

B.M.S. COLLEGE OF ENGINEERING
Basavanagudi, Bengaluru- 560019
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



LAB REPORT

On

Object Oriented Java Programming
(23CS3PCOOJ)

Submitted By :

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1BM22CS028

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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 discriminate b^2-4ac is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;

public class quad
{
    public static void main(String[] args)
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter num 1 : ");
        double a = s.nextDouble();
        System.out.println("Enter num 2 : ");
        double b = s.nextDouble();
        System.out.println("Enter num 3 : ");
        double c = s.nextDouble();
        double y = ((b*b)-(4*a*c));
        double z = Math.sqrt(y);
        if(y>0)
        {
            System.out.println("Given equation has 2 real solutions and they are : ");
            double d = ((-b+z)/(2*a));
            double e = ((-b-z)/(2*a));
            System.out.println(d+" and "+e);
        }
        else if(y==0)
        {
            double f = -b/(2*a);
```

```

System.out.println("Given equation has 1 real solution and that is : "+f);
}
else if(y<0)
{
System.out.println("Given equation does not have any real solutons");
}
else
{
System.out.println("Invalid Input");
}
System.out.println("Akash ks 1BM22CS028");
}
}

```

OUTPUT :

```

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>JAVA quad
Enter num 1 :
1
Enter num 2 :
-5
Enter num 3 :
-6
Given equation has 2 real solutions and they are :
6.0 and -1.0
Akash ks 1BM22CS028

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>javac quad.java

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>java quad
Enter num 1 :
2
Enter num 2 :
-4
Enter num 3 :
2
Given equation has 1 real solution and that is : 1.0
Akash ks 1BM22CS028

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>javac quad.java

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>java quad
Enter num 1 :
2
Enter num 2 :
4
Enter num 3 :
5
Given equation does not have any real solutons
Akash ks 1BM22CS028

```

LAB-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 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.next();

        System.out.print("Enter your name : ");

        name= s.next();

        for(int i=0;i<8;i++)
        {
            System.out.print("Enter your marks for subject "+(i+1)+ " : ");

            marks[i] = s.nextInt();

        }

    }

    public void displaydet()
```

```
{
System.out.println("Your usn is : "+usn);
System.out.println("Your name is : "+name);
for(int j=0;j<8;j++)
{
System.out.println("Your marks for subject "+(j+1)+ " : "+marks[j]);
}
}

public void sgpa()
{
int g=0;
for(int k =0;k<8;k++)
{
int v=0;
v = credits[k]*((marks[k]/10)+1);
g = g+v;
}
System.out.println("Your sgpa is : "+(g/20));
}
}

public class sgpathing
{
public static void main(String[] args) {
student p = new student();
p.enterdet();
p.displaydet();
p.sgpa();
}
```

```
D:\akashks\study\1BM22CS028_AKASH>javac sgpathing.java
```

```
D:\akashks\study\1BM22CS028_AKASH>java sgpathing
```

```
Enter your usn : 1BM22CS028
```

```
Enter your name : AKASH
```

```
Enter your marks for subject 1 : 89
```

```
Enter your marks for subject 2 : 79
```

```
Enter your marks for subject 3 : 85
```

```
Enter your marks for subject 4 : 86
```

```
Enter your marks for subject 5 : 87
```

```
Enter your marks for subject 6 : 92
```

```
Enter your marks for subject 7 : 93
```

```
Enter your marks for subject 8 : 94
```

```
Your usn is : 1BM22CS028
```

```
Your name is : AKASH
```

```
Your marks for subject 1 : 89
```

```
Your marks for subject 2 : 79
```

```
Your marks for subject 3 : 85
```

```
Your marks for subject 4 : 86
```

```
Your marks for subject 5 : 87
```

```
Your marks for subject 6 : 92
```

```
Your marks for subject 7 : 93
```

```
Your marks for subject 8 : 94
```

```
Your sgpa is : 8
```

LAB-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.

```
class Book{
    private String name;
    private String author;
    private int price;
    private int num_of_pages;

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

    public void setAuthor(String author) {
        this.author = author;
    }

    public void setPrice(int price) {
        this.price = price;
    }

    public void setNum_of_pages(int num_of_pages) {
        this.num_of_pages = num_of_pages;
    }

    public void setName(String name) {
        this.name = name;
    }
}
```

```

    }

    public String getName() {
        return name;
    }

    public String getAuthor() {
        return author;
    }

    public int getPrice() {
        return price;
    }

    public int getNum_of_pages() {
        return num_of_pages;
    }

    public String toString() {
        return "Book name=" + name + ", author=" + author + ", price=" + price + ",
num_of_pages=" + num_of_pages
            + " ";
    }
}

public class javaa{

    public static void main(String[] args)
    {
        int n =2;

        Book [] b = new Book[n];

        b[0] = new Book("LOTR","JRR Tolkien",500,1500);

        b[1] = new Book("PJO","RICK",200,500);

        System.out.println(b[0]);

        System.out.println(b[1]);

    }
}

```



```
D:\akashks\study\1BM22CS028_AKASH>javac javaa.java
```

```
D:\akashks\study\1BM22CS028_AKASH>java javaa
```

```
Book name=LOTR, author=JRR Tolkien, price=500, num_of_pages=1500
```

```
Book name=PJO, author=RICK, price=200, num_of_pages=500
```

LAB-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.Scanner;

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

class Rectangle extends shape
{
    void printArea()
    {
        System.out.println("The area is : "+(a*b));
    }
}

class Triangle extends shape
{
    void printArea()
    {
        System.out.println("The area is : "+((a*b)/2));
    }
}

class Circle extends shape
{
    void printArea()
```

```
{
    System.out.println("The area is : "+(3.14*a*a));

}
}

public class main
{
    public static void main(String[] args) {
        Rectangle r = new Rectangle();
        Triangle t = new Triangle();
        Circle c = new Circle();
        Scanner s = new Scanner(System.in);
        System.out.println("Enter sides for rectangle : ");
        r.a = s.nextDouble();
        r.b = s.nextDouble();
        r.printArea();
        System.out.println("Enter values for Triangle : ");
        t.a = s.nextDouble();
        t.b = s.nextDouble();
        t.printArea();
        System.out.println("Enter radius for Circle : ");
        c.a = s.nextDouble();
        c.printArea();
    }
}
```

```
D:\akashks\study\1BM22CS028_AKASH>javac main.java
```

```
D:\akashks\study\1BM22CS028_AKASH>java main
```

```
Enter sides for rectangle :
```

```
5
```

```
5
```

```
The area is : 25.0
```

```
Enter values for Triangle :
```

```
5
```

```
5
```

```
The area is : 12.5
```

```
Enter radius for Circle :
```

```
5
```

```
The area is : 78.5
```

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 Cur-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.

```
import java.util.Scanner;

class account
{
    String custname;
    int accnum;
    String acctype;
    double bal=5000;
}

class savacct extends account
{
```

```
public savacct(String e, int f, String g)
{
    custname = e;
    accnum = f;
    acctype = g;
    System.out.println("Customer details : ");
    System.out.println("Customer name : "+custname);
    System.out.println("Customer account number : "+accnum);
    System.out.println("Customer account type : "+acctype);
}
Scanner s1 = new Scanner(System.in);
public void deposit(int z)
{
    bal = bal+z;
    System.out.println("Your Current balance is : "+bal);
}
public void withdrawl()
{
    System.out.println("Enter the amount to be withdrawn : ");
    double q1 = s1.nextDouble();
    if(q1>bal)
    {
        System.out.println("Not enough amount!!");
    }
    else
    {
        System.out.println("You have withdrawn "+q1);
        bal = bal-q1;
    }
}
```

```

        System.out.println("Current balance is : "+bal);
    }
}

public void compinterest()
{
    double w = bal*(1+(0.05/12)) - bal;
    System.out.println("Current interest in : "+w);
}

public int chq()
{
    return 0;
}
}

class curacct extends account
{
    public curacct(String e1, int f1, String g1)
    {
        custname = e1;
        accnum = f1;
        acctype = g1;
        System.out.println("Customer details : ");
        System.out.println("Customer name : "+custname);
        System.out.println("Customer account number : "+accnum);
        System.out.println("Customer account type : "+acctype);
    }

    double e;

    Scanner s2 = new Scanner(System.in);

    public void deposit(int y)
    {

```

```

        bal = bal+y;
        System.out.println("Your Current balance is : "+bal);
    }
    public void withdrawl()
    {
        System.out.println("Enter the amount to be withdrawn : ");
        double q2 = s2.nextDouble();
        if(q2>bal)
        {
            System.out.println("Not enough amount!!");
        }
        else
        {
            System.out.println("You have withdrawn "+q2);
            bal = bal-q2;
            System.out.println("Current balance is : "+bal);
            if(bal<3000)
            {
                bal = bal-100;
                System.out.println("Your balance is below require balance!!,a penalty has been
imposed");
                System.out.println("Current balance is : "+bal);
            }
        }
    }
    public int chq()
    {
        return 1;
    }

```



```
}
```

```
public class bank
```

```
{
```

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

```
        Scanner s3 = new Scanner(System.in);
```

```
        System.out.println("Enter customer name : ");
```

```
        String a1 = s3.next();
```

```
        System.out.println("Enter customer acc num : ");
```

```
        int a2 = s3.nextInt();
```

```
        System.out.println("Enter customer type : ");
```

```
        String a3 = s3.next();
```

```
            savacct sav = new savacct(a1,a2,a3);
```

```
            sav.deposit(1000);
```

```
            sav.compinterest();
```

```
            sav.withdrawl();
```

```
        int l1 = sav.chq();
```

```
        if(l1 == 0)
```

```
{
```

```
    System.out.println("There is no cheque facility");
```

```
}
```

```
else
```

```
{
```

```
    System.out.println("Cheque facility available");
```

```
}
```

```
        System.out.println("Enter customer name : ");
```

```
        String b1 = s3.next();
```

```
        System.out.println("Enter customer acc num : ");
```

```
int b2 = s3.nextInt();
System.out.println("Enter customer account type : ");
String b3 = s3.next();

        curacct cur = new curacct(b1,b2,b3);
        cur.deposit(3000);
        cur.withdrawl();
        int l2 = cur.chq();

if(l2 == 0)
{
    System.out.println("There is no cheque facility");
}
else
{
    System.out.println("Cheque facility available");
}
}
```

```
D:\akashks\study\1BM22CS028_AKASH>javac bank.java
```

```
D:\akashks\study\1BM22CS028_AKASH>java bank
```

```
Enter customer name :
```

```
EDWARD
```

```
Enter customer acc num :
```

```
1133
```

```
Enter customer type :
```

```
sav
```

```
Customer details :
```

```
Customer name : EDWARD
```

```
Customer account number : 1133
```

```
Customer account type : sav
```

```
Your Current balance is : 6000.0
```

```
Current interest in : 25.0
```

```
Enter the amount to be withdrawn :
```

```
2000
```

```
You have withdrawn 2000.0
```

```
Current balance is : 4000.0
```

```
There is no cheque facility
```

```
Enter customer name :
```

```
KENWAY
```

```
Enter customer acc num :
```

```
4477
```

```
Enter customer account type :
```

```
cur
```

```
Customer details :
```

```
Customer name : KENWAY
```

```
Customer account number : 4477
```

```
Customer account type : cur
```

```
Your Current balance is : 8000.0
```

```
Enter the amount to be withdrawn :
```

```
4000
```

```
You have withdrawn 4000.0
```

```
Current balance is : 4000.0
```

```
Cheque facility available
```

LAB-6

Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

```
//CIE PACKAGE
```

```
//Student.java
```

```
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 the details :\n");
```

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

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

```
        sem=scan.nextInt();
```

```
    }
```

```
}
```

```
//Internals.java
```

```
package CIE;
```

```
public class Internal {
```

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

```
}
```

```
//SEE PACKAGE
```

```
//External.java
```

```
package SEE;
```

```
import CIE.Student;
```

```
public class External extends Student {
```

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

```
}
```

```
//FinalMarks.java
```

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

```
import SEE.*;
```

```
import CIE.*;
```

```
public class Finalmarks
```

```
{
```

```
    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[n];
```

```
        CIE.Internal s[]=new CIE.Internal[n];
```

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

```
        {
```

```
            st[i]=new SEE.External();
```

```
            s[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));
    s[i].im[j]=sc.nextInt();
    st[i].sm[j]=sc.nextInt();
    fm[j]=s[i].im[j]+st[i].sm[j];
}
System.out.println("Final marks of "+st[i].name);
for(int k=0; k<5; k++)
{
    System.out.println("Course "+(k+1)+" = "+fm[k]);
}
}
}
```

```
PS C:\Users\bmsce\Desktop\1BM22CS028_AKASH\package> java Finalmarks
Enter n:
1
Enter details 1
Enter the details :

1BM22CS028
AKASH
3
Enter im and sm of sub 1
50
50
Enter im and sm of sub 2
50
50
Enter im and sm of sub 3
50
50
Enter im and sm of sub 4
50
50
Enter im and sm of sub 5
50
50
Final marks of AKASH
Course 1 = 100
Course 2 = 100
Course 3 = 100
Course 4 = 100
Course 5 = 100
```

LAB-7

Write a program that demonstrates handling of exceptions in inheritance tree.

Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age<0. In Son class, implement a constructor that takes both father and son's age and throws an exception if son's age is >=father's age.

```
import java.util.Scanner;

class WrongAgeException extends Exception {
    public WrongAgeException(String message) {
        super(message);
    }
}

class father {
    int d_age;

    public father(int a) throws WrongAgeException{
        if (a < 0) {
            throw new WrongAgeException("Age is less than zero!!");
        }
        d_age = a;
    }
}

class son extends father
{
    int s_age;
```



```

    public son(int d_age,int s) throws WrongAgeException
    {
        super(d_age);
        if(d_age<s)
        {
            throw new WrongAgeException("father age can't be less than son!!");
        }
        s_age = s;
    }
}

public class father1
{
    public static void main(String[] args) {
        int x,y;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter father age");
        x = s.nextInt();
        System.out.println("Enter son age");
        y = s.nextInt();
        try {
            father s1 = new father(x);
            son s2 = new son(x,y);
        } catch (WrongAgeException e) {
            System.out.println("Exception: " + e.getMessage());
        }
    }
}

```

```
C:\Users\bmsce\Desktop\1BM22CS028_AKASH>java father1
Enter father age
-1
Enter son age
50
Exception: Age is less than zero!!
```

```
C:\Users\bmsce\Desktop\1BM22CS028_AKASH>java father1
Enter father age
40
Enter son age
50
Exception: father age can't be less than son!!
```

LAB-8

Write a program which creates two threads, one thread displaying “BMS College of Engineering” once every ten seconds and another displaying “CSE” once every two seconds.

class A implements Runnable

```
{
    public void run()
    {
        for(int i = 0;i<5;i++)
        {
            try {
                System.out.println("BMS COLLEGE OF ENGINEERING");

                Thread.sleep(10000);
            } catch(Exception e) {
                e.printStackTrace();
            }
        }
    }
}
```

class B implements Runnable

```
{
    public void run()
    {
        for(int i = 0;i<5;i++)
        {
```

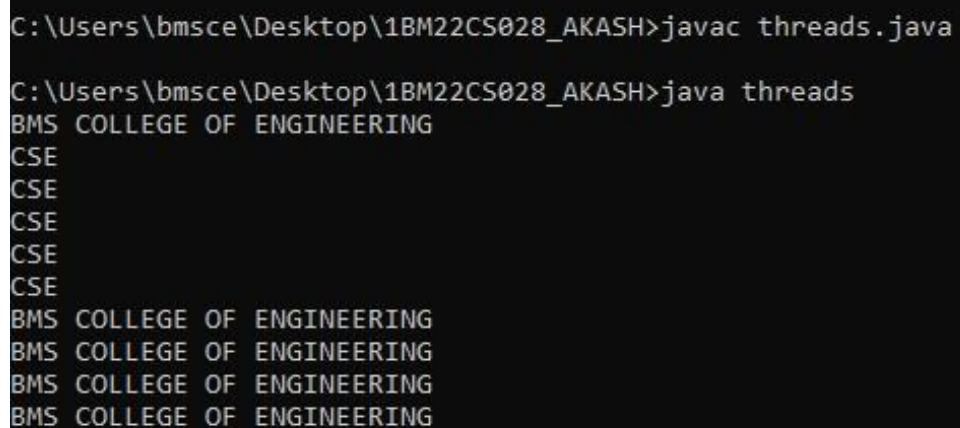
```

        try {
            System.out.println("CSE");

            Thread.sleep(2000);
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}

public class threads
{
    public static void main(String[] args) {
        A p1 = new A();
        B p2 = new B();
        Thread t1 = new Thread(p1);
        Thread t2 = new Thread(p2);
        t1.start();
        t2.start();
    }
}

```



```

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>javac threads.java

C:\Users\bmsce\Desktop\1BM22CS028_AKASH>java threads
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING

```

LAB-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 and 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

Arithmetic Exception Display the exception in a message dialog box

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

public class last
{
    public last()
    {
        JFrame jfrm = new JFrame("Divider App");
        jfrm.setSize(275,150);
        jfrm.setLayout(new FlowLayout());
        jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        JLabel jlab = new JLabel("Enter the divider and dividend");
        JTextField atjf = new JTextField(8);
        JTextField btjf = new JTextField(8);
        JButton button = new JButton("calculate");
        JLabel err = new JLabel();
        JLabel alab = new JLabel();
        JLabel blab = new JLabel();
        JLabel anslab = new JLabel();
        jfrm.add(err);
```

```
jfrm.add(jlab);
jfrm.add(atjf);
jfrm.add(btjf);
jfrm.add(button);
jfrm.add(alab);
jfrm.add(blab);
jfrm.add(anslab);

ActionListener l = new ActionListener() {
    public void actionPerformed(ActionEvent evt)
    {
        System.out.println("Action event from a text field");
    }
};

atjf.addActionListener(l);
btjf.addActionListener(l);
button.addActionListener(new ActionListener()
{
    public void actionPerformed(ActionEvent evt)
    {
        try
        {
            int a = Integer.parseInt(atjf.getText());
            int b = Integer.parseInt(btjf.getText());
            int ans = a/b;

            alab.setText("\nA = "+a);
            blab.setText("\nB = "+b);
            anslab.setText("\nAns = "+ans);
```

```
    }  
    catch(NumberFormatException e)  
    {  
        alab.setText("");  
        blab.setText("");  
        anslab.setText("");  
        err.setText("B should be non zero");  
    }  
}  
});  
jfrm.setVisible(true);
```

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

Divider App

Enter the divider and dividend

500 5

calculate A = 500 B = 5 Ans = 100