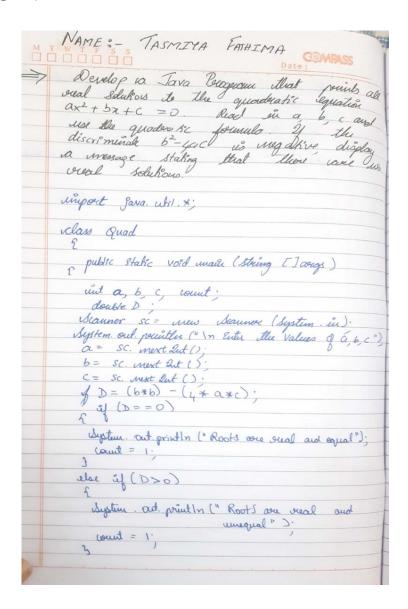
Lab Program: 1

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 discriminate b2-4ac is negative, display a message stating that there are no real solutions.

import java.util.*;



```
ulos of (D<0)

E

System. Out. panith ("Roots are singustrasy"):

if (court ==1)

7

clouble x 1 = ((-b + Math. sqrt (D)) /(2*a)):

double 82 = ((-b - Math. sqrt (D)) /(2*a)):

System. Out. painths ("Roots are: "+81+" "+82):

3
```

PROGRAM:-

```
class Qd
 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 r1=((-b+Math.sqrt(D))/(2*a));
 double r2=((-b-Math.sqrt(D))/(2*a));
 System.out.println("Roots are:"+r1+","+r2);
```

```
Microsoft Kindos (Werston 10.0.18365.1882)
(c) 2819 Microsoft Corporation. All rights reserved.

C:\windows\system32>cd\

C:\java\javac Qd.java

C:\javac Qd.javac Qd.java

C:\javac Qd.javac Qd.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.

```
NAME : - TASMIYA FATHIMA
1 1 BM 19CS 172 Date:
              LAB-2
   Develop a Java preogram to verate a class student with unembers usn, mame, an array
   to calculate so ca up ca student.
   import java. util . *;
   iclass Student 13
     Storing USN;
     steing name:
      und unacks [];
      int n, tol = 0;
      double SGPA:
      Students()
      SGPA = 0;
      void supert ()
      Scanner 50 = new scanner (hystem. in)
     System out paintly "Enter the USN and the
                         mane of the student V.
      USN = Sc. mext Line ().
     name = sc. ment Line ().
     System. out printer (° Enter Mu number of
                       subjects ").
     m = S(. mext 2ut().
     weetits = new int [n].
     marks = new int [n].
```

```
COMPASS
M T W T F S S
                                  Date:
   for (untieo; ien; i++)
   System out pointly ("Enter the coudits for subject"
               + (i+1)).
   weedits CiJ = Sc. next 2nt c).
     tot = tot + to coudits (i];
  for (inti=0; 12 n; i++)
    System out paidle (" Enter the marks of the
   student for subject: " + (i+i)).
marks [i] = sc. next Int();
     Void cgrade-points ()
       int i.
     for ( i=0; i<n; i++)
        & ( marks [i] >= 90 KA marks [i] < 100)
         | morks [i] = 10.
    else if (marks (i] >= 80 KK marks [i] < $ 90)
           unasks [:] = 9;
    else if (marks [i] >= 70 & & marks [i] < 80)
          macks [i] = 8;
   else if (marks [i] >= 60 kk marks [i] < 70)
         marks [i] = 7:
```

```
COMPASS
Date:
MTWTFSS
    ulse if ( marks [i] > $0 & K marks [i] (60)
          marks (i) = 60;
   else ef (marks [i] >= 60 kk marks [i] <50)
marks [i] = 4;
    else if (marks [i] < 40)
       marks [i] = 0.
   3
    void calculate_SGPA()
     unt i:
     for (i=0; i<n; i++)
         SGRAY SORA ATEX.
       SGPA = SGPA + ( width [i] * marks[i]);
       SORA = SORA/ tot;
     Void display _ details ()
         System out possible (" The student with USN: " + USN + ", Name: " + wante + ", Sg TA
          + SGPA)
     2
    public static void main (String [] args)
         Student 13 Obj = new Student ().
```

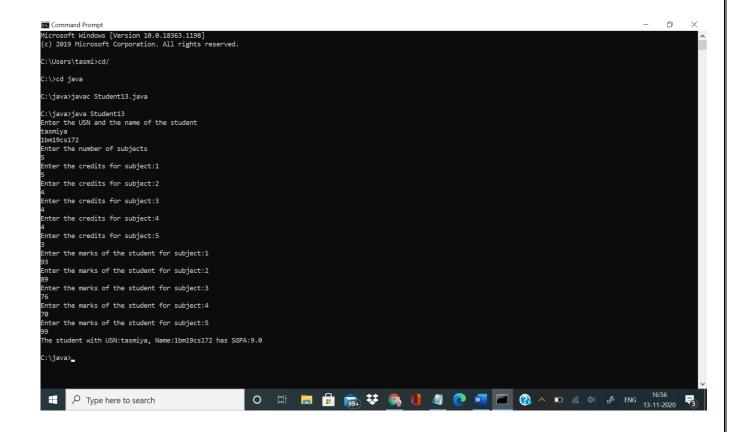
M	T W T F S S	Date :
	Obj. input (); Obj. genade_politie (); Obj. Calculate_Soren ();	
	Obj. display - details ();	

```
import java.util.*;
class Student13
String USN;
String name;
int credits[];
int marks[];
int n,tot=0;
double SGPA;
Student13()
SGPA=0;
void input()
Scanner sc=new Scanner(System.in);
System.out.println("Enter the USN and the name of the student");
USN=sc.nextLine();
name=sc.nextLine();
System.out.println("Enter the number of subjects");
n=sc.nextInt();
credits=new int[n];
marks =new int[n];
for(int i=0;i<n;i++)
```

```
System.out.println("Enter the credits for subject:"+(i+1));
credits[i]=sc.nextInt();
tot=tot+credits[i];
for(int i=0;i<n;i++)
System.out.println("Enter the marks of the student for
subject:"+(i+1));
marks[i]=sc.nextInt();
void grade_points()
{
  int i;
  for(i=0;i<n;i++)
  {
    if(marks[i]>=90 && marks[i]<100)
       marks[i]=10;
     else if(marks[i]>=80 && marks[i]<90)
       marks[i]=9;
```

```
else if(marks[i]>=70 && marks[i]<80)
       marks[i]=8;
    else if(marks[i]>=60 && marks[i]<70)
     {
       marks[i]=7;
    else if(marks[i]>=50 && marks[i]<60)
       marks[i]=6;
    else if(marks[i]>=40 && marks[i]<50)
       marks[i]=4;
    else if(marks[i]<40)
       marks[i]=0;
void calculate_SGPA()
int i;
```

```
for(i=0;i<n;i++)
 SGPA=SGPA+(credits[i]*marks[i]);
 SGPA=SGPA/tot;
void display_details()
{
 System.out.println("The student with USN:"+USN+",
Name:"+name+" has SGPA:"+SGPA);
public static void main(String[] args)
{
Student13 obj=new Student13();
obj.input();
obj.grade_points();
obj.calculate_SGPA();
obj.display_details();
```



LAB PROGRAM -3

<u>Lab program 3</u>: 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.

Write Up:-

```
JASMIYA FATHIMA
                                                  Date:
   MUSINE 1 BM19C5172
                             LAB-3
        Queste va class Book which contains
      members: mame, author, price, mum pages.

Include (a doustructor to set the values
for the members. Enclude methods to set and
aget the details of the objects. Include a

to String () method that could display the

nomplete details of the book. Develop a Java
       peragram to locate or book objects.
        impost gava util scanner.
         iclass Book
          pouvate string mame, author;
          private unt mem gages;
          Book ()
           mame = " The secont key".
              author = "Rejendera".
              peice = 499.00.
               mum-pages = 500.
            Void get Details ()
            Scanner & = new Scanner ( System. in);
           System. out printle 1" In tales the book name: ")
          System. out pountly (" In Enter the author mame: ", author = st. mext Line (); no & page:
            esystem out pointle !" \n Enter the perite");
```

```
Date:
System out populle (" Euler the pouce:")

pouce = sc. next Double();
public string to string ()
 storing derip = "Book name: "+ name + "\n Author

mame: " + author + "\n No. of pages: " + num pages+
"\n Paice: " + price + "\n":
    octume (temp);
 class Book details
    public static void mach ( String wags [ ])
         unt i n;
     Seanner & = new Seanner (Septem in);
    Septem out pointle (" Enter the number of book : ").
    n= sc. next But ();
   Book [] obj = new Book [n].
    for (i=o; izn; i++)
          Obj[i] = Mew ob Book();
  System. and pointly (" It It * * * Ente Book Details
                        * * * 1).
    for(i=0; Kn; i++)
           System. out printle (" In Book" + (i+1) +"; ").
Obj (i) get Details ():
```

	TWTFSS	Date:
M		
	fol(i=0, i< n; i+t)	
	System. out. pointle (obj [i])	,
	3	
	3	
	j	

```
import java.util.Scanner;
class Book
{
     private String name, author;
     private double price;
     private int num_pages;
    Book()
          name="The Secret key";
          author="Rajendra";
          price=399.00;
          num_pages=500;
     void getDetails()
          Scanner in=new Scanner(System.in);
          System.out.println("\nEnter the book name: ");
          name=in.nextLine();
          System.out.println("Enter the author name: ");
          author=in.nextLine();
          System.out.println("Enter the no.of pages: ");
          num_pages=in.nextInt();
```

```
System.out.println("Enter the price: ");
          price=in.nextDouble();
     }
     public String toString()
          String temp="Book name: "+name+"\nAuthor name:
"+author+"\nNo.of pages: "+num_pages+"\nPrice: "+price+"\n";
          return(temp);
class BOOK_details
 public static void main(String args[])
 {
     int i,n;
     Scanner in=new Scanner(System.in);
     System.out.print("Enter the number of books: ");
     n=in.nextInt();
     Book[] obj=new Book[n];
     for(i=0;i< n;i++)
          obj[i]=new Book();
```

```
System.out.println("\t\t***Enter Book Details***");
for(i=0;i<n;i++)
{
         System.out.println("\nBook "+(i+1)+";");
         obj[i].getDetails();
}
System.out.println("\t\t***Book Details***");
for(i=0;i<n;i++)
{
         System.out.println(obj[i]);
}</pre>
```

```
Administrator Command Prompt

C:\Javanjava 800C_details
Enter the number of books: 3

***Enter Book Details***

800k 1;

Enter the book name:
charlek Homes
Enter the suthor name:
cannon Doyle
Enter the price:
299

800k 2;

Enter the price:
299

800k 2;

Enter the book name:
harry potter
Enter the suthor name:
first noting
Enter the price:
500

800k 3;

Enter the price:
500

800k 3;

Enter the book name:
there the price:
500

800k 3;

Enter the book name:
there the suthor name:
charles
Enter the suthor name:
charles
Enter the the no.of pages:
500

800k 3;

Enter the book name:
thillight
Enter the the no.of pages:
500

800k Betails***

800k Details***

800k name: sherlock Homes
Author name: cannon Doyle
No.of pages: 780

800k name: sherlock Homes
Author name: cannon Doyle
No.of pages: 780
```

```
O
Administrator: Command Prompt
  rowling
nter the the no.of pages:
  nter the price:
  nter the the no.of pages:
  nter the price:
                ***Book Details***
    name: sherlock Homes
  othor name: cannon Doyle
of pages: 780
ice: 290.0
        me: harry potter
  othor name: jk rowling
o.of pages: 450
  ok name: twilight
  thor name: charles
                                                                                                                          0
                                          Ξi
```

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.

	N: TIBM 19 CS 17d LAB-4 Date:
	Develop a Java program to oreate van abstract class manned shape that contains there will and au empty melted manned points will brovide these classes manned Rectangle
	and an empty melted maned visit is
	Provide thee classes named Rectangle
	many and cercitie sum was lach
	a the Cases or touch the
	Ishape. Each one of the classes south only other method print brea () Aleat points the square of the square shi
	rations the arms of the coince so
	8
	sabstract class shape
	2
	uit a = 3 $uit b = 4$
	abstract public void print area ();
	2
4	
	whom rectangle extends shape
1	public and some suct.
	public void print_area()
	grant corea
	area a react = 9×6.
1	system out pointly (" The saver of rectangle
1	System out pointly (" The series of rectangle
	2
	class briangle extends Shape

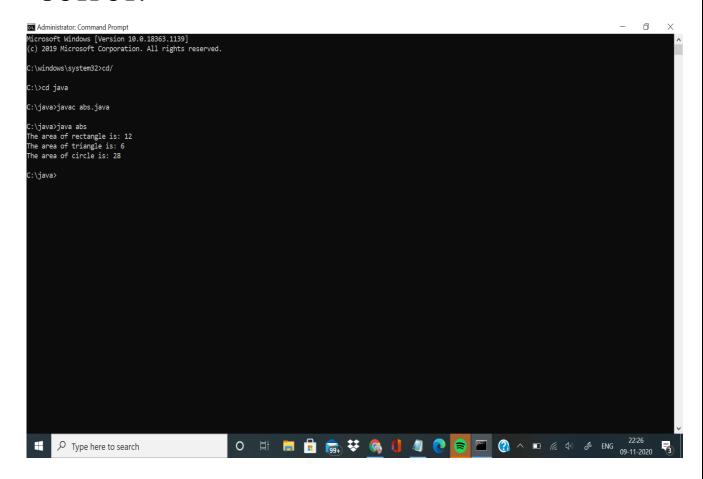
```
Date:
500000
       chut avea - toil :
    public Void petent area()
        arla - tri = ( aut ) ( 0.5 * a * b).
   System out peintly ("The area of towards is: "ava-tri).
   class linch extends Shape
    int area_ wode :
      public void penut to areal)
   System oud pointly ("The was of aids as :"

+ area - circle):
    class also
   a public estatic void amain ( string 17 args)
      rectangle out: new ouetande (?)
      oue point - area ():
thriangle their - wew triangle ();
      circle cir = men wich ();
      (il point - area ();
```

```
abstract class Shape
{
int a=3;
int b=4;
abstract public void print_area();
}
class rectangle extends Shape
```

```
public int area_rect;
public void print_area()
area_rect=a*b;
System.out.println("The area of rectangle is: "+area_rect);
class triangle extends Shape
int area_tri;
public void print_area()
area_tri=(int) (0.5*a*b);
System.out.println("The area of triangle is: "+area_tri);
class circle extends Shape
int area_circle;
public void print_area()
```

```
area_circle=(int) (3.14*a*a);
System.out.println("The area of circle is: "+area_circle);
}
class abs{
public static void main(String[] args){
rectangle rec = new rectangle();
rec.print_area();
triangle tri = new triangle();
tri.print_area();
circle cir = new circle();
cir.print_area();
}
```



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:

- a) Accept deposit from customer and update the balance.
- b) Display the balance.

- c) Compute and deposit interest
- d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.

	TASMIYA FAT HIMA
M T	VSM SIBMIACS142 Date:
	Date:
	LAB-5:
	Develop a Java program to wate a class Bank
	that maditains two kinds of account you its
	ustomers, one called savings account
	and the other unsent randent. The savings
	amount perovides compound interest and
	mithdraval faceleties but un chique book
	facility. The wescut account provides cheque
	poole facility but no interest brusent accor
	hod Less should also main tour as mine
	1) love gall 11 flu balance galls whom
	this level, a vervice Morge de imposed.
	lament in class Account illust signs cusion
	marie, account number and type of account
	Turne Min derive the classes would - all
	Land all the most with
	specific to dhis their requirements. Enclud
	the wecessary methods in order to acheer to
	following dasks:
a)	Accept deposit from customer and apara tou
1	following clasks: Accept deposit from customer and update the
6)	Display the balance
c)	Nemet wellthorains and update the word
	bluck for the minimum balance suger
	Display the balance Permit willthorough and update the balance balance injust for the uninimum balance injust penalty if measony and update the balance
	+4
	import gava. util. Scanner;
-	
	clas account
	1 of it.
	peivate struig mame; peivate long account-munites; poirate unt saccount type;
	pointe dong allocan - mines
_	pourale du sacour-

Date: double dalouce; void get data () Scaurce Sc = new Scanner (System, in) Septem out pointer (" Enter your mame ") System . Det. printle (" Enter the account number vaccount - number = SE. mext Lorg (); System · out, printly (" bloose "the account type". System. Out pecully ("1. Savings secount"); System out printle (" 2. Surrent account ") account - type = sc. next Int (); clut outron _ account _ type () 3 oreturn account type; class savings extends vaccount Staurer 8c = meir Scanner (Septem. in) Void get sav_ balance () system. out pointly ("enter the amount to be
placed in your Savings receptual");
amount sc next Double ();
balance + = amount;

```
void display - sav - blace ()
 System out printer ("balance = "+ balance);
void compute - sax interest ()
System and printle (" Interest of 5% shall be
 balance = balance + (05 * balance);
 Void withdrawl_ sav ()
System out printly ("Enter the amount to be
 With drawn ");
amount = SC. wext Double ();
 Jalance = balance - amount;
Mass wurent extends account
 Scanner se = www Scanner (System in).
  double amount
    final double min balance = 5000;
   Void get un balance ()
  System out pointly (" Inter the amount to
 Ile placed in your account");
    amount = Sc. max & Double ().
   balance + = amount;
```

M T W T F S S void display - un balance () System out painthe l'adama = " + balance); Void compute_cur_ service-charges () if (bolance < min _ balonce) System out printly ("Sowie clax of Rs. 500 shall be so levied"). balance - balance - 500. System out pointly l' minimum balone so mointained "); void with drawl_ (ces () System. Out pointle (" Enter the camount to amount = oc next Double (); balance - balance - amount; 4 class bankmain public static void main (string args [])
System out penally (" Enter the bank delails

```
Date:
M T W T F S S
   account acc = men account();
    acc. get_data ();
          type = acc. oution - account type 0;
   if ( type = = 1)
   System out peculty ( Sovings Acount").
    Savinge sav = new savings();
   Sav. get_ sav_ balance ().
   Saw. display - say - blace ();
    Sav. compute _ sav_ unterest ();
    Sar. display_ sar_ Unce ();
    Say. ulithdrawal_sav().
    son. display - sar blace ()
   2/ ( type = = 2)
    System. out pointly (" CURRENT ACCOUNT");
    current aux = men current ();
    (us get aus - balance ().
      au. display - au - blnce().
     cur. conquite _ cur _ service - charges ();
      lus. withdraw al - cur();
     cur display - cur - blace().
```

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

```
class account
{
    private String name;
    private long account_number;
    private int account_type;
```

```
double balance;
     void get_data()
      Scanner ss=new Scanner(System.in);
      System.out.println("enter your name");
      name=ss.next();
      System.out.println("enter the account_number");
      account_number=ss.nextLong();
     System.out.println("choose the account type ");
      System.out.println("1.savings account");
      System.out.println("2.current account");
      account_type=ss.nextInt();
     int return_account_type()
      return account_type;
}
class savings extends account
{
     Scanner ss=new Scanner(System.in);
     double amount;
```

```
void get_sav_balance()
      System.out.println("enter the amount to be placed in your
savings account");
      amount=ss.nextDouble();
      balance+=amount;
     void display_sav_blnce()
      System.out.println("balance="+balance);
     void compute_sav_interest()
      System.out.println("interest of 5% shall be added to your
balance");
      balance=balance+(.05*balance);
     void withdrawl_sav()
      System.out.println("enter the amount to be withdrawn");
      amount=ss.nextDouble();
```

```
balance=balance-amount;
}
class current extends account
{
     Scanner ss=new Scanner(System.in);
     double amount;
     final double min_balance=5000;
     void get_cur_balance()
     System.out.println("enter the amount to be placed in your
current account");
     amount=ss.nextDouble();
     balance+=amount;
     void display_cur_blnce()
     System.out.println("balance="+balance);
     void compute_cur_service_charges()
```

```
if(balance<min_balance)</pre>
           {
           System.out.println("service tax of rs.500 shall be levied");
           balance=balance-500;
      else
           System.out.println("minimum balance is maintained");
     void withdrawl_cur()
      System.out.println("enter the amount to be withdrawn");
      amount=ss.nextDouble();
      balance=balance-amount;
}
class bankmain
public static void main(String args[])
```

```
System.out.println("enter the bank details");
account acc=new account();
acc.get_data();
int type=acc.return_account_type();
if (type==1)
System.out.println("SAVINGS ACCOUNT");
savings sav=new savings();
 sav.get_sav_balance();
 sav.display_sav_blnce();
 sav.compute_sav_interest();
 sav.display_sav_blnce();
 sav.withdrawl_sav();
 sav.display_sav_blnce();
if(type==2)
System.out.println("CURRENT ACCOUNT");
 current cur=new current();
 cur.get_cur_balance();
 cur.display_cur_blnce();
 cur.compute_cur_service_charges();
 cur.display_cur_blnce();
 cur.withdrawl_cur();
```

```
cur.display_cur_blnce();
}
}
```

