

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.

Program :

```
29/09/20
Lab 1.
1. Quadratic equation
import java.util.*;
class Quadratic
{
    public static void main (String []arg)
    {
        Scanner S = new Scanner (System.in);
        System.out.println ("Enter a, b, c of the
        equation  $ax^2 + bx + c = 0$ ");
        double a = S.nextDouble();
        double b = S.nextDouble();
        double c = S.nextDouble();
        double d = b*b - 4.0*a*c;
        double roots1, roots2; System.out.println(d);
        if (d > 0)
        {
            roots1 = (-b - Math.sqrt(d)) / (2.0*a);
            roots2 = (-b + Math.sqrt(d)) / (2.0*a);
            System.out.println ("Two real roots are: " + roots1
                                + " " + roots2);
        }
        else if (d == 0)
        {
            System.out.println ("Roots are real and equal");
            roots1 = (-1*b) / (2*a);
            roots2 = roots1;
            System.out.println ("Roots are " + roots2);
        }
        else
        {
            System.out.println ("No real roots");
        }
    }
}
```

Output:

```
C:\Users\Hima\Desktop\java>javac Quadratic.java

C:\Users\Hima\Desktop\java>java Quadratic
Enter a,b,c of the equation ax^2+bx+c=0:
1 2 1
0.0
Roots are real and equal
root1: -1.0root2:-1.0

C:\Users\Hima\Desktop\java>javac Quadratic.java

C:\Users\Hima\Desktop\java>java Quadratic
Enter a,b,c of the equation ax^2+bx+c=0:
1 1 1
-3.0
roots are imaginary

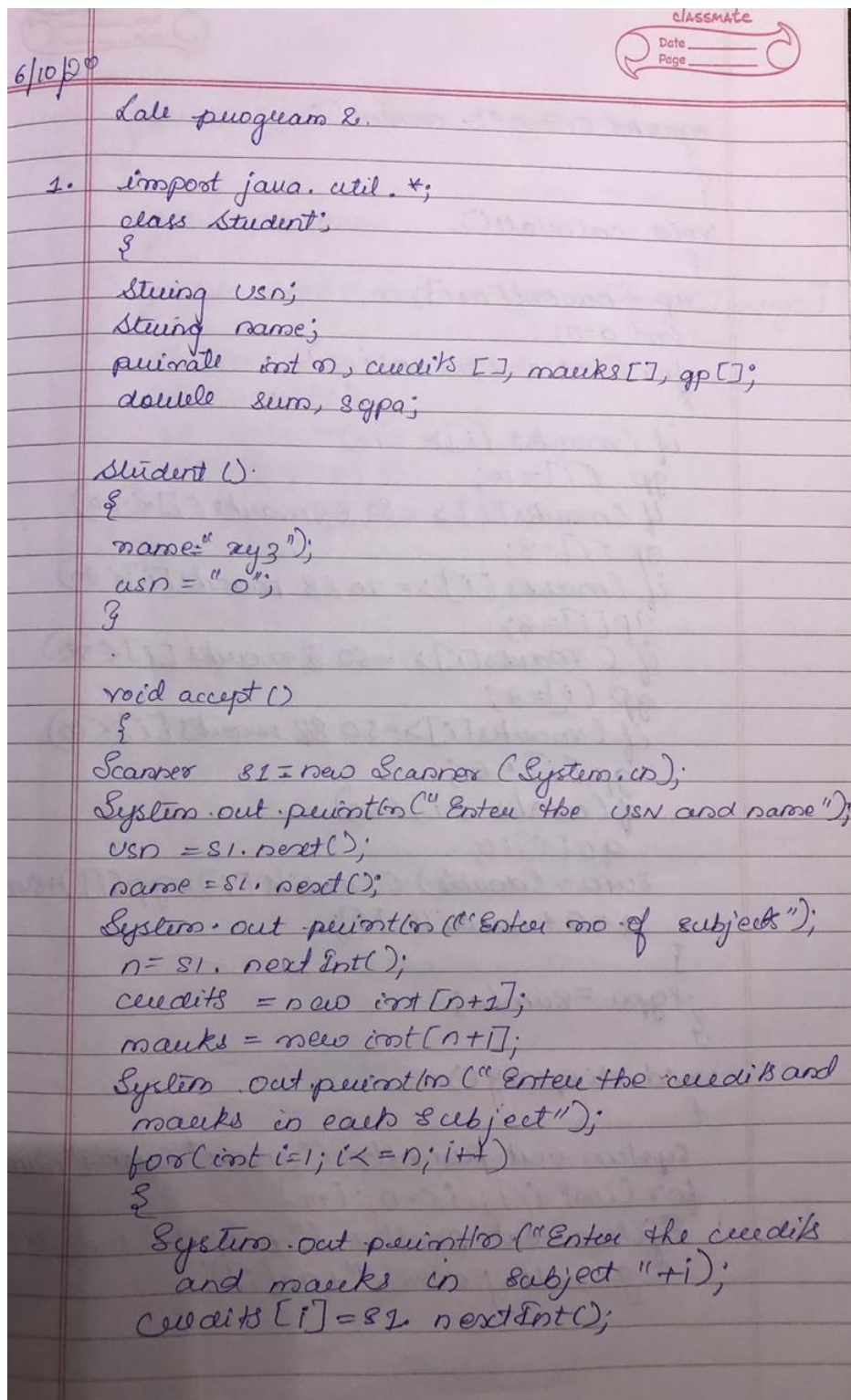
C:\Users\Hima\Desktop\java>javac Quadratic.java

C:\Users\Hima\Desktop\java>java Quadratic
Enter a,b,c of the equation ax^2+bx+c=0:
1 -1 -6
25.0
roots are real and unequal
root1 :-2.0 root2:3.0
```

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.

Program:



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Lab program 2.

```
1. import java.util.*;
class Student {
    String usn;
    String name;
    private int n, credits[], marks[], gp[];
    double sum, sgpa;

    Student () {
        name = "xyz";
        usn = "0";
    }

    void accept () {
        Scanner s1 = new Scanner (System.in);
        System.out.println("Enter the usn and name");
        usn = s1.next();
        name = s1.next();
        System.out.println("Enter no. of subjects");
        n = s1.nextInt();
        credits = new int [n+1];
        marks = new int [n+1];
        System.out.println("Enter the credits and marks in each subject");
        for (int i=1; i<=n; i++) {
            System.out.println("Enter the credits and marks in subject "+i);
            credits[i] = s1.nextInt();
        }
    }
}
```

```
marks[i] = s.nextInt();
```

```
}
```

```
void calculate()
```

```
{
```

```
    gp = new int[n+1];
```

```
    int a=0;
```

```
    for (int i=1; i<=n; i++)
```

```
    {
```

```
        if (marks[i] >= 90)
```

```
            gp[i] = 10;
```

```
        if (marks[i] >= 80 && marks[i] < 90)
```

```
            gp[i] = 9;
```

```
        if (marks[i] >= 70 && marks[i] < 80)
```

```
            gp[i] = 8;
```

```
        if (marks[i] >= 60 && marks[i] < 70)
```

```
            gp[i] = 7;
```

```
        if (marks[i] >= 50 && marks[i] < 60)
```

```
            gp[i] = 6;
```

```
        if (marks[i] < 50)
```

```
            gp[i] = 5;
```

```
        sum = (double) (credits[i] * gp[i]) + sum;
```

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

```
    }
```

```
    gpa = sum/a;
```

```
void display()
```

```
{
```

```
    System.out.println("usr: " + usn + " name: " + name);
```

```
    for (int i=1; i<=n; i++)
```

```
    {
```

```
        System.out.println("marks: " + marks[i] + " grade points: " + gp[i]);
```



```

        System.out.println ("sgpa : " + sgpa);
    }
}

class Studentmain
{
    public static void main (String[] args)
    {
        Student sc = new Student ();
        sc.accept();
        sc.calculate();
        sc.display();
    }
}

```

Output :

```
C:\Users\Hima\Desktop\java>javac Studentmain.java
```

```
C:\Users\Hima\Desktop\java>java Studentmain
```

```
Enter the usn and name
```

```
1bm1234 serena
```

```
Enter number of subjects
```

```
3
```

```
Enter the credits and marks in each subject
```

```
Enter the credits and marks in subject 1
```

```
3 56
```

```
Enter the credits and marks in subject 2
```

```
5 79
```

```
Enter the credits and marks in subject 3
```

```
4 99
```

```
usn:1bm1234 name:serena
```

```
marks:56 grade points:5
```

```
marks:79 grade points:8
```

```
marks:99 grade points:10
```

```
sgpa:7.916666666666667
```

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.

Program :

```
1/10/2020
Lab program 3.
1. import java.util.*;
class Book;
{
    String name, author;
    float price;
    int num_pages;

    Book()
    {
        name = " ";
        author = " ";
        price = 0.00;
        num_pages = 0;
    }

    void get()
    {
        System.out.println("Enter the details of the book");
        Scanner xx = new Scanner(System.in);
        name = xx.next();
        author = xx.next();
        price = xx.nextFloat();
        num_pages = xx.nextInt();
    }

    public String toString()
    {
        return ("Book : \n" + name + " Author : \n" + author +
            "\n Price : \n" + price + " No. of pgs : \n" + num_pages);
    }
}
```

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```

class Bookmain
{
    public static void main (String args[])
    {
        int n;
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter the number of objects");
        n = sc.nextInt();
        Book x[] = new Book[n];
        for (int i=0; i<n; i++)
        {
            x[i] = new Book();
            x[i].get();
        }
        for (int i=0; i<n; i++)
        {
            System.out.println ("Details of book "+ (i+1) + ":");
            System.out.println (x[i]);
        }
    }
}

```

Output :

```
C:\Users\Hima\Desktop\java>javac Bookmain.java
C:\Users\Hima\Desktop\java>java Bookmain

Enter the nubmer of objects:
3

Enter the details of the book
twincke dan 450 1200

Enter the details of the book
Dwen Rossie 345 560

Enter the details of the book
life Ambrose 100 234

details of book1:
Book:twincke
Author:dan
Price:450.0
Number of pages:1200

details of book2:
Book:Dwen
Author:Rossie
Price:345.0
Number of pages:560

details of book3:
Book:life
Author:Ambrose
Price:100.0
Number of pages:234
```


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.

Program :

3/11/20.

Lab 4

1. Abstract program.

```
abstract class shape {
    int a, b;
    abstract void printArea();
}

class Rectangle extends shape {
    int a;
    int b;
    Rectangle (int x, int y) {
        a = x;
        b = y;
    }
    void printArea() {
        System.out.println("Area of rectangle: " + a * b);
    }
}

class Triangle extends shape {
    int a, b;
    Triangle (int x, int y) {
        a = x;
        b = y;
    }
}
```

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```

void printArea()
{
    a = x; System.out.println("Area: " + (a*b));
    b = y;
}

```

```

class Circle extends Shape
{
    int a;
    void Circle(int x)
    {
        a = x;
    }
    void printArea()
    {
        System.out.println("Area: " + 3.14*a*a);
    }
}

```

```

class Shapemain
{
    public static void main (String args[])
    {
        Rectangle r = new Rectangle (2, 4)
        Triangle t = new Triangle (2, 4)
        Circle c = new Circle (2)
        r.printArea();
        t.printArea();
        c.printArea();
    }
}

```

Output

```
C:\Users\Hima\Desktop\java>javac shapemain.java  
  
C:\Users\Hima\Desktop\java>java shapemain  
area of rectangle:8  
area of triangle:4  
area of circle:12.56
```

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

Program :

03/11/20

Lab 6. - Bank program.

```
import java.util.Scanner;
abstract class account
{
    String accname, acctype;
    long accnum;
    double balance;
    final int minbal = 1000;
    account(String name, long num, double bal,
             String type)
    {
        accname = name;
        accnum = num;
        balance = bal;
        acctype = type;
    }

    abstract void addBal(double amt);
    abstract void dispBal();
    abstract void withdraw(double amt);
}

class curacc extends account {
    curacc(String name, long num, double bal,
           String type)
    {
        super(name, num, bal, type);
        System.out.println("name:" + accname + "\nnum"
                           + "\nbalanc:" + balance + "\nacc type: curacc");
    }

    void addBal(double amount)
    {
        balance = balance + amount;
    }
}
```



```
void display()
{
```

```
    System.out.println("Your balance: "+balance);
}
```

```
void withdraw(double amount)
{
```

```
    if (balance < amount)
    {
```

```
        System.out.println("You don't have enough  
        balance");
```

```
        System.out.println("balance: "+balance);
        return;
    }
```

```
    balance = balance - amount;
```

```
    S.O.P/n ("balance: "+balance);
```

```
    if (balance < minbal)
    {
```

```
        S.O.P/n ("Penalty of ₹. "+(balance * 0.01) +  
        " as balance is less than the min needed");
```

```
        balance = balance - balance * 0.01;
```

```
        S.O.P/n ("Current balance = "+balance);
    }
```

```
    }
}
```

```
class Sav-act extends account {
```

```
    Sav-act (String name, long num, double bal)
    {
```

```
        Super (name, num, bal, "Savings");
```

```
        S.O.P/n ("name "+ accname + "In fact "  
        + accnum + " \n bal " + bal + " \n type " +  
        accype);
    }
```

```
}
```

```

void addBal (double amount)
{
    balance = balance + amount;
    interest();
}

void interest()
{
    int t=2;
    balance = balance * Math.pow(1+(0.2),t);
}

void dispBal()
{
    S.o.pln("Balance: "+balance);
}

void withdraw (double amount)
{
    balance = balance - amount;
    S.o.pln("Balance: "+balance);
}
}

```

```

public class bank
{

```

```

    public static void main (String ss[])
    {

```

```

        Scanner sc = new Scanner (System.in);
        curr_acc e = new curr_acc ("Toy", 12345,
            8000.0, "Current");

```

```

        double amount;

```

```

        int flag=0;

```

```

        while (flag == 0)
        {

```

```

            S.o.pln(" 1: Add Bal. 2: display,

```

```

            3: Withdraw 4: Checkbook 5: saving

```

```

int cb = sc.nextInt();
scrit cb (cb)
{
case 1: S.O.println("Enter amount to be added");
amount = sc.nextDouble();
c.addBal(amount);
break;
case 2: c.dispBal();
break;
case 3: S.O.println("Enter amount to be withdrawn");
amount = sc.nextDouble();
c.withdraw(amount);
break;
case 4: S.O.println("Enter details: Name of the
receiver");
String name = sc.nextLine();
name = sc.nextLine();
S.O.println("Enter amount to be sent");
double a = sc.nextDouble();
if (a > c.balance)
{
S.O.println("You dont have enough balance");
}
else
{
S.O.println("Enter password");
String p = sc.nextLine();
p = sc.nextLine();
S.O.println("Receiver " + name + " amount
sent is " + a);
c.balance = c.balance - a;
}
S.O.println("balance = " + c.balance);
break;
}

```


default:

flag = 1;
}
}

Sav_acct s = new Sav_acct("Pop", 1111, 8000);

flag = 0;

while (flag == 0)

{

S.O.P/n("1: Add Bal 2: Display 3: Withdraw
4: quit");

int ch = sc.nextInt();

switch (ch)

{

case 1: System.out.println("Enter amount to
be added");

amount = sc.nextDouble();

s.addBal(amount);

break;

case 2:

s.dispBal();

break;

case 3:

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

amount = sc.nextDouble();

s.withdraw(amount);

break;

default: flag = 1;

}

}

}

}

Output

```
C:\Users\Hima\Desktop\java>javac bank.java
```

```
C:\Users\Hima\Desktop\java>java bank
```

```
name: jay
```

```
accnum: 123456
```

```
balance: 3000.0
```

```
acctype: Current
```

```
1:AddBal
```

```
2:displayBal
```

```
3:withdraw
```

```
4:checkbook
```

```
5:saving account
```

```
1
```

```
enter amount to be added:
```

```
1200
```

```
1:AddBal
```

```
2:displayBal
```

```
3:withdraw
```

```
4:checkbook
```

```
5:saving account
```

```
2
```

```
Your balance is: 4200.0
```

```
1:AddBal
```

```
2:displayBal
```

```
3:withdraw
```

```
4:checkbook
```

```
5:saving account
```

```
3
```

```
enter amount to be withdrawn:
```

```
1200
```

```
balance = 3000.0
```

```
1:AddBal
```

```
2:displayBal
```

```
3:withdraw
```

```
4:checkbook
```

```
5:saving account
```

```
4
```

```
enter details
```

```
enter name of the reciever:
```

```
4
enter details
enter name of the reciever:
tanvi
enter the amount to be sent:
1000
Enter password
xxxxxx
reciever : tanvi
amount sent is 1000.0
balance = 2000.0
1:AddBal
2:displayBal
3:withdraw
4:checkbook
5:saving account
5
name: jennie    accno: 500676    bal: 7000.0    type: Savings
1:AddBal
2:displayBal
3:withdraw
4:quit
1
enter amt to be added:
1000
1:AddBal
2:displayBal
3:withdraw
4:quit
2
Your balance is: 11520.0
1:AddBal
2:displayBal
3:withdraw
4:quit
3
enter amt to be withdrawn:
200
balance = 11320.0
1:AddBal
2:displayBal
3:withdraw
4:quit
```
