

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.

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αAB (week 3).

→ ① Quadratic eqn program

public class Main {

 public static void main (String args[]) {

 double x1, x2;

 Scanner sc = new Scanner (System.in);

 System.out.println ("Enter a,b,c value : ");

 double a = sc.nextDouble();

 double b = sc.nextDouble();

 double c = sc.nextDouble();

 double d = $b^2 - 4ac$;

 if (d < 0) {

 System.out.println ("Imaginary root");
 System.out.println (" $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ");

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`System.out.println ("Imaginary root2: " +
 (-b/2*a) + "j" + Math.sqrt((-D)/2*a))
 + "i")j`

{ else }

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

$x_2 = (-b - \sqrt{D})/2*a - j$

`System.out.println ("real root 1: +x1)j`

`System.out.println ("real root2: +x2)j`

{}

{}

{}

BASIC ALGO / LOGIC

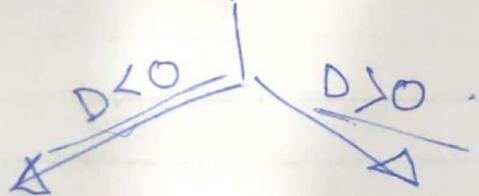
① Quadratic determinant : $b^2 - 4ac$

where a, b, c are variables.

$$\underline{ax^2 + bx + c}$$

INPUT (a, b, c)

$$b^2 - 4ac = D$$



$$\frac{-b \pm \sqrt{-D}}{2a} = \begin{cases} \text{(some form)} \\ \text{of fraction) } \end{cases} \frac{-b + \sqrt{D}}{2a} = \text{some value}$$

OUTPUT $a \quad b \quad c$

$$\begin{aligned} \text{Imaginary root 1} &= -12.5 + 21.65 \\ \text{Imaginary root 2} &= -12.5 - 21.65 \end{aligned}$$

$$\left| \begin{array}{l} \frac{1}{4} \\ \text{real root 1: } -1.0 \\ \text{real root 2: } -4.0 \end{array} \right.$$

```
1 public class Main{  
2     public static void main(String args[]){  
3         double r1,r2;  
4         Scanner sc = new Scanner(System.in);  
5         System.out.println("Enter a,b,c value:\t");  
6         double a = sc.nextDouble();  
7         double b = sc.nextDouble();  
8         double c = sc.nextDouble();  
9         double D = b*b-4*a*c;  
10        if(D<0) {  
11            System.out.println("Imaginary root1: "+(-b/2*a)+"+"+(Math.sqrt(-D)/2*a)+"i");  
12            System.out.println("Imaginary root2: "+(-b/2*a)+"-"+(Math.sqrt(-D)/2*a)+"i");  
13        }else {  
14            r1 = (-b+Math.sqrt(D))/2*a;  
15            r2 = (-b-Math.sqrt(D))/2*a;  
16            System.out.println("real root1: "+r1);  
17            System.out.println("real root2: "+r2);  
18        }  
19    }  
20 }  
21 }  
22 }  
23 }  
24 }
```

input

```
Enter a,b,c value:  
5  
5  
5  
Imaginary root1: -12.5+ 21.65063509461097i  
Imaginary root2: -12.5- 21.65063509461097i
```

LAB PROGRAM 2→

Develop a java program to create a class student with members usn, name and credits and array marks use methods to display and accept details.

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Q) SGPA Program -

```
import java.util.Scanner;
class Student
{
    private String USN;
    private String name;
    private int n;
    private double SGPA = 0;
    private int totalCredits = 0;

    Scanner ss = new Scanner(System.in);

    void Details()
    {
        System.out.println("Enter USN of student");
        USN = ss.nextLine();

        System.out.println("Enter name");
        name = ss.nextLine();

        System.out.println("Enter no of subjects");
        n = ss.nextInt();

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

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double marks [] = new double [n];
 System.out.println ("Enter details of sub");

for (int i=0; i<n; i++) -

{ System.out.println ("Enter credits allotted to sub" + (i+1));

marks[i] = ss.nextInt();

Calculate (credits[i], marks[i], i);

} }

void Calculate (int credits, double marks, int j)

{ totalCredits = totalCredits + credit;

if (mark >= 90 && mark <= 100) -

SGPA = SGPA + (10 * credit);

else if (mark >= 80 && mark <= 89)

SGPA = SGPA + (9 * credit);

else if (mark >= 70 && mark <= 79)

SGPA = SGPA + (6 * credit);
 Teacher's Signature : _____

else if (marks >= 60 && mark <= 69)

$$SGPA = SGPA + (7 * \text{credits})$$

else if (marks >= 50 && mark <= 59)

$$SGPA = SGPA + (6 * \text{credits})$$

else if (marks >= 40 && mark <= 39)

$$SGPA = SGPA + (5 * \text{credits})$$

else

System.out.println("Failed subject " + (j+1));

}

void Display()

{ System.out.println("Name: " + name);

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

System.out.println("CGPA of student " +
(SGPA / total credits));

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Class Main

{ Public static void main (String args [])
{

student s1 = new Student ();

s1. Details (); // similar to
s1. Display () calling function

05
J

}

X

Teacher's Signature : _____

Output

Enter USN of student
151 -

Enter name of student

Shivanshu P

Enter no of subj

① - 3

Credits allotted to sub 1

5

Enter marks in sub 1.

80

Credits allotted to sub 2

4

Enter marks in sub 2

75

Enter ~~marks~~ credits allotted to sub 3

4 -

Enter marks in sub 3,

72

Details of student

~~Name~~ Name: Shivanshu P -

USM 8 151 -

SGPA 8 8.3846

basic logic for
input

name —

VSN —

~~marks~~ subj — n

marks [] - - - marks [$\leq n$]

credits [] - - - credits [$\leq n$]

basic logic of program & marks [0+1]

↓
marks [$\leq n$]

total ↓ using if-else cond
~~marks~~ SCIP A

$$= (\text{SCIP A} + 'x' * \text{credit})$$

↓

$$\text{SCIP A} = \frac{\text{total SCIP A}}{\text{total credits}}$$

'x' ⇒ Grade Point

10 - 5 or else fail.
depending on if-else —

C:\Users\shivanshu\Desktop> java lab

Enter USN of the student

151

Enter Name of the student

shivanshu p

Enter no of subjects

5

Enter details of the subjects:

Enter credits allotted to the subject 1

5

Enter marks in the subject 1

80

Enter credits allotted to the subject 2

4

Enter marks in the subject 2

75

Enter credits allotted to the subject 3

4

Enter marks in the subject 3

72

Enter credits allotted to the subject 4

3

Enter marks in the subject 4

71

Enter credits allotted to the subject 5

1

Enter marks in the subject 5

58

Enter credits allotted to the subject 6

3

Enter marks in the subject 6

88

Details of the Student

Name :shivanshu p

USN: 151

SGPA of student 8.523809523809524

C:\Users\shivanshu\Desktop>

LAB3 → 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.

```
import java.util.Scanner;  
class Main {  
    public static void main(String args[]) {  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        Book B[] = new Book[n];  
        for (int i = 0; i < n; i++) {  
            System.out.println("Book " + B[i]);  
            System.out.print("\n");  
        }  
    }  
}
```

// Algo → create a class Book with constructor function to string() which shall return string
class BookName Eg call the Book Class
code → // contd.

→ class Book {

int

String name, author; price, nPages;

Book()

2 Scanner sc = new Scanner(system.in);

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

name = sc.nextLine();

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

author = sc.nextLine();

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

price = sc.nextInt();

System.out.println("Enter no of pages");

nPages = sc.nextInt();

}

public String to String() {

return ("Name of book : " + this.name +
" In Author : " + author + " In Price : " + price
+ " In Pgno : " + this.pgno +);

}

}

Main.java

```
9 import java.util.Scanner;  
10
```

Enter the Number of Books:

2

Enter the Name of The book: da
Enter the Author of book da: a
Enter the Price of book da: 12
Enter the Number of pages: 11

Enter the Name of The book:

Enter the Author of book : pas
Enter the Price of book : 24
Enter the Number of pages: 1

Name of Book : da

Author : a

Price : 12

Number of Pages: 11

Name of Book :

Author : pas

Price : 24

Number of Pages: 1

LAB4 DOWN → Program to create a abstract class shape with 2 intergers and method printArea() and 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.

Area Abstract

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

```
class Shape {
```

```
    int slenght;
```

```
    int shreath;
```

```
    void printArea() {
```

```
}
```

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

```
{
```

```
class Rectangle extends Shape {
```

```
    void printArea() {
```

```
        System.out.println("Enter the length of rect");
```

```
        Slenght = Sinp.nextInt();
```

```
        System.out.println("Enter breath of rect");
```

```
        Shreath = Sinp.nextInt();
```

```
        System.out.println("The area of Rectangle  
is :" + (Slenght * Shreath));
```

```
}
```



Class Triangle extends Shape {

void paintArea() {

System.out.println("Enter the height : ");

Slenght = Sinp.nextInt();

System.out.println("Enter the base : ");

Sbreadth = Sinp.nextInt();

"System.out.println("The Area of triangle
is : " + (0.5 * Sbreadth * Slenght));

}

}

Class Circle extends Shape {

void paintArea() {

System.out.println("Enter the radius : ");

Slenght = Sinp.nextInt();

System.out.println("The area of circle
is : " + (3.143 * Slenght * Slenght));

}

}



public class App {

public static void main (String [] args)

throws Exception {

 Rectangle R1 = new Rectangle ();

 Triangle T1 = new Triangle ();

 Circle C1 = new Circle ();

 R1.paintArea ();

 T1.paintArea ();

 C1.paintArea ();

}

}

o

—

OOJLABS - java1/src/ App.java - Eclipse IDE

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Transactions.java App.java

```
1 package java1;
2
3
4
5 Problems Javadoc Declaration Console
6 terminated> App [Java Application] C:\Users\shivanshu.p2\pool\plugins\org.eclipse.jdt.openjdk.hotspot.jre.full.win32.x86_64_14.0.2.v20200815-0932\jre\bin\javaw.exe (06-Nov-2020, 3:11:08 pm - 3:11:33 pm)
7 Enter the length of Rectangle
8 10
9 Enter the breadth of Rectangle
10 20
11 The AREA of RECTANGLE is : 200
12 Enter the Height :
13 11
14 Enter the Base :
15 10
16 The AREA of TRIANGLE is : 55.0
17 Enter the Radius :
18 7
19 The AREA of CIRCLE is : 154.00699999999998
```

LAB 5 DOWN-→

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. -->

BANK

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

```
class Bank
```

{

```
    int depositbal;
```

```
    int withdrawbal;
```

```
    String customername;
```

```
    String accountno;
```

```
    String accounttype;
```

```
    int Balenue = 27800;
```

```
    void accept()
```

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

System.out.println ("Enter customer name\n");

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

System.out.println ("Enter acc number\n");

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

System.out.println ("Enter acc type\n");

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

}



void display()

{ System.out.println ("CUSTOMER NAME : " + customer
- name + "\n"); }

System.out.println ("CUSTOMER Acc NO : " + accountno)

System.out.println ("CUSTOMER Acc TYPE : " + acc_type);

System.out.println ("BALANCE : " + balance);

}

} // end of class .i

Class current extends Bank {

int updatedbalance;

int AfterWithdrawing;

int updatedlostbalance;

int cdeposit() {

updatedbalance = Balance + depositbalance;

return updatedbalance;

}



int c.withdraw() {

Afterwithdraw = ((updated balance) - withdrawn
balance) ;

}

int minimum ()

{ if (After withdraw) <= (2000))

{ updatedlostbalance = ((After withdraw) - (200));

System.out.println ("You have minimum but
below 2000 so u have lost 200Rs");

return updatedlostbalance; }

else

return Afterwithdraw;

}

class Saurav extends Bank {

int updatedbalance;

int Afterwithdraw;

int updatedlostbalance;

scop - bas();



subtotal balance = Balance + deposit balance

return subtotal balance;

{

int interest();

{ double r = 0.08; }

int n = 12;

int t = 5;

compound interest = (int) ↗

((subtotal balance) * (Math · pow ((1+r/n)
+ (n*t)))) ;

return compound interest;

{

int Smithba(); {

- Afterwithdraws = (compoundinterest) - (balance);

return Afterwithdraws;

int minimum();

{ if ((Afterwithdraws) < -(1000))

$S \cdot \text{updatedlostbalance} = ((\text{After withdraw}) - 100);$

return updatedlostbalance;

}

else

return Afterwithdraw;

Class Transactions {

public static void main (String args ()) {

Scanner s = new Scanner (System.in);

current CA = new current ();

CA.accept();

System.out.println ("Enter the money u
want to deposit in current acc");

CA.depositbalance = s.nextInt();

System.out.println ("After your deposit,
of " + CA.depositbalance + " New Balance is:
+ CA.cdeposit());

System.out.println ("Enter the money you
want to withdraw");

CA.withdrawbalance = s.nextInt();



System.out.println ("After your withdrawal of "+
CA.withdrawBalance + "\n Now your total balance
is Rs - " + CA.cWithBal());

System.out.println ("After checking if you have
minimum balance is Rs " + CA.minimum());

SavAcc SA = new SavAcc();
SA.accept();

System.out.println ("Enter money u want to
deposit in Saving acc");

SA.depositBalance = sc.nextInt();

SA.display();

System.out.println ("After your deposition of " + SA.
"\n Now your total bal is Rs " + SA.depositBal());

System.out.println ("After interest your total "
+ SA.interest());

System.out.println ("After checking if u have
minimum balance you are not updated
total balance hence is Rs - " + SA.minimum());

3

3

File Edit Source Refactor Navigate Search Project Run Window Help

Problems Javadoc Declaration Console

<terminated> Transactions [Java Application] C:\Users\shivanshu\p2\pool\plugins\org.eclipse.jdt.openjdkhotspot.jre.full.win32.x86_64_14.0.2.v20200815-0932\jre

Enter the customer name
shivanshu
Enter the Account Number
911
Enter the Account type
current
Enter the money u want to deposit in current account in rupees
1000
CUSTOMER NAME : shivanshu
ACCOUNT NUMBER : 911
ACCOUNT TYPE : current
After your deposition of 1000
Now your total balance is RS-28800
Enter the money you want to withdraw in rupees
800
After your withdrawal of 800
Now your total balance is RS-28000
After checking if u have minimum balance are not your updated total balance is RS-28000
Enter the customer name
shivanshu
Enter the Account Number
911
Enter the Account type
savings
Enter the money u want to deposit in Saving account
10000
CUSTOMER NAME : shivanshu
ACCOUNT NUMBER : 911
ACCOUNT TYPE : savings
After your deposition of 10000
Now your total balance is RS-37800
After interest ur updated balance is RS-56316|
Enter the money you want to withdraw in Saving account
316
After your withdrawal of RS-316
Now your total balance is RS-56000
After checking if u have minimum balance are not your updated total balance is RS-56000

ACCOUNT TYPE : savings
After your deposition of 10000
Now your total balance is RS-37800
After interest ur updated balance is RS-56316|
Enter the money you want to withdraw in Saving account
316
After your withdrawal of RS-316
Now your total balance is RS-56000
After checking if u have minimum balance are not your updated total balance is RS-56000



