

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.

Week 3 (Lab program)

Algorithm:

Input  $a, b, c$   
Calculate discriminant

If  $d < 0$   
No real roots

If  $d \geq 0$   
Calculation of  $x_1$  and  $x_2$

If  $d = 0$   
Real roots & equal roots  
Print  $x_1$  and  $x_2$

If  $d > 0$   
Real and unequal roots  
Print  $x_1$  and  $x_2$

Program:

```
import java.util.Scanner;
class oop1 {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        double a, b, c, x1, x2, d;
        System.out.println("Enter the values of a, b, c");
        a = sc.nextDouble();
        b = sc.nextDouble();
        c = sc.nextDouble();
        d = (b*b) - (4*a*c);
        if (d < 0)
            System.out.println("No real roots for the given quadratic equation");
        else if (d >= 0) {
            x1 = (-b + (Math.sqrt(d))) / (2*a);
            x2 = (-b - (Math.sqrt(d))) / (2*a);
        }
    }
}
```

```

    if (d == 0)
    {
        System.out.println("Roots are real and equal");
        System.out.println("The roots are: " + r1 + " and " + r2);
    }
    else
    {
        System.out.println("Roots are real and unequal");
        System.out.println("The roots are: " + r1 + " and " + r2);
    }
}
}
}

```

```
C:\Users\Adithi\Desktop\java_prgs>javac oop1.java
```

```
C:\Users\Adithi\Desktop\java_prgs>java oop1
```

```
Enter the values of a,b,c
```

```
1
```

```
-6
```

```
5
```

```
Roots are real and unequal
```

```
The roots are: 5.00 and 1.00
```

```
C:\Users\Adithi\Desktop\java_prgs>java oop1
```

```
Enter the values of a,b,c
```

```
1
```

```
4
```

```
5
```

```
No real roots for the given quadratic equation
```

```
C:\Users\Adithi\Desktop\java_prgs>java oop1
```

```
Enter the values of a,b,c
```

```
9
```

```
-6
```

```
1
```

```
Roots are real and equal
```

```
The roots are: 0.33 and 0.33
```

```
C:\Users\Adithi\Desktop\java_prgs>
```

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.

Week-11 (Lab program-2)

```
import java.util.Scanner;
class Student
{
    private String usn, name;
    private int n, i, gpa, sum, credits_sum;
    private float sgpa;
    int credits[]; new int[10];
    double marks[]; new double[10];
    Student()
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number of subjects");
        n = sc.nextInt();
        sum = 0;
        credits = new int[n];
        marks = new double[n];
        credits_sum = 0;
    }
    void accept()
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter usn and name");
        usn = sc.next();
        name = sc.next();
        for (i = 0; i < n; i++)
        {
            System.out.println("Enter " + (i+1) + " subject marks and credits");
            marks[i] = sc.nextDouble();
            credits[i] = sc.nextInt();
        }
    }
}
```

```

void cal()
{
    for (i=0; i<n; i++)
    {
        if (marks[i] == 100)
            gdppts = 10;
        else if (marks[i] >= 60 && marks[i] < 100)
            gdppts = ((int)(marks[i]/10)) + 1;
        else if (marks[i] >= 40 && marks[i] < 60)
            gdppts = ((int)(marks[i]/10));
        else if (marks[i] < 40)
            gdppts = 0;
        sum = sum + (gdppts * credits[i]);
    }
    for (i=0; i<n; i++)
    {
        credits_sum = credits_sum + credits[i];
    }
    sgpa = (float) sum / credits_sum;
}

void display()
{
    System.out.println("Student details: ");
    System.out.println("Name: " + name);
    System.out.println("USN: " + usn);
    System.out.println("SGPA: %.2f", sgpa);
}

class StudentMain
{
    public static void main(String args[])
    {
        Student s = new Student();
        s.accept();
        s.cal();
        s.display();
    }
}

```

```
C:\Users\Adithi\Desktop\java_prgs>java StudentMain
Enter the number of subjects
6
Enter USN and name
1BM19CS005
Adithi
Enter 1 subject's marks and credits
80
7
Enter 2 subject's marks and credits
98.7
5
Enter 3 subject's marks and credits
89
2
Enter 4 subject's marks and credits
89
4
Enter 5 subject's marks and credits
100
8
Enter 6 subject's marks and credits
78
6
Student details:
Name: Adithi
USN: 1BM19CS005
SGPA: 9.22
C:\Users\Adithi\Desktop\java_prgs>
```



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.Scanner;
class book
{
    String name, author;
    float price;
    int num_pages;
    book()
    {
        name = "";
        author = "";
        price = 0.0f;
        num_pages = 0;
    }
    void accept()
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the name of the book");
        name = sc.next();
        System.out.println("Enter the name of the author");
        author = sc.next();
        System.out.println("Enter the price of the book");
        price = sc.nextFloat();
        System.out.println("Enter the number of pages in the book");
        num_pages = sc.nextInt();
    }
    public String toString()
    {
        return "Name: " + name + ", Author: " + author + " Price: " + price + ", Number of pages: " + num_pages;
    }
}
```

```

3
class bookMain
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        int n, i;
        System.out.println("Enter the number of books");
        n = sc.nextInt();
        book b[] = new book[n];
        for (i = 0; i < n; i++)
        {
            b[i] = new book();
            System.out.println("Enter " + (i+1) + " book details");
            b[i].accept();
        }
        for (i = 0; i < n; i++)
        {
            System.out.println(b[i]);
        }
    }
}

```

```

C:\Users\Adithi\Desktop\java_prgs>java bookMain
Enter the number of books
2
Enter 1 book details
Enter the name of the book
HarryPotter
Enter the name of the author
J.K.Rowling
Enter the price of the book
200
Enter the number of pages in the book
350
Enter 2 book details
Enter the name of the book
Angel-and-demons
Enter the name of the author
DanBrown
Enter the price of the book
350
Enter the number of pages in the book
300
Name: HarryPotter, Author: J.K.Rowling, Price: 200.0, Number of pages: 350
Name: Angel-and-demons, Author: DanBrown, Price: 350.0, Number of pages: 300
C:\Users\Adithi\Desktop\java_prgs>

```

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.

```
Week-8
Lab programs
1. import java.util.Scanner;
abstract class Shape
{
    int a,b;
    abstract void printArea();
}
class Rectangle extends Shape
{
    Rectangle(int x, int y)
    {
        a=x;
        b=y;
    }
    void printArea()
    {
        System.out.println("Area of the rectangle is: " + (a*b));
    }
}
class Triangle extends Shape
{
    Triangle(int x, int y)
    {
        a=x;
        b=y;
    }
    void printArea()
    {
        System.out.println("Area of the triangle is: " + (0.5*a*b));
    }
}
class Circle extends Shape
{
    Circle(int x)
    {
        a=x;
    }
}
```



```

void printArea()
{ System.out.printf("Area of the circle is:
%.2f", (3.14 * a * a));
}
}
class ShapeMain
{
    public static void main(String args[])
    { int x, y;
      Scanner sc = new Scanner(System.in);
      System.out.println("Enter the length and
width of the rectangle");
      x = sc.nextInt();
      y = sc.nextInt();
      Rectangle ob1 = new Rectangle(x, y);
      ob1.printArea();
      System.out.println("Enter the base length
and height of the triangle");
      x = sc.nextInt();
      y = sc.nextInt();
      Triangle ob2 = new Triangle(x, y);
      ob2.printArea();
      System.out.println("Enter the radius of the circle");
      x = sc.nextInt();
      Circle ob3 = new Circle(x);
      ob3.printArea();
    }
}
}

```

```

C:\Users\Adithi\Desktop\java_prgs>java ShapeMain
Enter the length and width of the rectangle
3
4
Area of the rectangle is: 12
Enter the base length and height of the triangle
2
5
Area of the triangle is: 5.0
Enter the radius of the circle
6
Area of the circle is: 113.04
C:\Users\Adithi\Desktop\java_prgs>

```

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.

```
2. import java.util.Scanner;
class Account
{
    String name, acc.no;
    int type; double bal;
}
class Sav-acct extends Account
{
    double ci, bal, dep, with, time, rate, min;
    void setData (String n, String an, int t, double d)
    {
        name = n;
        acc.no = an;
        type = t; bal = b;
    }
    void dep-acc (double d, double b)
    {
        dep = d;
        bal = b;
        bal = bal + dep;
    }
    void display ()
    {
        System.out.println("The total balance of the customer is: " + bal);
    }
    void interest (float time, float r)
    {
        time = time;
        rate = r;
        ci = bal;
        bal = bal * (Math.pow(1 + (rate * 0.01)), time);
        ci = bal - ci;
        System.out.println("Compound interest: " + ci);
        System.out.println("Balance after depositing interest: " + bal);
    }
}
```

```

void withdraw(double w)
{
    Scanner sc = new Scanner(System.in);
    double m;
    wit = w;
    if (wit > bal)
        System.out.println("Your withdrawal amount exceeds your balance amount");
    else
    {
        bal = bal - wit;
        System.out.println("Your balance after withdrawal is: " + bal);
        System.out.println("Enter minimum balance allowed");
        m = sc.nextDouble();
        this.minimum(m);
    }
}

void minimum(double m)
{
    min = m;
    if (bal < min)
    {
        System.out.println("Your balance is less than the minimum amount");
        System.out.println("Your total balance is: " + bal);
    }
}

class cur-acct extends Account
{
    double bal, dep, wit, min, penalty;
    Boolean cheque;
    void setData(String n, String an, int t, double)
    {
        name = n;
        acc-no = an;
        type = t; bal = b;
    }
    void dep-acc(double d, double)
    {

```

```
dep = d;  
bal = b;  
bal = bal + dep;
```

```
3  
void display()  
{ System.out.println("The total balance of the  
customer is: "+bal);  
3
```

```
void withdraw(double w)  
{ Scanner sc = new Scanner(System.in);  
double m; float p;  
wit = w;  
if (wit > bal)  
System.out.println("Your withdrawal amount  
exceeds your balance amount");  
else
```

```
{ bal = bal - wit;  
System.out.println("Your balance after  
withdrawal is: "+bal);
```

```
System.out.println("Enter minimum balance allowed and  
service charge percentage");  
m = sc.nextDouble(); p = sc.nextFloat(); this.minimum(m, p);  
void minimum(double m, double p)
```

```
{  
penalty = p;  
min = m;  
if (bal < min)  
{
```

```
System.out.println("Your balance is less  
than the minimum amount");
```

```
bal = bal - (min - bal) * penalty * 0.01;
```

```
3  
System.out.println("Your total balance is: "+bal);  
3
```

```
3
```



```
class AccountMain  
{
```

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

```
        int s-no-cust, c-no-cust, i, che;
```

```
        String n, an;
```

```
        double d, b, w, m;
```

```
        float Time, r, p;
```

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

```
        System.out.println("Enter the number of  
        customers with savings account");
```

```
        s-no-cust = sc.nextInt();
```

```
        System.out.println("Enter the number of  
        customers with current account");
```

```
        c-no-cust = sc.nextInt();
```

```
        Sav_acct objS[] = new Sav_acct[s-no-cust];
```

```
        Curr_acct objC[] = new Curr_acct[c-no-cust];
```

```
        if (s-no-cust > 0)
```

```
            System.out.println("--- Savings account ---");
```

```
            for (i = 0; i < s-no-cust; i++)
```

```
            {
```

```
                objS[i] = new Sav_acct();
```

```
                System.out.println("enter " + (i+1) + " customer's  
                name and account number");
```

```
                n = sc.next();
```

```
                an = sc.next(); b = sc.nextDouble();
```

```
                objS[i].setData(n, an, 100, b);
```

```
                System.out.println("Enter the current balance  
                and deposit amount");
```

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

```
                d = sc.nextDouble();
```

```
                objS[i].dep-acc(d, 8);
```

```
                objS[i].display();
```

```
                System.out.println("Enter the time period  
                and rate of interest");
```



```

Time = sc.nextFloat();
r = sc.nextFloat();
obj[i].interest(Time, r);
System.out.println("Enter the withdrawal
amount");
w = sc.nextDouble();
obj[i].withdraw(w);
System.out.println("Enter minimum balance
allowed");
m = sc.nextDouble();
obj[i].minimum(m);
}

if (c.no cust > 0)
System.out.println("--- Current account ---");
for (i = 0; i < c.no cust; i++)
{
obj[i] = new CurrAcct();
System.out.println("Enter " + (i+1) + " customer's name
and account number and current balance");
n = sc.next();
an = sc.next();
b = sc.nextDouble();
obj[i].setData(n, an, 2, b);
System.out.println("Enter 1 if the customer has a
cheque book else press 0");
che = sc.nextInt();
if (che == 1)
obj[i].cheque = false;
System.out.println("Enter the deposit amount");
d = sc.nextDouble();
obj[i].depAcc(d);
obj[i].display();
System.out.println("Enter withdrawal amount");
w = sc.nextDouble();
obj[i].withdraw(w); } } }

```

```

C:\Users\Adithi\Desktop\java_prgs>java AccountMain
Enter the number of customers with savings account
1
Enter the number of customers with current account
1
---Savings account---
Enter 1 customer's name and account number and current balance
Aditi
59394903
1000
Enter the deposit amount
200
The total balance of the customer is: 1200.0
Enter the time period and the rate of interest
1
3
Compound interest: 36.0
Balance after depositing interest: 1236.0
Enter the withdrawal amount
500
Your balance after withdrawal is: 736.0
Enter the minimum balance allowed
500
---Current account---
Enter 1 customer's name and account number and current balance
Anu
64689900
2000
Enter 1 if the customer has cheque book else press 0
1
Enter the deposit amount
100
The total balance of the customer is: 2100.0
Enter the withdrawal amount
1500
Your balance after withdrawal is: 600.0
Enter the minimum balance allowed and the service charge percentage
700
1
Your balance is less than the minimum amount
Your total balance is: 599.0
C:\Users\Adithi\Desktop\java_prgs>

```

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.

## Week-9- Lab program-6

File-Student.java

```
package CIE;  
public class Student  
{  
    public String name, usn;  
    public int sem;  
}
```

File-Internals.java

```
package CIE;  
import java.util.Scanner;  
public class Internals extends Student  
{  
    Scanner sc=new Scanner(System.in);  
    public int intmarks[] = new int[5];  
    public void accept (int s, String usn, String  
        Name, int sem)  
    {  
        int i;  
        usn=usn;  
        Name=Name;  
        sem=sem;  
        for (i=0; i<s; i++)  
        {  
            System.out.println("Enter "+s+" student's  
                internals marks in "+(i+1)+" Subject out of  
                50");  
            intmarks[i]=sc.nextInt();  
        }  
    }  
}
```

file - External.java

package SEE;

import CIE.\*;

~~import SEE~~

import java.util.Scanner;

public class External extends CIE.Student

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

public int extmarks[] = new int[5];

public void accept(int i, String USN, String Name, int Sem)

{

int i;

USN = USN;

name = Name;

sem = Sem;

for (i = 0; i < 5; i++)

{ System.out.println("Enter " + i + " student's external marks in " + i + " subject out of 100");

extmarks[i] = sc.nextInt();

}

}

}

file - marks.java -

import CIE.\*;

import SEE.\*;

import java.util.Scanner;

class marks

{ public static void main (String args[])

{ int n, i, j, Sem;

String USN, Name;

Scanner sc = new Scanner(System.in);

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

n = sc.nextInt();



```

        CIE-Internals iie[] = new CIE-Internals[n];
        SEE-External see[] = new SEE-External[n];
        for (i=0; i<n; i++)
        {
            System.out.println("Enter "+(i+1)+" student's
            USN, name and sem");
            USN = sc.next();
            Name = sc.next();
            Sem = sc.next();
            iie[i] = new CIE-Internals();
            iie[i].accept(i+1, USN, Name, Sem);
            see[i] = new SEE-External();
            see[i].accept(i+1, USN, Name, Sem);
        }
        for (i=0; i<n; i++)
        {
            System.out.println("---Details of student
            "+(i+1)+"---");
            System.out.println("USN: "+iie[i].USN);
            System.out.println("Name: "+iie[i].Name);
            System.out.println("Semester: "+iie[i].Sem);
            for (j=0; j<s; j++)
            {
                System.out.println("Final marks in "+(j+1)+"
                subject: "+(iie[i].intmarks[j] +
                see[i].extmarks[j]/2));
            }
            System.out.println();
        }
    }
}

```

### Procedure:

```

> javac Student.java
Student class file is dragged into folder CIE
> javac Internals.java
Internals class file is dragged into folder CIE
> javac External.java
External class file is dragged into folder SEE
> javac marks.java

> java marks

```



```

C:\Users\Adithi\Desktop\java_prgrs\package1>javac Student.java
C:\Users\Adithi\Desktop\java_prgrs\package1>javac Internals.java
C:\Users\Adithi\Desktop\java_prgrs\package1>javac External.java
C:\Users\Adithi\Desktop\java_prgrs\package1>javac marks.java
C:\Users\Adithi\Desktop\java_prgrs\package1>java marks
Enter the number of students
2
Enter 1 student's USN, name and sem
1BM10CS001
Aditi
2
Enter 1 student's internals marks in 1 subject out of 50
40
Enter 1 student's internals marks in 2 subject out of 50
50
Enter 1 student's internals marks in 3 subject out of 50
44
Enter 1 student's internals marks in 4 subject out of 50
45
Enter 1 student's internals marks in 5 subject out of 50
43
Enter 1 student's external marks in 1 subject out of 100
80
Enter 1 student's external marks in 2 subject out of 100
90
Enter 1 student's external marks in 3 subject out of 100
99
Enter 1 student's external marks in 4 subject out of 100
100
Enter 1 student's external marks in 5 subject out of 100
98
Enter 2 student's USN, name and sem
1BM10CS002
Anu
2
Enter 2 student's internals marks in 1 subject out of 50
40
Enter 2 student's internals marks in 2 subject out of 50

```

```

Enter 2 student's USN, name and sem
1BM10CS002
Anu
2
Enter 2 student's internals marks in 1 subject out of 50
40
Enter 2 student's internals marks in 2 subject out of 50
43
Enter 2 student's internals marks in 3 subject out of 50
30
Enter 2 student's internals marks in 4 subject out of 50
43
Enter 2 student's internals marks in 5 subject out of 50
44
Enter 2 student's external marks in 1 subject out of 100
88
Enter 2 student's external marks in 2 subject out of 100
87
Enter 2 student's external marks in 3 subject out of 100
78
Enter 2 student's external marks in 4 subject out of 100
76
Enter 2 student's external marks in 5 subject out of 100
89
---Details of student 1---
USN: 1BM10CS001
Name: Aditi
Semester: 2
Final marks in 1 subject: 80
Final marks in 2 subject: 95
Final marks in 3 subject: 93
Final marks in 4 subject: 95
Final marks in 5 subject: 92

---Details of student 2---
USN: 1BM10CS002
Name: Anu
Semester: 2
Final marks in 1 subject: 84
Final marks in 2 subject: 86
Final marks in 3 subject: 69
Final marks in 4 subject: 81
Final marks in 5 subject: 88

C:\Users\Adithi\Desktop\java_prgrs\package1>

```

7. Write a program to demonstrate generics with multiple object parameters.

Week-10 - lab program 7

```
class TwoGen<T, V> {
    T ob1;
    V ob2;
    TwoGen(T o1, V o2) {
        ob1 = o1;
        ob2 = o2;
    }
    void showTypes() {
        System.out.println("Type of T is " + ob1.getClass().getName());
        System.out.println("Type of V is " + ob2.getClass().getName());
    }
    T getob1() {
        return ob1;
    }
    V getob2() {
        return ob2;
    }
}

class SimpGen {
    public static void main(String args[]) {
        TwoGen<Boolean, Double> tgObj = new TwoGen<Boolean, Double>
            (true, 568.979);
        tgObj.showTypes();
        Boolean v = tgObj.getob1();
        System.out.println("value: " + v);
        Double d = tgObj.getob2();
        System.out.println("value: " + d);
    }
}
```

```
C:\Users\Adithi\Desktop\java_prgs>javac generics.java
```

```
C:\Users\Adithi\Desktop\java_prgs>java SimpGen
```

```
Type of T is java.lang.Boolean
```

```
Type of V is java.lang.Double
```

```
value: true
```

```
value: 568.979
```

```
C:\Users\Adithi\Desktop\java_prgs>
```

8. 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 Wrong Age ( ) 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.

Week-10 - lab program 8

```

import java.util.Scanner;
class Father
{
    int f-age;
    Father(int age)
    {
        try {
            check(age);
        }
        catch (Excp e)
        {
            System.out.println(e+" Age cannot be negative.");
        }
    }

    static void check(int a) throws Excp
    {
        if (a < 0)
            throw new Excp();
        System.out.println("No exception in father's age.");
    }
}

class Excp extends Exception
{
    public String toString()
    {
        return "Wrong Age";
    }
}

class Son extends Father
{
    int s-age;
    Son(int f, int s)
    {
        super(f);
        try {
            check(f, s);
        }
        catch (Excp e)
    }
}

```

```

2 System.out.println("Son's age cannot
be greater than or equal to father's age.");
3
3
static void check(int fa, int son) throws Exp
{
    if (son >= fa)
        throw new Exp();
    System.out.println("No exception in
    son's age");
3
3
class excpMain
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        int f, s;
        System.out.println("Enter the age of father
        and son");
        f = sc.nextInt();
        s = sc.nextInt();
        son ob = new son(f, s);
3
3
}
}

```

```

C:\Users\Adithi\Desktop\java_prgrs>javac excp.java

C:\Users\Adithi\Desktop\java_prgrs>java excpMain
Enter the age of father and son
50
20
No exception in father's age
No exception in son's age

C:\Users\Adithi\Desktop\java_prgrs>java excpMain
Enter the age of father and son
20
50
No exception in father's age
Wrong age. Son's age cannot be greater than or equal to father's age.

C:\Users\Adithi\Desktop\java_prgrs>java excpMain
Enter the age of father and son
-80
50
Wrong age. Age cannot be negative.
Wrong age. Son's age cannot be greater than or equal to father's age.

C:\Users\Adithi\Desktop\java_prgrs>

```



9. 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.

Week-11 - lab program-9

```
class NewThread implements Runnable {
    String name;
    int n;
    Thread t;
    NewThread(String threadname, int a) {
        name = threadname;
        n = a;
        t = new Thread(this, name);
        t.start();
    }

    public void run()
    {
        try {
            for (int i = 5; i > 0; i--)
            {
                System.out.println(name);
                if (n == 1)
                    Thread.sleep(10000);
                else if (n == 2)
                    Thread.sleep(2000);
            }
        }
        catch (InterruptedException e)
        {
            System.out.println(name + "Interrupted");
        }
    }
}

class MultiThreadMain
{
    public static void main(String args[])
    {
        new NewThread("BMS College of Engineering", 1);
        new NewThread("CSE", 2);
    }
}
```

```
C:\Users\Adithi\Desktop\java_prgs>java MultiThreadMain
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
C:\Users\Adithi\Desktop\java_prgs>
```



10. 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.

Week-12 - Lab program-10

```

import java.awt.*;
import java.awt.event.*;
public class DOP10 extends Frame implements
    ActionListener
{
    Button b;
    TextField n1, n2, r1;
    public DOP10()
    {
        setLayout(new FlowLayout());
        b = new Button("Divide");
        Label num1 = new Label("Num1: ", Label.RIGHT);
        n1 = new TextField(10);
        add(num1);
        add(n1);
        Label num2 = new Label("Num2: ", Label.RIGHT);
        n2 = new TextField(10);
        add(num2);
        add(n2);
        Label res = new Label("Result: ", Label.RIGHT);
        r1 = new TextField(20);
        add(res);
        add(r1);
        add(b);
        b.addActionListener(this);
        addWindowListener(new MyWindowAdapter());
    }
    public void actionPerformed(ActionEvent ae)
    {
        int i=0; j=0;
        try {
            i = Integer.parseInt(n1.getText());
            j = Integer.parseInt(n2.getText());
        }
    }
}

```

```

catch (NumberFormatException e)
{
    s = "Number Format Exception";
    r.setText("");
    DialogBox db = new DialogBox(this, "Dialog", s);
    db.setVisible(true);
    return;
}
try
{
    if (j == 0)
        throw new ArithmeticException();
    double q = (double)i/j;
    s = Double.toString(q);
    r.setText(s);
}
catch (ArithmeticException e)
{
    s = "Arithmetic Exception";
    r.setText("");
    DialogBox db = new DialogBox(this, "Dialog", s);
    db.setVisible(true);
}

public static void main(String args[])
{
    op10 appwin = new op10();
    appwin.setSize(new Dimension(380, 180));
    appwin.setTitle("Division");
    appwin.setVisible(true);
}

class MyWindowAdapter extends WindowAdapter
{
    public void windowClosing(WindowEvent we)
    {
        System.exit(0);
    }
}

```

```

class DialogBox extends Dialog
{
    DialogBox(Frame parent, String title, String s)
    {
        super(parent, title, false);
        setLayout(new FlowLayout());
        setSize(300, 200);
        add(new Label(s));
        Button b;
        add(b = new Button("OK"));
        b.addActionListener(lae -> dispose());
        addWindowListener(new WindowAdapter() {
            public void windowClosing(WindowEvent
            we) { dispose();
            }
        });
    }
}

```

A Java Swing window titled "Division" with a standard title bar (minimize, maximize, close buttons). Inside the window, there are two input fields labeled "Num1:" and "Num2:". "Num1:" contains the value "10" and "Num2:" contains the value "5". Below these is a "Result:" label followed by a text field containing "2.0". To the right of the "Result:" field is a button labeled "Divide".

This image shows two overlapping Java Swing windows. The background window is titled "Division" and has the same layout as the previous screenshot, but with "Num1:" set to "10.1" and the "Result:" field empty. Overlaid on top of it is a smaller dialog box titled "Dialog". The dialog box has a title bar with a close button and contains the text "Number Format Exception" followed by an "OK" button.

Division

Num1:  Num2:

Result:

Dialog

Number Format Exception

Division

Num1:  Num2:

Result:

Dialog

Arithmetic Exception