

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**  
**“Jnana Sangama”, Belgaum -590014, Karnataka.**



**LAB WORK REPORT**  
**On**

**“OBJECT ORIENTED PROGRAMMING IN JAVA”**

*Submitted by*

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*Under the Guidance of*

**PROF.SWATI SHRIDHARAN**

*in partial fulfillment for the award of the degree of*  
**BACHELOR OF ENGINEERING**  
*in*  
**COMPUTER SCIENCE AND ENGINEERING**



**B.M.S. COLLEGE OF ENGINEERING**  
**(Autonomous Institution under VTU)**  
**BENGALURU-560019**

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**B. M. S. College of Engineering,**  
**Bull Temple Road, Bangalore 560019**  
(Affiliated To Visvesvaraya Technological University, Belgaum)

**Department of Computer Science and Engineering**



**CERTIFICATE**

This is to certify that the lab work of the course “**Object Oriented Programming in Java**” carried out by **MANASVINI DEEPAK (1BM22CS336)**, who is a bonafide student of **B. M. S. College of Engineering**. It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visveswararajah Technological University, Belgaum during the year 2024. The lab report has been approved as it satisfies the academic requirements in respect of **Object Oriented Programming in Java (23CS3PCOOJ)** work prescribed for the said degree.

Signature of the Guide

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BMSCE, Bengaluru

Signature of the HOD

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Prof & Head of Dept of  
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External Viva

Name of the Examiner

Signature with

date

**B.M.S. COLLEGE OF ENGINEERING**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**



**DECLARATION**

I, **MANASVINI DEEPAK (1BM22CS336)**, student of 3<sup>rd</sup> Semester, B.E, Department of Computer Science and Engineering, BMS College of Engineering, Bangalore, hereby declare that, this lab report for the course “Object Oriented Programming in Java” has been carried out by me under the guidance of Prof. Swati Sridharan, Assistant Professor, Department of CSE, BMS College of Engineering, Bangalore during the academic semester Dec 2023 - Mar 2024.

I also declare that to the best of my knowledge and belief, the report here is not from part of any other report by any other students.

Signature

**MANASVINI DEEPAK**

**(1BM22CS336)**

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## **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.

### **CODE:**

```
import java.util.*;

class Quadratic
{
    public static void main(String args[])
    {
        System.out.println("NAME: MANASVINI DEEPAK\nUSN: 1BM22CS336");

        Scanner Sc=new Scanner(System.in);

        System.out.println("Enter the coefficient of (x^2)");
        int a=Sc.nextInt();

        System.out.println("Enter the coefficient (x)");
        int b=Sc.nextInt();

        System.out.println("Enter the constant");
        int c=Sc.nextInt();

        double des = (b*b)-(4*a*c);

        if(des>=0)
        {
            double r1 = (-b + Math.sqrt(des))/(2*a);
```

```

        double r2 = (-b - Math.sqrt(des))/(2*a);

        System.out.println("The roots of the equation are: "+r1+" , "+r2);

    }

    else

    {

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

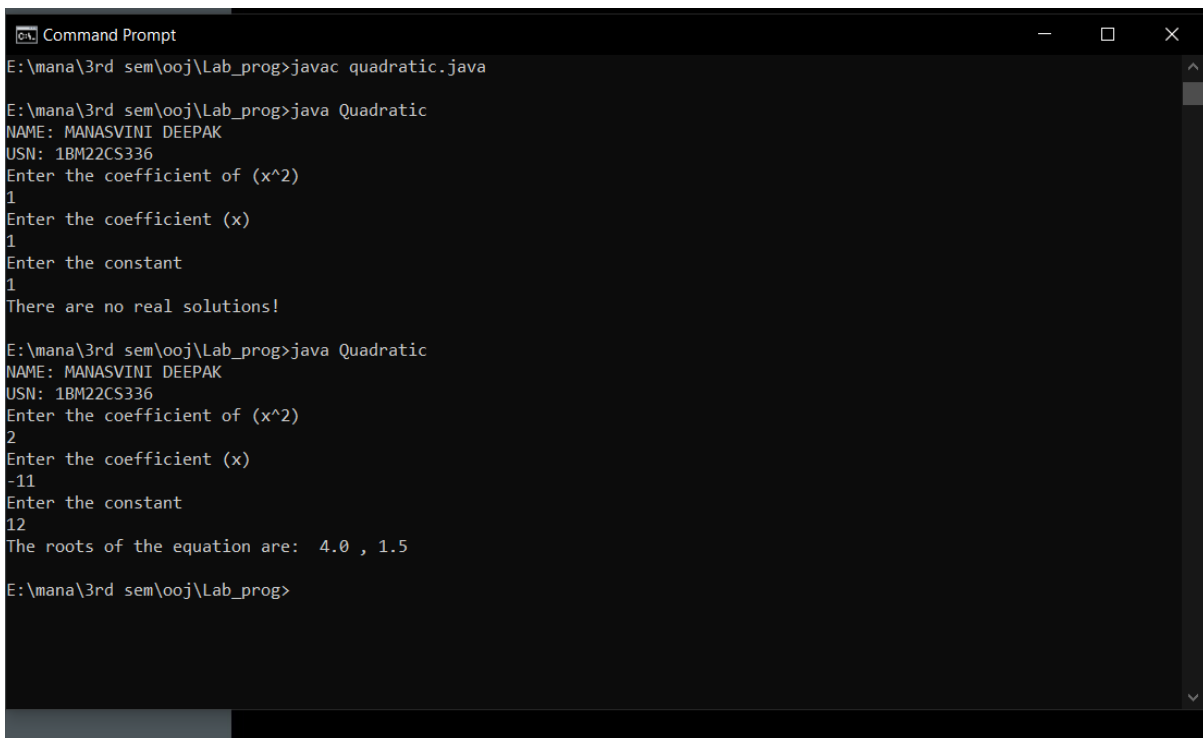
    }

}

}

```

### OUTPUT:



```

Command Prompt
E:\mana\3rd sem\ooj\Lab_prog>javac quadratic.java

E:\mana\3rd sem\ooj\Lab_prog>java Quadratic
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Enter the coefficient of (x^2)
1
Enter the coefficient (x)
1
Enter the constant
1
There are no real solutions!

E:\mana\3rd sem\ooj\Lab_prog>java Quadratic
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Enter the coefficient of (x^2)
2
Enter the coefficient (x)
-11
Enter the constant
12
The roots of the equation are: 4.0 , 1.5

E:\mana\3rd sem\ooj\Lab_prog>

```

## **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.

### **CODE:**

```
import java.util.Scanner;

class Student
{
    String usn;
    String name;
    int[] credits = new int[8];
    int[] marks = new int[8];
    void input()
    {
        Scanner Sc = new Scanner(System.in);
        System.out.println("Enter the name of the student: ");
        name=Sc.nextLine();
        System.out.println("Enter the USN:");
        usn=Sc.nextLine();
        System.out.println("Enter the credits in order: ");
        for(int i=0;i<8;i++)
        {
            credits[i]=Sc.nextInt();
```

```

    }
    System.out.println("Enter the marks of student in order");
    for(int i=0;i<8;i++)
    {
        marks[i]=Sc.nextInt();
    }
}

void display()
{
    System.out.println("****STUDENT DETAILS****");
    System.out.println("Name: "+name);
    System.out.println("USN: "+usn);
    System.out.println("The marks obtained and credits for each subject are");
    for(int i=0;i<8;i++)
    {
        System.out.println("Subject "+(i+1)+" "+marks[i]);
        System.out.println("Subject "+(i+1)+" +credits: " +credits[i]);
    }
}

void sgpa()
{
    double sum=0, res=0;
    for(int i=0;i<8;i++)
    {

```



```
double gp=0;
if(90<marks[i] && marks[i]<=100)
{
    gp=10;
}
else if(80<marks[i] && marks[i]<=90)
{
    gp=9;
}
else if(70<marks[i] && marks[i]<=80)
{
    gp=8;
}
else if(60<marks[i] && marks[i]<=70)
{
    gp=7;
}
else if(50<marks[i] && marks[i]<=60)
{
    gp=6;
}
else if(40<marks[i] && marks[i]<=50)
{
    gp=5;
```

```

        }
        else
        {
            gp=4;
        }

        res = res + gp*credits[i];

        sum = sum + credits[i];
    }

    double sgpa=res/sum;

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

class runcode
{
    public static void main(String[] args)
    {
        System.out.println("NAME: MANASVINI DEEPAK\nUSN: 1BM22CS336");

        Scanner sc=new Scanner(System.in);

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

        int n=sc.nextInt();

        for(int j=1;j<=n;j++)
        {
            Student S=new Student();

            S.input();
        }
    }
}

```

```

        S.display();

        S.sgpa();

    }

}

}

```

### OUTPUT:

```

E:\mana\3rd sem\ooj\Lab_prog>javac cgpa.java
E:\mana\3rd sem\ooj\Lab_prog>java runcode
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Enter the number of students
1
Enter the name of the student:
Anjana
Enter the USN:
1BM22CS003
Enter the credits in order:
4
4
3
3
3
1
1
1
Enter the marks of student in order
91
91
88
90
82
85
94
97
****STUDENT DETAILS****
Name: Anjana
USN: 1BM22CS003
The marks obtained and credits for each subject are
Subject 1 91
Subject 1 +credits: 4
Subject 2 91
Subject 2 +credits: 4
Subject 3 88
Subject 3 +credits: 3
Subject 4 90
Subject 4 +credits: 3
Subject 5 82
Subject 5 +credits: 3
Subject 6 85
Subject 6 +credits: 1
Subject 7 94
Subject 7 +credits: 1
Subject 8 97
Subject 8 +credits: 1
SGPA: 9.5

```

### **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.

#### **CODE:**

```
import java.util.*;

class Book
{
    private String name;
    private String author;
    private double price;
    private int num_pages;

    public Book()
    {
    }

    public Book(String name,String author, int pages, double price)
    {
        this.author=author;
        this.name=name;
```

```
        this.price=price;
        this.num_pages=pages;
    }
    public void setName(String name)
    {
        this.name=name;
    }
    public void setAuthor(String author)
    {
        this.author=author;
    }
    public void setPages(int pages)
    {
        this.num_pages=pages;
    }
    public void setPrice(double price)
    {
        this.price=price;
    }
    public String getName()
    {
        return (name);
    }
    public String getAuthor()
```

```

    {
        return author;
    }

    public int getPages()
    {
        return num_pages;
    }

    public double getPrice()
    {
        return price;
    }

    public String toString()
    {
        return "Book Name: "+name+" Author: "+ author + " Price: " +price+ "
Pages: "+num_pages;
    }
}

public class NumberBook
{
    public static void main(String[] args)
    {
        System.out.println("NAME: MANASVINI DEEPAK\nUSN:
1BM22CS336");

        Scanner Sc=new Scanner(System.in);

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

```

```
int n=Sc.nextInt();  
Book[] books = new Book[n];  
for(int i=0;i<n;i++)  
{  
    books[i]=new Book();  
    System.out.println("Enter Book Name: ");  
    String name=Sc.nextLine();  
    System.out.println("Enter Author: ");  
    String author=Sc.nextLine();  
    System.out.println("Enter Price: ");  
    double price=Sc.nextDouble();  
    System.out.println("Enter Number of pages: ");  
    int num_pages=Sc.nextInt();  
  
    books[i].setName(name);  
    books[i].setAuthor(author);  
    books[i].setPrice(price);  
    books[i].setPages(num_pages);  
  
}  
for(int i=0;i<n;i++)  
{  
    System.out.println(books[i].toString());  
}
```

```
}  
  
}
```

### OUTPUT:

```
E:\mana\3rd sem\ooj\Lab_prog>javac NumberBook.java  
  
E:\mana\3rd sem\ooj\Lab_prog>java NumberBook  
NAME: MANASVINI DEEPAK  
USN: 1BM22CS336  
Enter number of books:  
2  
Enter Book Name:  
Harry Potter  
Enter Author:  
JK Rowling  
Enter Price:  
250  
Enter Number of pages:  
600  
Enter Book Name:  
Famous Five  
Enter Author:  
Enid Blyton  
Enter Price:  
200  
Enter Number of pages:  
300  
Book Name: Harry Potter Author: JK Rowling Price: 250.0 Pages: 600  
Book Name: Famous Five Author: Enid Blyton Price: 200.0 Pages: 300
```



#### **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.

#### **CODE:**

```
abstract class Shape
{
    private int a,b;
    Shape()
    {

    }

    abstract void printArea();
}

class Rectangle extends Shape
{
    private int a,b;
    Rectangle(int a,int b)
    {
        this.a=a;
        this.b=b;
    }
    void printArea()
    {
        System.out.println("Area of Rectangle: "+(a*b));
    }
}

class Triangle extends Shape
{
    private int a,b;
    Triangle(int a,int b)
    {
        this.a=a;
```

```

        this.b=b;
    }
    void printArea()
    {
        System.out.println("Area of Triangle: "+(0.5*a*b));
    }
}

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

public class Area
{
    public static void main(String[] args)
    {
        Shape r=new Rectangle(5, 4);
        Shape t=new Triangle(4, 6);
        Shape c=new Circle(3);
        System.out.println("NAME: MANASVINI DEEPAK\nUSN:
1BM22CS336");
        r.printArea();
        t.printArea();
        c.printArea();
    }
}

```

### OUTPUT:

```

C:\Users\laptop>cd /d E:\mana\3rd sem\ooj\Lab_prog
E:\mana\3rd sem\ooj\Lab_prog>javac Area.java
E:\mana\3rd sem\ooj\Lab_prog>java Area
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Area of Rectangle: 20
Area of Triangle: 12.0
Area of Circle: 28.259999999999998

```

## **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 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.

### **CODE:**

```
import java.util.*;
class Account {
    String customerName;
    String accountNumber;
    String accountType;
    double balance;

    public Account(String customerName, String accountNumber, String
accountType,
double balance) {
    this.customerName = customerName;
    this.accountNumber = accountNumber;
    this.accountType = accountType;
    this.balance = balance;
    }
    void deposit(double amount) {
    balance += amount;
```

```

System.out.println("Deposit successful. Updated balance: " + balance);
}
void displayBalance() {
System.out.println("Current balance: " + balance);
}
}
class CurAcct extends Account {
double minBalance;
double serviceCharge;
public CurAcct(String customerName, String accountNumber,String acctype,
double
balance, double minBalance, double serviceCharge) {

super(customerName, accountNumber, acctype, balance);
this.minBalance = minBalance;
this.serviceCharge = serviceCharge;
}
void withdraw(double amount) {
if (amount <= balance) {
balance -= amount;
System.out.println("Withdrawal successful. Updated balance: " + balance);
} else {
System.out.println("Insufficient funds. Withdrawal not permitted.");
}
}
void checkMinBalance() {
if (balance < minBalance) {
balance -= serviceCharge;
System.out.println("Minimum balance not maintained. Service charge
imposed.");
}
}
}
class SavAcct extends Account {
double interestRate;

public SavAcct(String customerName, String accountNumber,String acctype,
double
balance, double interestRate) {
super(customerName, accountNumber, acctype, balance);
this.interestRate = interestRate;
}
void computeInterest() {

```

```

double interest = balance * interestRate / 100;
balance += interest;
System.out.println("Interest computed and deposited. Updated balance: " +
balance);
}
void withdraw(double amount) {
if (amount <= balance) {
balance -= amount;
System.out.println("Withdrawal successful. Updated balance: " + balance);
} else {
System.out.println("Insufficient funds. Withdrawal not permitted.");
}
}
}
}

```

```

public class Bank {
public static void main(String[] args) {
Scanner sc = new Scanner(System.in);
System.out.println("NAME: MANASVINI DEEPAK\nUSN: 1BM22CS336");
System.out.println("ENTER CHOICE");
System.out.println("ENTER 1 TO CREATE SAVINGS ACCOUNT");
System.out.println("ENTER 2 TO CREATE CURRENT ACCOUNT");
int ch = sc.nextInt();
switch (ch){
case 1:
System.out.println("Enter Customer Name:");
String s_name = sc.next();
System.out.println("Enter Account Number:");
String s_accno = sc.next();
System.out.println("Enter Balance:");
double s_bal = sc.nextDouble();
System.out.println("Enter Interest:");

double s_intrate = sc.nextDouble();
SavAcct savingsAcc = new
SavAcct(s_name,s_accno,"Savings",s_bal,s_intrate);
System.out.println("ENTER CHOICE FOR SAVINGS ACC");
System.out.println("ENTER 1 TO DEPOSIT AMT");
System.out.println("ENTER 2 TO COMPUTE INTEREST");
System.out.println("ENTER 3 TO WITHDRAW");
System.out.println("ENTER 4 TO EXIT");
int ch_s = sc.nextInt();
do{

```

```

switch (ch_s){
case 1:
System.out.println("Enter amount to deposit:");
double s_damt = sc.nextDouble();
savingsAcc.deposit(s_damt);
savingsAcc.displayBalance();
break;
case 2:
savingsAcc.computeInterest();
break;
case 3:
System.out.println("Enter amount to withdraw:");

double s_wamt = sc.nextDouble();
savingsAcc.withdraw(s_wamt);
savingsAcc.displayBalance();
break;
case 4:
break;
}
System.out.println("ENTER CHOICE");
ch_s = sc.nextInt();
}while(ch_s!=4);
break;
case 2:
System.out.println("Enter Customer Name:");
String c_name = sc.next();
System.out.println("Enter Account Number:");
String c_accno = sc.next();
System.out.println("Enter Balance:");
double c_bal = sc.nextDouble();

System.out.println("Enter Minimum Balance:");
double c_minbal = sc.nextDouble();
System.out.println("Enter Service Charges:");
double c_serch = sc.nextDouble();
CurAcct currentAcc = new
CurAcct(c_name,c_accno,"Current",c_bal,c_minbal,c_serch);
System.out.println("ENTER CHOICE FOR SAVINGS ACC");
System.out.println("ENTER 1 TO DEPOSIT AMT");
System.out.println("ENTER 2 TO CHECK MIN BALANCE");
System.out.println("ENTER 3 TO WITHDRAW");
System.out.println("ENTER 4 TO EXIT");

```

```
int ch_c = sc.nextInt();
do{
switch (ch_c){
case 1:
System.out.println("Enter amount to deposit:");
double damt = sc.nextDouble();
currentAcc.deposit(damt);
currentAcc.displayBalance();
break;
case 2:

currentAcc.checkMinBalance();
break;
case 3:
System.out.println("Enter amount to withdraw:");
double wamt = sc.nextDouble();
currentAcc.withdraw(wamt);
currentAcc.displayBalance();
break;
case 4:
break;
}
System.out.println("ENTER CHOICE");
ch_c = sc.nextInt();
}while(ch_c!=4);
break;
}
}
}
```

### OUTPUT:

```
E:\mana\3rd sem\ooj\Lab_prog>javac Bank.java

E:\mana\3rd sem\ooj\Lab_prog>java Bank
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
ENTER CHOICE
ENTER 1 TO CREATE SAVINGS ACCOUNT
ENTER 2 TO CREATE CURRENT ACCOUNT
1
Enter Customer Name:
Aditi
Enter Account Number:
00297789597
Enter Balance:
10000
Enter Interest:
0.05
ENTER CHOICE FOR SAVINGS ACC
ENTER 1 TO DEPOSIT AMT
ENTER 2 TO COMPUTE INTEREST
ENTER 3 TO WITHDRAW
ENTER 4 TO EXIT
1
Enter amount to deposit:
2000
Deposit successful. Updated balance: 12000.0
Current balance: 12000.0
ENTER CHOICE
1
Enter amount to deposit:
200
Deposit successful. Updated balance: 12200.0
Current balance: 12200.0
ENTER CHOICE
2
Interest computed and deposited. Updated balance: 12206.1
ENTER CHOICE
3
Enter amount to withdraw:
350
Withdrawal successful. Updated balance: 11856.1
Current balance: 11856.1
ENTER CHOICE
4
```



## **PROGRAM 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.

### **CODE:**

```
package CIE;
import java.util.Arrays;
public class Internals {
    int CIE_marks[];
    public Internals (int I_marks[]){
        this.CIE_marks = I_marks;
    }
    public void dispImarks(){
        System.out.println("CIE Marks: "+
            Arrays.toString(Arrays.stream(CIE_marks).toArray()));
    }
}
```

```
package CIE;
public class Student {
    String name;
    String USN;
    int sem;
    public Student(){
    }
    public Student(String name, String USN, int semester){
        this.name = name;
        this.USN = USN;
        this.sem = semester;
    }
    public void display(){
        System.out.println("Name: "+name);
        System.out.println("USN: "+USN);
        System.out.println("Semester: "+sem);
    }
}
```

```
}  
}
```

```
package SEE;  
import CIE.Student;  
import java.util.Arrays;  
public class Externals extends Student {  
    int SEE_marks[] = new int[5];  
    public Externals(String name, String USN, int semester, int E_marks[]){  
        super(name,USN,semester);  
        this.SEE_marks = E_marks;  
    }  
    Externals(int E_marks[]){  
        this.SEE_marks = E_marks;  
    }  
    public void dispEMarks(){  
        System.out.println("SEE Marks: "+  
Arrays.toString(Arrays.stream(SEE_marks).toArray()));  
    }  
}
```

```
import CIE.*;  
import SEE.*;  
import java.util.*;  
public class Prog6 {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int E_marks[] = new int[5];  
        int I_marks[] = new int[5];  
        System.out.println("VISHWAS H KUMAR 1BM22CS338");  
        System.out.println("Enter Student name:");  
        String name = sc.next();  
        System.out.println("Enter USN:");  
        String USN = sc.next();  
        System.out.println("Enter Semester:");  
        int semester = sc.nextInt();  
        System.out.println("Enter SEE Marks:");  
  
        for (int i=0; i<5;i++){  
            System.out.println("Enter marks:");  
            int n = sc.nextInt();  
            E_marks[i] = n;  
        }  
    }  
}
```

```
System.out.println("Enter CIE Marks:");
for (int i=0; i<5;i++){
System.out.println("Enter marks:");
int k = sc.nextInt();
I_marks[i] = k;
}
Externals e_s1 = new Externals(name,USN,semester,E_marks);
Internals i_s1 = new Internals(I_marks);
e_s1.display();
e_s1.dispEmarks();
i_s1.dispImarks();
}
}
```

### OUTPUT:

```
E:\mana\3rd sem\ooj\Lab_prog>javac Marks.java

E:\mana\3rd sem\ooj\Lab_prog>java Marks
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Enter Student name:
Disha
Enter USN:
1BM22CS286
Enter Semester:
3
Enter SEE Marks:
Enter marks:
90
Enter marks:
78
Enter marks:
84
Enter marks:
85
Enter marks:
93
Enter CIE Marks:
Enter marks:
45
Enter marks:
43
Enter marks:
49
Enter marks:
50
Enter marks:
41
Name: Disha
USN: 1BM22CS286
Semester: 3
SEE Marks: [90, 78, 84, 85, 93]
CIE Marks: [45, 43, 49, 50, 41]
```

## **PROGRAM 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.

### **CODE:**

```
import java.util.*;
class WrongAge extends Exception
{
    WrongAge(String s)
    {
        super(s);
    }
}

class Father
{
    int age;
    Father(int age) throws WrongAge
    {
        if(age<0)
        {
            throw new WrongAge("Age less than zero!!");
        }
        this.age=age;
    }
    public int getAge()
    {
        return (age);
    }
}

class Son extends Father
{
    int s_age;
```

```

Son(int f_age,int s_age) throws WrongAge
{
    super(f_age);
    if(s_age>f_age)
    {
        throw new WrongAge("Son's age is greater than father's age");
    }
    this.s_age=s_age;
}
public int getSonAge()
{
    return s_age;
}

}

public class Age
{
    public static void main(String args[])
    {
        System.out.println("NAME: MANASVINI DEEPAK\nUSN:
1BM22CS336");

        Scanner Sc = new Scanner(System.in);
        System.out.println("Father Son");
        int f_age,s_age;
        System.out.println("Enter father's age");
        f_age=Sc.nextInt();
        try
        {

            Father f = new Father(f_age);
            System.out.println("Father's age: "+f.getAge());
        }
        catch(WrongAge e)
        {
            System.out.println("ERROR:"+ e.getMessage());
        }
        try
        {
            System.out.println("Enter son's age");
            s_age=Sc.nextInt();
            Son s=new Son(f_age,s_age);

```

```

        System.out.println("Age of Son: "+s.getSonAge());
    }
    catch(WrongAge e)
    {
        System.out.println("ERROR:"+ e.getMessage());
    }
}
}
}

```

### OUTPUT:

```

E:\mana\3rd sem\ooj\Lab_prog>javac Age.java

E:\mana\3rd sem\ooj\Lab_prog>java Age
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Father Son
Enter father's age
12
Father's age: 12
Enter son's age
24
ERROR:Son's age is greater than father's age

E:\mana\3rd sem\ooj\Lab_prog>java Age
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Father Son
Enter father's age
-12
ERROR:Age less than zero!!
Enter son's age
12
ERROR:Age less than zero!!

E:\mana\3rd sem\ooj\Lab_prog>java Age
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
Father Son
Enter father's age
45
Father's age: 45
Enter son's age
23
Age of Son: 23

```

### **PROGRAM 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.

#### **CODE:**

```
class Thread1 implements Runnable
```

```
{
    public void run()
    {

        for(int i=0;i<3;i++)
        {
            try
            {
                System.out.println("BMS COLLEGE OF ENGINEERING");
                Thread.sleep(10000);
            }
            catch(InterruptedException e)
            {
                System.out.println("ERROR!");
            }

        }

    }
}
```

```
class Thread2 implements Runnable
```

```
{
    public void run()
    {
        for(int i=0;i<10;i++)
        {
            try
            {
                System.out.println("CSE");
            }
        }
    }
}
```



```

        Thread.sleep(2000);
    }
    catch(InterruptedException e)
    {
        System.out.println("ERROR!");
    }

}
}
}

class Threads
{
    public static void main(String[] args) {
        System.out.println("NAME: MANASVINI DEEPAK\nUSN:
1BM22CS336");

        Thread1 t = new Thread1();
        Thread th1 = new Thread(t);
        Thread2 t2 = new Thread2();
        Thread th2 = new Thread(t2);
        th1.start();
        th2.start();
    }
}

```

### OUTPUT:

```

E:\mana\3rd sem\ooj\Lab_prog>javac threadexample.java

E:\mana\3rd sem\ooj\Lab_prog>java Threads
NAME: MANASVINI DEEPAK
USN: 1BM22CS336
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING

```

## **PROGRAM 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 `ArithmeticException`. Display the exception in a message dialog box.

### **CODE:**

```
import javax.swing.*.*;

import java.awt.*.*;

import java.awt.event.*;

class SwingDemo{

    SwingDemo(){

        // create jframe container

        JFrame jfrm = new JFrame(""Divider App"");

        jfrm.setSize(275, 150);

        jfrm.setLayout(new FlowLayout());

        // to terminate on close

        jfrm.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        // text label

        JLabel jlab = new JLabel(""Enter the divider and dividend:"");

        // add text field for both numbers

        JTextField ajtf = new JTextField(8);

        JTextField bjtf = new JTextField(8);
```

```

// calc button

JButton button = new JButton("&quot;Calculate&quot;");


// labels

JLabel err = new JLabel();

JLabel alab = new JLabel();

JLabel blab = new JLabel();


JLabel anslab = new JLabel();


// add in order :)

jfrm.add(err); // to display error bois

jfrm.add(jlab);

jfrm.add(ajtff);

jfrm.add(bjtf);

jfrm.add(button);

jfrm.add(alab);

jfrm.add(blab);

jfrm.add(anslab);


ActionListener l = new ActionListener() {

    public void actionPerformed(ActionEvent evt) {

        System.out.println("&quot;Action event from a text field&quot;");

    }

};

ajtff.addActionListener(l);

bjtf.addActionListener(l);

```

```

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

            alab.setText("&quot;\nA = &quot; + a);
            blab.setText("&quot;\nB = &quot; + b);
            anslab.setText("&quot;\nAns = &quot;+ ans);
        }
        catch(NumberFormatException e){
            alab.setText("&quot;&quot;);
            blab.setText("&quot;&quot;);
            anslab.setText("&quot;&quot;);

            err.setText("&quot;Enter Only Integers!&quot;);
        }
        catch(ArithmeticException e){
            alab.setText("&quot;&quot;);
            blab.setText("&quot;&quot;);
            anslab.setText("&quot;&quot;);
            err.setText("&quot;B should be NON zero!&quot;);
        }
    }
});

```

```

        // display frame

        jfrm.setVisible(true);
    }

    public static void main(String args[]){

        // create frame on event dispatching thread

        SwingUtilities.invokeLater(new Runnable(){

            public void run(){

                new SwingDemo();

            }

        });

    }

}

```

### OUTPUT:

```

E:\mana\3rd sem\ooj\Lab_prog>javac SwingDemo.java

E:\mana\3rd sem\ooj\Lab_prog>java SwingDemo

E:\mana\3rd sem\ooj\Lab_prog>javac SwingDemo.java

E:\mana\3rd sem\ooj\Lab_prog>java SwingDemo
NAME: MANASVINI DEEPAK
USN: 1BM22CS336

```

