

//LAB - 1 Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c$

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.*;
```

```
public class Quadratic{
```

```
    public static void main(String []args){
```

```
        int a,b,c;
```

```
        double root1,root2,D;
```

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

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

```
        a=sc.nextInt();
```

```
        b=sc.nextInt();
```

```
        c=sc.nextInt();
```

```
        D=b*b-4*a*c;
```

```
        if(D>0)
```

```
{
```

```
    System.out.println("real roots are : \n");
```

```
    root1 = (-b + Math.sqrt(D)) / (2 * a);
```

```
    root2 = (-b - Math.sqrt(D)) / (2 * a);
```

```
    System.out.println("root1 is "+root1+"root 2 is "+root2);
```

```
}
```

```
else if(D<0)
```

```
{
```

```
    System.out.println("Imaginary roots");
```

```
    System.out.println("There are no real solutions");
```

```
}
```

```
}  
}
```

```
C:\Users\Samarth\Documents\lab programs>javac Quadratic.java  
  
C:\Users\Samarth\Documents\lab programs>java Quadratic  
Enter a,b,c :  
3 1 1  
Imaginary roots  
There are no real solutions  
  
C:\Users\Samarth\Documents\lab programs>java Quadratic  
Enter a,b,c :  
1 3 1  
real roots are :  
  
root1 is -0.3819660112501051root 2 is -2.618033988749895
```

// 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.

```
import java.util.Scanner;  
  
class StudentSGPA{  
    int usn,i,j;  
  
    String name=new String();  
  
    int credits[]=new int[5];  
  
    int marks[]=new int[5];  
  
    float SGPA(){  
        float sum=0;  
  
        for(int i=0;i<5;i++){  
            sum=sum+(credits[i]*marks[j]);  
        }  
  
        return sum/5;  
    }  
}
```

```

    }
}
public class Main{

    public static void main(String []args){
        Scanner in = new Scanner(System.in);
        StudentSGPA Stud1 = new StudentSGPA();
        System.out.println("Enter Details");
        System.out.println("Entee Name : ");
        Stud1.name=in.nextLine();
        System.out.println("Enter USN : ");
        Stud1.usn=in.nextInt();
        System.out.println("Enter the Credits ");
        for(int j=0;j<5;j++){
            System.out.println("subject "+(j+1));
            int cd = in.nextInt();
            Stud1.credits[j]=cd;
        }
        System.out.println("Enter the marks ");
        for(int j=0;j<5;j++){
            System.out.println("subject "+(j+1));
            int mk = in.nextInt();
            Stud1.marks[j]=mk;
        }
        System.out.println("Student Details :");
        System.out.println("Name :"+Stud1.name);
        System.out.println("USN :"+Stud1.usn);
        System.out.println("SGPA :"+Stud1.SGPA());

    }
}

```

```

C:\Users\Samarth\Documents\lab programs>java Main
Enter Details
Entee Name :
SAM
Enter USN :
141
Enter the Credits
subject 1
3
subject 2
4
subject 3
3
subject 4
2
subject 5
4
Enter the marks
subject 1
76
subject 2
89
subject 3
67
subject 4
97
subject 5
56
Student Details :
Name :SAM
USN :141
SGPA :243.2

C:\Users\Samarth\Documents\lab programs>_

```

// 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.

```

import java.util.*;

class Book {
    String name;
    String author;
    int price;

```

```

int num_pages;

Book()
{
}

Book(String name,String author,int price,int num_pages)
{
    this.name=name;
    this.author=author;
    this.price=price;
    this.num_pages=num_pages;
}

void Read()
{
    Scanner s=new Scanner(System.in);
    System.out.println("Enter the name of the book");
    name=s.next();
    System.out.println("Enter the author of the book");
    author=s.next();
    System.out.println("Enter the price of the book");
    price=s.nextInt();
    System.out.println("Enter the number of pages of the book");
    num_pages=s.nextInt();
}

public String toString()
{
    return ("Name: "+name + "\n" + "Author: "+author + "\n" + "Price: "+price + "\n"
+"Number of pages: "+num_pages );
}
}

public class BookMainFunc {
    public static void main(String args[])
    {

```

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

Book b1=new Book("7TH HABIT","STEPHEN COVEY",1000,345);

System.out.println("Sample input:\n"+b1);

System.out.println("Enter the number of books");

int n=a.nextInt();

Book b[]=new Book[n];

for(int i=0;i<n;i++)
{
    b[i]=new Book();

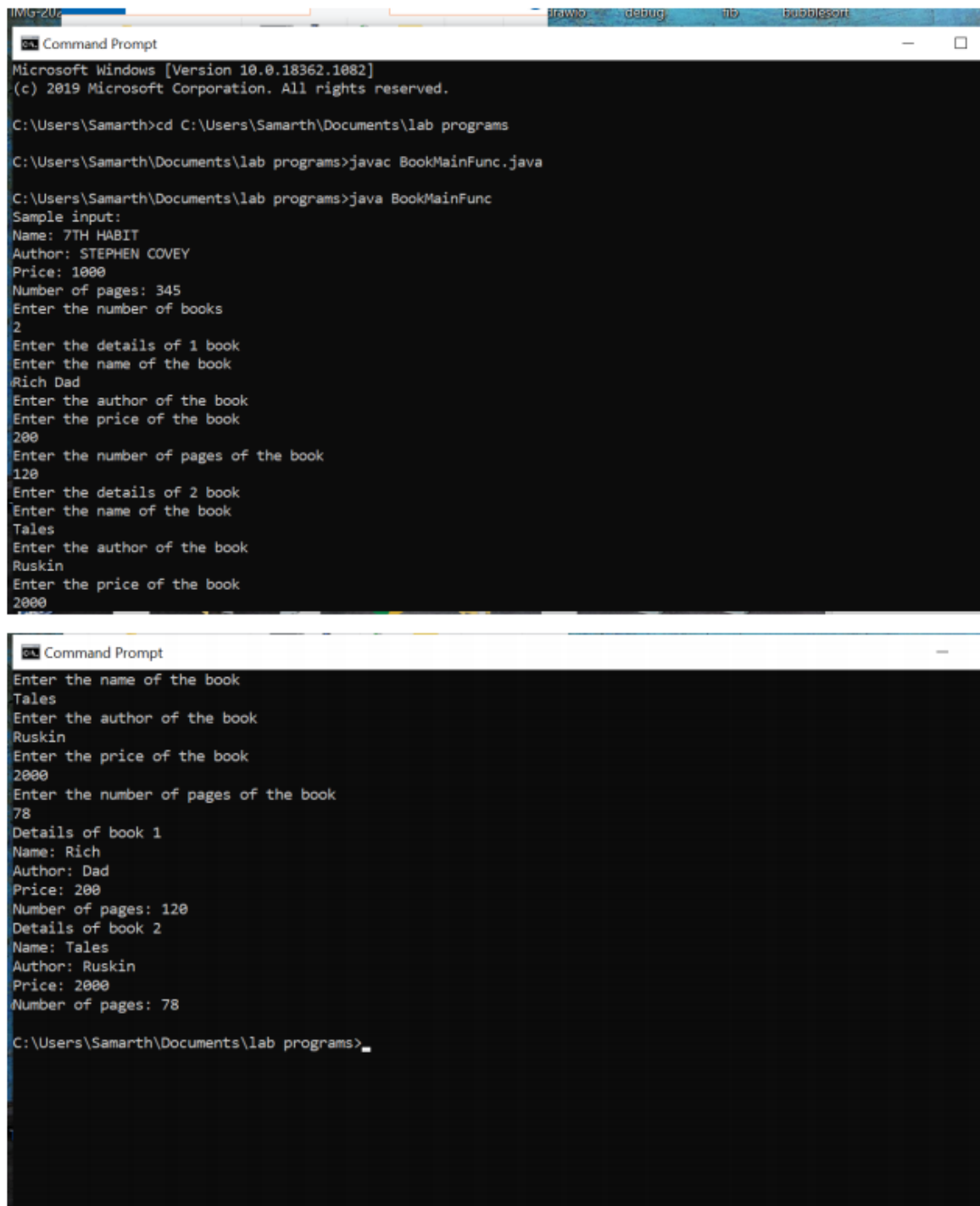
    System.out.println("Enter the details of "+(i+1)+" book");

    b[i].Read();
}

for(int i=0;i<n;i++)
{
    System.out.println("Details of book "+(i+1));

    System.out.println(b[i]);
}

}
```



```
Command Prompt
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Samarth>cd C:\Users\Samarth\Documents\lab programs

C:\Users\Samarth\Documents\lab programs>javac BookMainFunc.java

C:\Users\Samarth\Documents\lab programs>java BookMainFunc
Sample input:
Name: 7TH HABIT
Author: STEPHEN COVEY
Price: 1000
Number of pages: 345
Enter the number of books
2
Enter the details of 1 book
Enter the name of the book
Rich Dad
Enter the author of the book
Enter the price of the book
200
Enter the number of pages of the book
120
Enter the details of 2 book
Enter the name of the book
Tales
Enter the author of the book
Ruskin
Enter the price of the book
2000

Enter the name of the book
Tales
Enter the author of the book
Ruskin
Enter the price of the book
2000
Enter the number of pages of the book
78
Details of book 1
Name: Rich
Author: Dad
Price: 200
Number of pages: 120
Details of book 2
Name: Tales
Author: Ruskin
Price: 2000
Number of pages: 78

C:\Users\Samarth\Documents\lab programs>
```

// Lab Exercises – 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.

```
import java.util.*;
```

```

class Shape{
    int Sl;
    int Sb;

    void printArea(){

    }

    Scanner S_inp = new Scanner(System.in);
}

class Rectangle extends Shape{
    void printArea(){
        System.out.println("Enter the lenght of Rectangle");
        Sl = S_inp.nextInt();
        System.out.println("Enter the breadth of Rectangle");
        Sb = S_inp.nextInt();

        System.out.println("The AREA of RECTANGLE is : "+ (Sb*Sl));
    }
}

class Trinagle extends Shape{
    void printArea(){
        System.out.println("Enter the Height : ");
        Sl = S_inp.nextFloat();
        System.out.println("Enter the Base : ");
        Sb = S_inp.nextInt();

        System.out.println("The AREA of TRIANGLE is : " +(.5*Sb*Sl));
    }
}

```



```
    }  
}
```

```
class Circle extends Shape{  
    void printArea(){  
        System.out.println("Enter the Radius :");  
        SI = S_inp.nextInt();  
  
        System.out.println("The AREA of CIRCLE is : "+(3.143*SI*SI));  
    }  
}
```

```
public class MainA {  
    public static void main(String[] args){  
  
        Rectangle R1 = new Rectangle();  
        Trinagle T1 = new Trinagle();  
        Circle C1 = new Circle();  
  
        R1.printArea();  
        T1.printArea();  
        C1.printArea();  
    }  
}
```

```

C:\Users\Samarth\Documents>java MainA
Enter the lenght of Rectangle
12
Enter the breadth of Rectangle
13
The AREA of RECTANGLE is : 156
Enter the Height :
3
Enter the Base :
3
The AREA of TRIANGLE is : 4.5
Enter the Radius :
3
The AREA of CIRCLE is : 28.286999999999995

C:\Users\Samarth\Documents>java MainA
Enter the lenght of Rectangle
13
Enter the breadth of Rectangle
0
The AREA of RECTANGLE is : 0
Enter the Height :
2
Enter the Base :
2
The AREA of TRIANGLE is : 2.0
Enter the Radius :
7
The AREA of CIRCLE is : 154.006999999999998

C:\Users\Samarth\Documents>exit_

```

//lab 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

```

class account{

String name , acc_no ,acc_type;

double balance;

account(String name,String acc_no, String acc_type){

this.name=name;

this.acc_no=acc_no;

this.acc_type=acc_type;

balance=0;

}

void deposit(double amt){

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

```

```

balance+=amt;
System.out.println("updated balance : "+balance);
}
void withdraw(double amt){
System.out.println("balance : "+balance);
balance-=amt;
System.out.println("updated balance : "+balance);
}
}
class curr_acct extends account{
curr_acct(String name,String acc_no, String acc_type){
super(name,acc_no,acc_type);
}
double service= 100;
double min_bal=3000;
int charged=0;
void check(){
if(balance<min_bal&& charged==0){
balance-=service;
charged=1;
System.out.println(service+" deducted due to low
balance");
}
if(charged==1)
{
System.out.println("your balance is low to avoid
beign fined again increase your balance");
}
}
void disp_bal(){
check();

```

```

System.out.println("your account balance is
"+balance);
}
}
class sav_acct extends account{
    sav_acct(String name,String acc_no, String acc_type){
        super(name,acc_no,acc_type);
    }
    int given=0;
    void interest(){
        if (balance>10000 && given==0) {
            balance+=0.007*balance;
            System.out.println("your account has been credited
with 0.7% interest ");
            given+=1;
        }
        if (balance>100000 && given==1) {
            balance+=0.005*balance;
            System.out.println("your account has been credited
with 0.5% interest ");
            given+=1;
        }
        if (balance>1000000 && given==2) {
            balance+=0.002*balance;
            System.out.println("your account has been credited
with 0.2% interest ");
            given+=1;
        }
    }
    void disp_bal(){
        interest();
    }
}

```

```
System.out.println("your account balance is  
"+balance);  
}  
}  
  
class bank{  
  
    public static void main(String[] args) {  
  
        sav_acct sav = new sav_acct("A","1b","savings");  
        System.out.println("savings account functions:");  
        sav.deposit(11000);  
        sav.disp_bal();  
        sav.withdraw(5000);  
        curr_acct cur = new curr_acct("B","2b","current");  
        System.out.println("current account functions:");  
        cur.deposit(5000);  
        cur.withdraw(2500);  
        cur.disp_bal();  
    }  
}
```

```

}
Enter the customer name

sammy
Enter the Account Number

11
Enter the Account type

current
Enter the money u want to deposit in current account in rupees
100
CUSTOMER NAME : sammy
ACCOUNT NUMBER : 11
ACCOUNT TYPE : current
After your deposition of 100
Now your total balance is RS-27900
Enter the money you want to withdraw in rupees
900
After your withdrawal of 900
Now your total balance is RS-27000
After checking if u have minimum balance are not your updated total balance is RS-27000
Enter the customer name

sammy
Enter the Account Number

11
Enter the Account type

savings
Enter the money u want to deposit in Saving account
100
CUSTOMER NAME : sammy
ACCOUNT NUMBER : 11
ACCOUNT TYPE : savings
After your deposition of 100
Now your total balance is RS-27900
After interest ur updated balance is RS-41566
}

```

```

Enter the money u want to deposit in saving account
100
CUSTOMER NAME : sammy
ACCOUNT NUMBER : 11
ACCOUNT TYPE : savings
After your deposition of 100
Now your total balance is RS-27900
After interest ur updated balance is RS-41566
Enter the money you want to withdraw in Saving account
41567
After your withdrawal of RS-41567
Now your total balance is RS--1
After checking if u have minimum balance are not your updated total balance is RS--101

```

<