

1) Develop a Java program, that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read 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.

```

→ public class QuadraticEquation {
    public static void main (String [] args) {
        float a, b, c, d;
        double r1, r2;
        Scanner scan = new Scanner (System.in);
        System.out.println ("Enter the coefficient");
        a = scan.nextFloat ();
        b = scan.nextFloat ();
        c = scan.nextFloat ();
        d = b * b - 4 * a * c;
        if (d > 0)
            System.out.println ("Roots are real and distinct");
        r1 = (-b + Math.sqrt (d)) / (2 * a);
        r2 = (-b - Math.sqrt (d)) / (2 * a);
        System.out.println ("root1" + r1 + "root2" + r2);
    }
    else if (d == 0)
        System.out.println ("Roots are equal");
    r1 = r2 = -b / (2 * a);
}

```

```
    System.out.println("Roots = " + p("x" + "2" + "Y));  
    if (D < 0) System.out.println("Roots are imaginary");  
    else System.out.println("Roots are real");
```

~~$x_1 = -b/(2*a)$~~

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

```
C:\Abhi008>javac Q.java

C:\Abhi008>java Q
Enter a coefficient a: 1
Enter a coefficient b: 4
Enter a coefficient c: 1
Two real solutions: -2.267949192431123 and -5.732050807568877
Name:Aditya.
USN:1BM22CS015.

C:\Abhi008>java Q
Enter a coefficient a: 2
Enter a coefficient b: 4
Enter a coefficient c: 8
Roots are not equal since discriminate is 0
Name:Aditya.
USN:1BM22CS015.

C:\Abhi008>java Q
Enter a coefficient a: 2
Enter a coefficient b: 4
Enter a coefficient c: 2
Both roots are equal:-1.0
Name:Aditya.
USN:1BM22CS015.
```

Code → LAB-2

```
import java.util.Scanner;  
class student  
{  
    Scanner s = new Scanner (System.in);  
    String usn;  
    String name;  
    int [ ] credits = { 4, 4, 3, 3, 3, 1, 1, 1 };  
    int [ ] marks = new int [8];  
    public void enterdet()  
{  
        System.out.print ("Enter your usn : ");  
        usn = s.nextLine();  
        System.out.print ("Enter your name : ");  
        name = s.nextLine();  
        for (int i=0; i<8; i++)  
        {  
            System.out.print ("Enter marks for subject "+  
                (i+1) + ": ");  
            marks [i] = s.nextInt();  
        }  
    }  
    public void displayedet()  
{  
        System.out.println ("Your usn is : " + usn);  
        System.out.println ("Your name is : " + name);  
        for (int i=1; i<8; i++)  
        {  
            System.out.println ("Your marks for subject "+  
                (i+1) + " is : " + marks [i]);  
        }  
    }  
}
```

```
public void sgpa()
```

```
{ float g = 0;
```

```
for (int j = 0; j < 8; j++)
```

```
{ int v;
```

```
v = credits[j] * ((marks[j]/10) + 1);
```

```
g = g + v;
```

```
System.out.println ("Your sgpa is :" +(g/8));
```

```
}
```

```
}
```

```
{
```

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

```
student p = new student();
```

```
p.enterdet();
```

~~```
p.displaydet();
```~~~~```
p.sgpac();
```~~

```
}
```

```
.
```

```
C:\Abhi008>java Main
Enter your usn : 15
Enter your name : Aditya
Enter marks for subject 1 : 80
Enter marks for subject 2 : 78
Enter marks for subject 3 : 90
Enter marks for subject 4 : 88
Enter marks for subject 5 : 78
Enter marks for subject 6 : 65
Enter marks for subject 7 : 100
Enter marks for subject 8 : 78
Your usn is : 15
Your name is : Aditya
Your marks for subject 1 is : 78
Your marks for subject 2 is : 90
Your marks for subject 3 is : 88
Your marks for subject 4 is : 78
Your marks for subject 5 is : 65
Your marks for subject 6 is : 100
Your marks for subject 7 is : 78
Your sgpa is : 8.75
Name:Aditya.
USN:1BM22CS015.
```

LAB - 3

state a class Book which contains four members: name, author, price, num. pages
include a constructor to set the and values for the members. include methods to set and get the details of the subject object. 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.Scanner;~~

~~class Books {~~

~~String name;~~

~~String author;~~

~~int price;~~

~~int num_pages;~~

~~public void get(int i) {~~

~~Scanner in = new Scanner(System.in);~~

~~System.out.println("Enter details of books" + (i + 1) + "in name, author, price, num_pages order");~~

~~name = in.next();~~

~~author = in.next();~~

~~price = in.nextInt();~~

~~num_pages = in.nextInt();~~

~~}~~

```
public String toString() {  
    return "Details of Book " + (i+1) + " " +  
    "Name: " + name + " " + "Author: " + Author  
    price author + " " + "Price: " + price + " " +  
    "No of pages: " + numPages;  
}
```

```
class D {  
    public static void main(String[] args) {  
        int n;  
        Scanner in = new Scanner(System.in);  
        System.out.println("Enter Number of Books");  
        n = in.nextInt();  
        Books b[] = new Books[n];  
        for (int i=0; i<n; i++) {  
            b[i].set(i);  
        }  
        System.out.println();  
        for (int i=0; i<n; i++) {  
            System.out.println(b[i].toString());  
        }  
    }  
}
```

```
C:\Abhi008>javac Abhishek.java
```

```
C:\Abhi008>java Abhishek
```

```
Enter the number of books:
```

```
1
```

```
Enter the Details of the book 1 in order name, author,price,Number of pages
```

```
Aditya
```

```
Dr.Aditya
```

```
150
```

```
450
```

```
Details of Book
```

```
Name =Aditya
```

```
Author Name=Dr.Aditya
```

```
Price=150
```

```
Number of pages=450
```

```
Name:Aditya.
```

```
USN:1BM22CS015.
```

g) develop a Java program to create an abstract class named shape that contains the two integers and an empty method named printArea().
provide three classes named rectangle, triangle, circle such that each one of the classes contain only the method printArea() that prints the area of given shape.

```
import java.util.Scanner;  
abstract class shape {  
    int x, y;  
    abstract void area();  
}  
public static void main (String args[]){  
    Shape obj1 = new circle();  
    Obj1. area();
```

```
Shape obj2 = new rectangle();  
Obj2. area();
```

```
shape obj3 = new triangle();
```

```
Obj3. area();
```

```
}
```

```
}
```

class circle extends shape {
 circle () {

```
scanner sc = new scanner (System.in);
System.out.println ("enter the radius of
the circle");
x = sc.nextInt();
y = x;
void area () {
    System.out.println ("area of circle is " + 3.14
    * x * y);
}
```

~~class rectangle extends shape~~

~~rectangle()~~

```
scanner sc = new scanner (System.in);
System.out.println ("enter the length and
breadth of the rectangle");
x = sc.nextInt();
y = sc.nextInt();
```

~~void area ()~~

~~System.out.println ("area of rectangle
is " + x * y);~~

~~}~~

~~)~~

Class triangle extends shape

triangle {

Scanner sc = new Scanner (System.in);
System.out.println ("Enter the base and
height of the triangle");

x = sc.nextInt();

y = sc.nextInt();

}

void area ()

System.out.println ("Area of triangle
is " + 0.5 * x * y);

}

```
C:\Abhi008>javac Lab4.java
```

```
C:\Abhi008>java Lab4
```

```
Enter length and breadth:
```

```
15
```

```
10
```

```
Area of the rectangle is:150.0
```

```
Enter base and height:
```

```
10
```

```
10
```

```
Area of the Triangle is:100.0
```

```
Enter Radius:
```

```
18
```

```
Area of the Circle is:1017.36
```

```
Name :Aditya.
```

```
USN:1BM22CS015.
```

```
import java.util.Scanner;  
class Account {  
    String customerName;  
    long accNo;  
    String accountType;  
    double balance;  
    public Account (String customerName,  
                    long accNo, String accountType) {  
        this.customerName = customerName;  
        this.accountType = accountType;  
        this.balance = 0.0;  
    }  
  
    public void displayBalance () {  
        System.out.println ("Account Number: " +  
                           accNo);  
        System.out.println ("Customer Name: " + customerName);  
        System.out.println ("Account Type: " + accountType);  
        System.out.println ("Balance: $" + balance);  
    }  
}
```

Class Current extends Account {

 double minBalance;

 double serviceCharge;

 public Current(String customerName, long acno)

 super(customerName, acno, "Current");

 this.minBalance = 500.0; // set minimum balance

 this.serviceCharge = 50.0; // set service charge

 public void withdraw(double amount) {

 if (balance - amount >= minBalance) {

 balance -= amount;

 System.out.println("Withdrawal successful.

 Current Balance: \$ " + balance);

 }

 else

 System.out.println("Insufficient funds.

 withdraw not allowed.");

 }

 public void imposeServiceCharge() {

 if (balance < minBalance) {

 balance -= serviceCharge;

 System.out.println("Service charge imposed.

 Current Balance: Rs." + balance);

 }

Class SavAcct extends Account {
 double interestRate;
 public SavAcct (String customerName, long accno) {
 super (customerName, accno, "savings");
 this .interestRate = 0.05 ;
 }

 public void depositInterest () {
 double interest = balance * interestRate;
 balance += interest;
 System.out.println ("Interest deposited.
 Current Balance: \$ " + balance);
 }

 public void compoundInterest (double initial
 Amount, int term) {
 double compoundInterest = initialAmount * Math.pow
 (1 + interestRate, term) - initialAmount;
 balance += compoundInterest;
 System.out.println ("compound Interest
 deposited. Current Balance: RS. " + balance);
 }

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

```
Scanner scanner = new Scanner(System.in);
System.out.println ("1. current");
System.out.println ("2. savings");
System.out.print ("Enter choice (1 or 2): ");
int choice = scanner.nextInt();
System.out.print ("Enter customer name: ");
String customerName = scanner.next();
System.out.print ("Enter account number: ");
long accno = scanner.nextLong();
if (choice == 1) {
    CURACCT curAccount = new CURACCT (customerName,
                                         accno);
    System.out.print ("Enter initial balance: $");
    double initialBalance = scanner.nextDouble();
    curAccount.balance = initialBalance;
    System.out.print ("Enter withdrawal amount: ");
    double withdrawalAmount = scanner.nextDouble();
    curAccount.withdraw (withdrawalAmount);
    curAccount.imposeServiceCharge ();
    curAccount.displayBalance ();
}
else if (choice == 2) {
    SAVACCT savAccount = new SAVACCT (customer
                                         Name, accno);
    System.out.print ("Enter initial balance: $");
```

```
double initialBalance = scanner.nextInt();  
savAccount.balance = initialBalance;  
System.out.print("Enter withdrawal amount: $");  
double withdrawalAmount = scanner.nextDouble();  
savAccount.balance -= withdrawalAmount;  
System.out.println("Withdrawal successful.  
Current balance: $" + savAccount.balance);  
System.out.print("Enter interest rate: ");  
double interestRate = scanner.nextInt();  
savAccount.interestRate = interestRate;  
savAccount.displayBalance();  
System.out.print("Enter term (in years) for  
compound interest calculation: ");  
int term = scanner.nextInt();  
savAccount.compoundInterest(initialBalance,  
term);  
savAccount.displayBalance();  
}
```

Used if user enters invalid choice

```
System.out.println("invalid choice");  
}  
}  
}
```

```
C:\Abhi008>javac Main3.java

C:\Abhi008>java Main3
Customer name is :Abhishek
Customer account number is:199
Customer account type is:Savings
Enter the amount to be Deposit in your saving account:
500
Your Current balance is : 1500.0
Current interest is : 50
Enter the amount to be withdrawn From your saving account :
10
You have withdrawn 10.0
Your Current balance is : 1490.0
Customer name is :Amar
Customer account number is:200
Customer account type is:Current
Enter the amount to be Deposit in your current account:
50000
Your Current balance is : 53000.0
Enter the amount to be withdrawn from your current account :
1000
You have withdrawn 1000.0
Current balance is : 52000.0
Enter the amount for which cheque has to be issued
5000
Via cashing a cheque you have withdrawn 5000.0
Current balance is : 47000.0
Name:Aditya.
USN:1BM22CS015.
```

```
package CIE;  
import java.util.*;
```

```
public class student
```

```
{
```

```
    public int sem;
```

```
    public String USN;
```

```
    public String Name;
```

```
    public void accept()
```

```
{
```

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

```
    System.out.println("Enter USN, Name and Sem:");
```

```
    USN = scan.nextLine();
```

```
    name = scan.nextLine();
```

```
    Sem = scan.nextLine();
```

```
}
```

```
}
```

```
package CIE;  
public class Internal
```

{

```
    public int im[] = new int[5];
```

}

```
package SEE;
```

```
import CIE.Student;
```

```
public class External extends Student
```

{

```
    public int son[] = new int[5];
```

}

~~import java.util.*;~~~~import SEE.*;~~~~import CIE.*;~~

```
public class final mark
```

{

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

{

```
    int fm[] = new int[5]
```

~~Scanner sc = new Scanner (System.in);~~~~System.out.println ("Enter N :");~~~~int n = sc.nextInt();~~~~SEE.External st[] = new SEE.External();~~~~CIE.Internal s[] = new CIE.Internal[n];~~~~for (int i = 0; i < n; i++)~~

{

```
st[i] = new SEE.External();
sc[i] = new CIE.Internal();
System.out.println("Enter details " + (i+1));
st[i].accept();
```

```
for (int j=0; j<5; j++)
```

```
}
```

```
System.out.println("Enter im and sm  
of sub " + (j+1));
```

```
sc[i].im[i] = sc.nextInt();
```

```
st[i].sm[i] = sc.nextInt();
```

```
fm[j] = sc[i].im[i] + st[i].sm[i];
```

```
}
```

```
System.out.println("Final marks of " +  
st[i].name);
```

```
for (int k=0; k<5; k++)
```

```
{
```

```
System.out.println("Course " + (k+1) + " = " + fm[k]);
```

```
}
```

```
}
```

```
}
```

D:\JAVA LAB PROGRAM LISTS\lab 6>java FinalMarks

Name:Aditya

USN:1BM22CS015

Enter n:

1

Enter details 1

Enter USN, Name, Sem:

1BM15

Aditya

3

Enter internal and external of sub 1

23

21

Enter internal and external of sub 2

34

50

Enter internal and external of sub 3

23

43

Enter internal and external of sub 4

43

23

Enter internal and external of sub 5

43

23

Final marks of Aditya

Course 1 = 44

Course 2 = 84

Course 3 = 66

Course 4 = 66

Course 5 = 66

```
import java.util.Scanner;  
class WrongAge extends Exception {  
    public WrongAge ("String message") {  
        super (message);  
    }  
}
```

```
class Father {  
    int fatherAge;  
    public Father (int fatherAge) throws  
        wrongAge {  
        if (fatherAge <= 0)  
            throw ("Age cannot be  
            negative");  
        this.fatherAge = fatherAge;  
    }  
}
```

```
class Son extends Father {  
    int sonAge;  
    public Son (int fatherAge, int sonAge) throws  
        wrongAge {  
        if (sonAge >= fatherAge)  
            throw ("Age cannot be  
            negative");  
        this.sonAge = sonAge;  
    }  
}
```

throw new wrongAge("son's age must be less
than father's age!");

this.sonAge = sonAge;

public class FatherSon

public static void main(String[] args)

Scanner sc = new Scanner(System.in);
System.out.print("enter father's age and
son's age:");

int fa = sc.nextInt();

int sa = sc.nextInt();

try {

Son s = new Son(fa, sa);

(father.fatherAge = fa;

System.out.println("father age :" + s.fatherAge);

System.out.println("son age :" + s.sonAge);

} catch (wrongAge e) {

System.out.println("Error" + e.getMessage());

```
C:\Abhi008>javac Lab7.java
```

```
C:\Abhi008>java Lab7
```

Father's age: 50

Son's age: 25

Name:Aditya.

USN:1BM22CS015.

prog - 1

(class A extends Thread)

int t1, time;

A() {

t1 = 1000;

time = 21000;

}

public void run()

{

while (t1 <= time)

{

System.out.println ("BMS COLLEGE OF
ENGINEERING");

try {

Sleep (10000);

}

catch (Exception e) {

System.out.println ("error");

}

t1 += 10000;

}

}

(class B extends Thread {

int t2, time;

B() {

time = 21000;

t2 = 1000;

}

```
public void run()
{
    while (t2 <= time)
    {
        system.out.println("cse");
        sleep(2000);
    }
    catch (Exception e)
    {
        system.out.println("error");
    }
    t2 += 2000;
}
class th
```

```
public static void main (String args[])
{
    A a = new A();
    B b = new B();
    a.start();
    b.start();
}
```

A a = new A();

B b = new B();

a.start();

b.start();

}

```
C:\Abhi008>java Lab8
Name:Aditya.
USN:1BM22CS015.
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
```

9/

* write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, num1 and num2. The division of num1 / num2 is displayed in the Result field when the Divide button is clicked. If num1 or num2 were not an integer, the program would throw a NumberFormatException. If num2 were zero, the program would throw an ArithmeticException displaying the exception in a message dialog box.

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;

class SwingDemo {
    SwingDemo() {
        JFrame iframe = new JFrame("Division API");
        iframe.setSize(width: 275, height: 150);
        iframe.setLayout(new FlowLayout());
        iframe.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        JLabel jlab = new JLabel("Enter the divisor and dividend:");
    }
}
```

```
JTextField aitf = new JButton("Calculate");
JLabel err = new JLabel();
JLabel alab = new JLabel();
JLabel blab = new JLabel();

JLabel anslab = new JLabel();
iframe.add(err);
iframe.add(alab);
iframe.add(aitf);
iframe.add(btf);
iframe.add(button);
iframe.add(alab);
iframe.add(blab);
iframe.add(anslab);
```

```
ActionListener I = new ActionListener() {
    public void actionPerformed(ActionEvent evt) {
```

```
    System.out.println("Action event for a  
text field");
```

```
}
```

~~```
 aitf.addActionListener(I);
 btf.addActionListener(I);
```~~

```
button.addActionListener(new ActionListener() {
 public void actionPerformed(ActionEvent evt) {
```

try {

```
 int a = Integer.parseInt(ai.getText());
 int b = Integer.parseInt(bi.getText());
 int ans = a / b;
```

```
 alab.setText("In A = " + a);
 blab.setText("In B = " + b);
 ansLab.setText("In Ans = " + ans);
```

}

catch (NumberFormatException e) {

```
 alab.setText("Text");
 blab.setText("Text");
 ansLab.setText("Text");
```

```
 err.setText("Enter only integers!");
```

catch (ArithmaticException e) {

```
 alab.setText("Text");
 blab.setText("Text");
 ansLab.setText("Text");
 err.setText("B should be non
zero!");
```

}

}

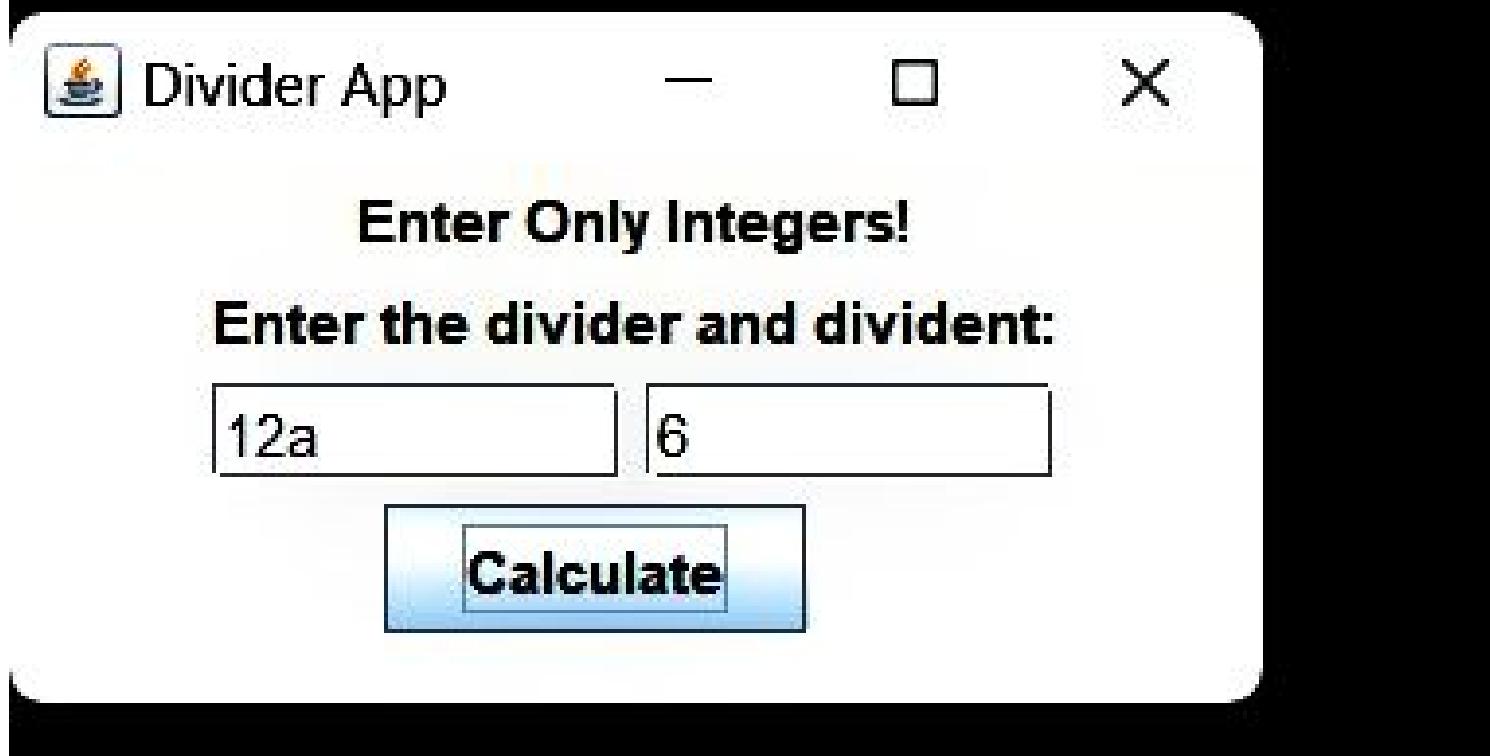
} ;

```
 jFrame.setVisible (b : true);
}
```

```
public static void main (String args[]) {
 SwingUtilities.invokeLater (new Runnable () {
 public void run () {
 new swingDemo ();
 }
 });
}
```

output :-

```
C:\Abhi008>java SwingDemo
Action event from a text field
```



```
C:\Abhi008>java SwingDemo
Action event from a text field
Action event from a text field
```

 Divider App — □ ×

**B should be NON zero!**

**Enter the divider and dividend:**

|    |   |
|----|---|
| 15 | 0 |
|----|---|

**Calculate**

```
C:\Abhi008>javac SwingDemo.java
```

```
C:\Abhi008>java SwingDemo
```

```
Action event from a text field
Action event from a text field
```

