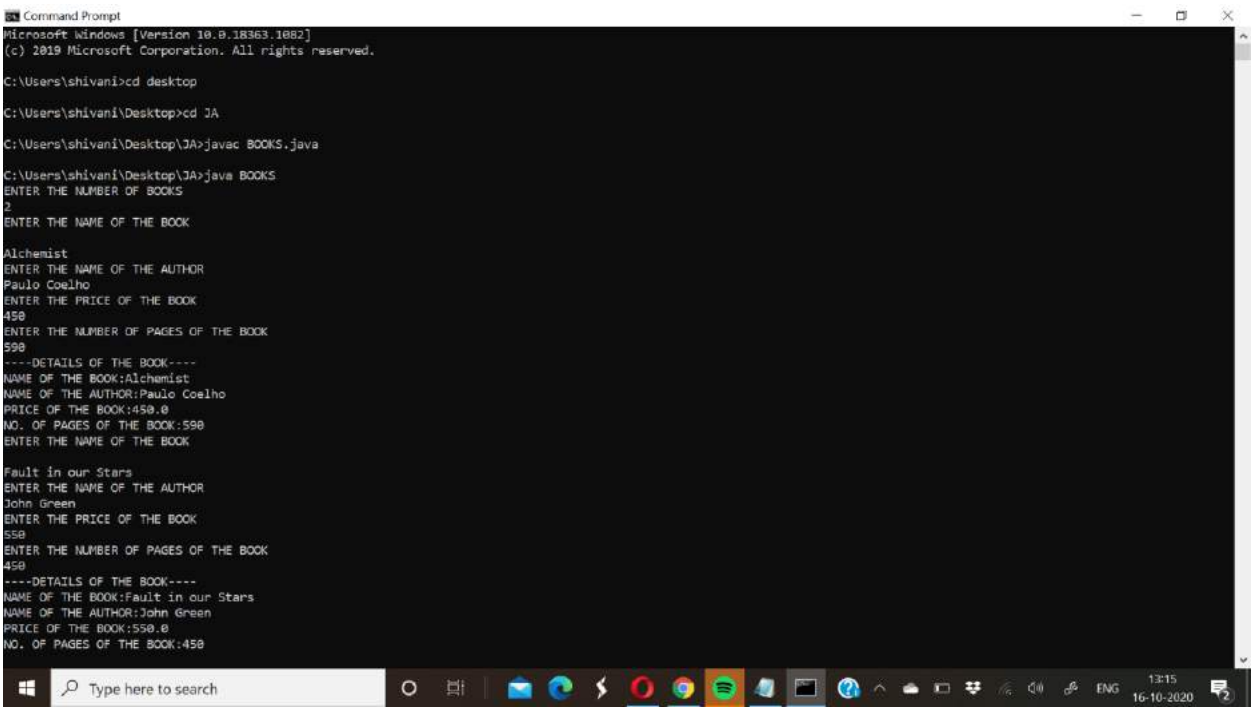
LAB PROGRAM-3

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.

```
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 BO
    num_pages = ob.nextInt();
  }
```

```
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();
     }
  }
}
```



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

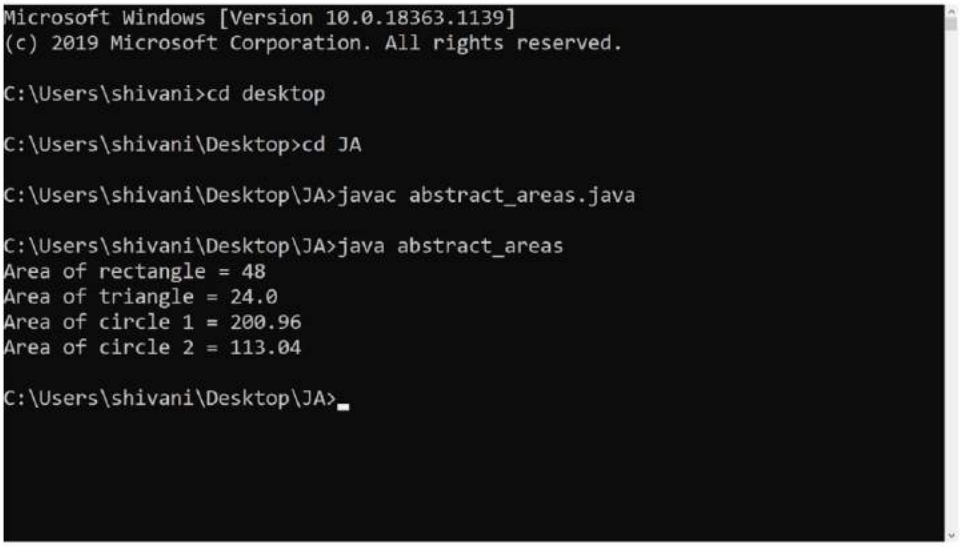
Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle & Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea()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



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

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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 account;
 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 withdrawal()
  { 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 cmp_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:"+cinterest);
      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?\n1.Deposit\n2.Withdraw\n");
```

```
int ch = in.nextInt();
if (ch==1)
b.deposit();
else if (ch==2)
b.withdrawl();
else
System.out.println("Invalid choice");
b.cmp_interest();
b.display();
}
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");
}
}
```

```
        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");

    }
}
```