

29/9/20

IBM19CS090

Mohammed Ibrahim Rathil S.

Lab Program -1 :

Develop a Java prg 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 discriminant $b^2 - 4ac$ is < 0 , display a message stating there are no real solutions.

Code:

```

import java.util.*;
class roots
{
    public static void main (String args[])
    {
        double a,b,c,x,y,d;
        System.out.println ("Enter the coefficients a,b,c: ");
        Scanner s = new Scanner (System.in);
        a = s.nextFloat();
        b = s.nextFloat();
        c = s.nextFloat();
        d = (b*b) - (4*a*c);
        if (d == 0)
        {
            x = -b / (2*a);
            y = x
            System.out.println ("Both Roots Are Real and Equal");
            System.out.println ("R1 = " + x + " And R2 = " + y);
        }
        else if (d > 0)
        {
            x = (-b + Math.sqrt(d)) / (2*a);
            y = (-b - Math.sqrt(d)) / (2*a);
        }
    }
}

```

```
System.out.println("Roots Are Real and Distinct");
System.out.println("R1 = " + x + " And R2 = " + y);
```

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Roots.java

Saved

```
1 import java.util.*;
2 class roots
3 {
4     public static void main(String args[])
5     {
6         double a,b,c,x,y,d;
7         System.out.println("Enter the coefficients a,b,c:");
8         Scanner s=new Scanner(System.in);
9         a=s.nextFloat();
10        b=s.nextFloat();
11        c=s.nextFloat();
12        d=(b*b)-(4*a*c);
13        if(d==0)
14        {
15            x=-b/(2*a);
16            y=x;
17            System.out.println("Both Roots Are Real and Equal ");
18            System.out.println("R1="+x+" And R2="+y);
19        }
20        else if(d>0)
21        {
22            x=(-b+Math.sqrt(d))/(2*a);
23            y=(-b-Math.sqrt(d))/(2*a);
24            System.out.println("Roots Are Real and Distinct");
25            System.out.println("R1="+x+" And R2="+y);
26        }
27        else
28        {
29            System.out.println("Roots Are Imaginary. No Real Solution!");
30        }
31    }
32 }
33 }
```

x Terminal



Enter the coefficients a,b,c:

1

-16

64

Both Roots Are Real and Equal

R1=8.0 And R2=8.0

Process finished.

x Terminal



Enter the coefficients a,b,c:

2
-3
-1

Roots Are Real and Distinct

R1=1.7807764064044151 And R2=-0.2807764064044

Process finished.

x Terminal



Enter the coefficients a,b,c:

5

-4

2

Roots Are Imaginary. No Real Solution!

Process finished.

Mohammed Ibrahim Rahil.

Lab Program 2:

Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

code:

```

import java.util.Scanner;
class Student
{
    private
        String usn, name;
        float cr[] = new float[5];
        float m[] = new float[5];
    public
        Scanner s = new Scanner (System.in);
        void getdet()
        {
            System.out.println ("Enter Name:");
            name = s.nextLine();
            System.out.println ("Enter USN:");
            usn = s.nextLine();
            for (int i=0; i<5; i++)
            {
                System.out.println ("Enter Credits for Subject "+(i+1));
                cr[i] = s.nextFloat();
                System.out.println ("Enter Marks for subject "+(i+1));
                m[i] = s.nextFloat();
            }
        }
}

```

public void printdet()

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```
{  
    System.out.println("Student Details are, ");  
    System.out.println("Name: "+name);  
    System.out.println("USN: "+usn);  
    for (int i=0; i<5; i++)  
    {  
        System.out.println("Subject "+(i+1)+" Credits: "+cr[i]);  
        System.out.println("Subject "+(i+1)+" Marks: "+m[i]);  
    }  
}
```

public void scgpa()

{

int a;

float scg=0, tcr=0;

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

```
{  
    tcr += cr[i];
```

}

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

```
{  
    if (m[i]>=90)
```

a = 10;

else if (m[i]>=80)

a = 8;

else if (m[i]>=70)

a = 7;

else if (m[i]>=60)

a = 6;

else if (m[i]>=50)

a = 5;

else

a = 4;

scg += ((cr[i]*a)/tcr);

System.out.println("SGPA is "+scg);

}

class main
{
public static void main (String args[])
{
~~float scgpa~~
Student s1 = new Student();
s1.getdet();
s1.printdet();
s1.scgpa();
}
}

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```
scgpa.java
Saved

2
3 class Student
4 {
5     private
6         String usn,name;
7         float cr[]=new float[5];
8         float m[]=new float[5];
9     public
10    Scanner s=new Scanner(System.in);
11    void getdet()
12    {
13
14        System.out.println("Enter Name:");
15        name=s.next();
16        System.out.println("Enter USN:");
17        usn=s.next();
18        for(int i=0;i<5;i++)
19        {
20            System.out.println("Enter Credits for subject "+(i+1)+":");
21            cr[i]=s.nextFloat();
22            System.out.println("Enter Marks for subject "+(i+1)+"(for 100):");
23            m[i]=s.nextFloat();
24        }
25    }
26    public void printdet()
27    {
28        System.out.println("Student Details are,");
29        System.out.println ("Name:"+name);
30        System.out.println ("USN:"+usn);
31        for(int i=0;i<5;i++)
32        {
33            System.out.println("Subject "+(i+1)+" Credits:"+cr[i]);
34            System.out.println("Subject "+(i+1)+" Marks:"+m[i]);
35        }
36    }
37    public void scgpa()
38    {
39        int a;
40        float scg=0,tcr=0;
41        for(int i=0;i<5;i++)
42        {
43            tcr+=cr[i];
44        }
45        for(int i=0;i<5;i++)
46        {
47            if(m[i]>=90)
48                a=10;
49            else if(m[i]>=80)
50                a=8;
51            else if(m[i]>=70)
52                a=7;
53            else if(m[i]>=60)
54                a=6;
55            else if(m[i]>=50)
56                a=5;
57            else
58                a=4;
59            scg+=((cr[i]*a)/tcr);
60        }
61        System.out.println("SCGP is "+scg);
62    }
63 }
64
65 class main
66 {
67     public static void main(String args[])
68     {
69         float scgp;
70         Scanner n=new Scanner(System.in);
71         Student s1=new Student();
72         s1.getdet();
73         s1.printdet();
74         s1.scgpa();
75     }
76 }
```

x Terminal



```
Enter Name:  
rahil  
Enter USN:  
1BM19CS090  
Enter Credits for subject 1:  
5  
Enter Marks for subject 1(for 100):  
87  
Enter Credits for subject 2:  
4  
Enter Marks for subject 2(for 100):  
91  
Enter Credits for subject 3:  
4  
Enter Marks for subject 3(for 100):  
81  
Enter Credits for subject 4:  
4  
Enter Marks for subject 4(for 100):  
76  
Enter Credits for subject 5:  
3  
Enter Marks for subject 5(for 100):  
71  
Student Details are,  
Name:rahil  
USN:1BM19CS090  
Subject 1 Credits:5.0  
Subject 1 Marks:87.0  
Subject 2 Credits:4.0  
Subject 2 Marks:91.0  
Subject 3 Credits:4.0  
Subject 3 Marks:81.0  
Subject 4 Credits:4.0  
Subject 4 Marks:76.0  
Subject 5 Credits:3.0  
Subject 5 Marks:71.0  
SCGP is 8.05
```

Process finished.

Q) 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 get the details of the objects. Include a method that could display the complete details of the book. Develop a Java prg. to create n book objects.

```

import java.util.Scanner;
class Book
{
    private
    String name, auth;
    float price, num_pages;
    public
    Scanner s = new Scanner (System.in);
    Book()
    {
        name = "xyz";
        auth = "abc";
        price = 0;
        num_pages = 0;
    }
    void getdet()
    {
        System.out.print ("Enter Book Name : ");
        name = s.next();
        System.out.print ("Enter Author Name : ");
        auth = s.next();
        System.out.print ("Enter Price : ");
        price = s.nextFloat();
    }
}

```

```

        System.out.print ("Enter No. of pages : ");
        numPages = s.nextFloat ();
    }

    public String toString ()
    {
        return ("Book Name : " + name + "\nAuthor Name = "
                + auth + "\nprice = " + price + "\nNo. of Pages = "
                + numPages );
    }
}

class BookMain
{
    public static void main (String args [])
    {
        int n;
        Scanner s = new Scanner (System.in);
        System.out.println ("Enter No. of Books : ");
        n = s.nextInt();
        Book b [] = new Book [n];
        for (int i=0; i<n; i++)
        {
            b [i] = new Book ();
            System.out.println ("Book No. " + (i+1));
            b [i].getdet ();
        }
        for (int i=0; i<n; i++)
        {
            System.out.println ("\nDetails of Book " + (i+1) + ",");
            System.out.println (b[i]);
        }
    }
}

```

```
← BookInfo.java 🔒
Saved

1 import java.util.Scanner;
2 class Book
3 {
4     private
5     String name,auth;
6     float price,num_pages;
7     public
8     Scanner s=new Scanner(System.in);
9     Book()
10    {
11        name="xyz";
12        auth="abc";
13        price=0;
14        num_pages=0;
15    }
16    void getdet()
17    {
18        System.out.print("Enter Book Name:");
19        name=s.next();
20        System.out.print("Enter Author Name:");
21        auth=s.next();
22        System.out.print("Enter Price:");
23        price=s.nextFloat();
24        System.out.print("Enter No. of pages:");
25        num_pages=s.nextFloat();
26    }
27    public String toString()
28    {
29        return("Book Name="+name+"\nAuthor Name="+auth+"\nprice="+price+"\nNo. of Pages="+num_pages);
30    }
31}
32 class BookMain
33{
34    public static void main(String args[])
35    {
36        int n;
37        Scanner s=new Scanner(System.in);
38        System.out.println("Enter No. of Books:");
39        n=s.nextInt();
40        Book b[]={};
41        for(int i=0;i<n;i++)
42        {
43            b[i]=new Book();
44            System.out.println("Book No-"+(i+1));
45            b[i].getdet();
46        }
47        for(int i=0;i<n;i++)
48        {
49            System.out.println("\nDetails of Book "+(i+1)+",");
50            System.out.println(b[i]);
51        }
52    }
53}
```

x Terminal



Enter No. of Books:

2

Book No-1

Enter Book Name:Famous

Enter Author Name:Gyllenhaal

Enter Price:699

Enter No. of pages:436

Book No-2

Enter Book Name:North

Enter Author Name:Trippier

Enter Price:899

Enter No. of pages:1232

Details of Book 1,

Book Name=Famous

Author Name=Gyllenhaal

price=699.0

No. of Pages=436.0

Details of Book 2,

Book Name=North

Author Name=Trippier

price=899.0

No. of Pages=1232.0

Process finished.

Lab 4 Program: 3/11/20 IBM19 CS090

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code:

```
import java.util.Scanner;
abstract class Shape {
    float a, b;
    abstract void printArea();
    Scanner ss = new Scanner(System.in);
}

class Rectangle extends Shape {
    void printArea() {
        System.out.print("Enter Length: ");
        a = ss.nextFloat();
        System.out.print("Enter Breadth: ");
        b = ss.nextFloat();
        System.out.print("Area of Rectangle is " + (a * b) + "\n");
    }
}

class Triangle extends Shape {
    void printArea() {
        System.out.print("Enter Base Length: ");
        a = ss.nextFloat();
        System.out.print("Enter Height: ");
        b = ss.nextFloat();
        System.out.print("Area of Triangle is " + (0.5 * (a * b)) + "\n");
    }
}

class Circle extends Shape {
    void printArea() {
        System.out.print("Enter Radius: ");
        a = ss.nextFloat();
        System.out.print("Area of Circle is " + (3.14 * a * a) + "\n");
    }
}
```

```

class AreaMain {
    public static void main (String args[]) {
        int i;
        Scanner ss = new Scanner (System.in);
        do {
            System.out.print ("\n1. Rectangle \n2. Triangle \n3. Circle \n4. Exit \nEnter Your choice: ");
            i = ss.nextInt();
            if (i == 1) {
                Rectangle r = new Rectangle();
                r.printArea();
            } else if (i == 2) {
                Triangle t = new Triangle();
                t.printArea();
            } else if (i == 3) {
                Circle c = new Circle();
                c.printArea();
            } else if (i == 4)
                break;
            else
                System.out.println ("Enter Valid Choice!!!");
        } while (i > 0);
    }
}

```

ShapeArea.java

Saved

```
1 import java.util.Scanner;
2 abstract class Shape{
3     float a,b;
4     abstract void printArea();
5     Scanner ss=new Scanner(System.in);
6 }
7
8 class Rectangle extends Shape{
9     void printArea(){
10         System.out.print("Enter Length:");
11         a=ss.nextFloat();
12         System.out.print("Enter Breadth:");
13         b=ss.nextFloat();
14         System.out.print("Area of Rectangle is "+(a*b)+"\n");
15     }
16 }
17 class Triangle extends Shape{
18     void printArea(){
19         System.out.print("Enter Base Length:");
20         a=ss.nextFloat();
21         System.out.print("Enter Height:");
22         b=ss.nextFloat();
23         System.out.print("Area of Triangle is "+(0.5*(a*b))+"\n");
24     }
25 }
26 class Circle extends Shape{
27     void printArea(){
28         System.out.print("Enter Radius:");
29         a=ss.nextFloat();
30         System.out.print("Area of Circle is "+(3.14*a*a)+"\n");
31     }
32 }
33 class AreaMain{
34     public static void main(String args[]){
35         int i;
36         Scanner ss=new Scanner(System.in);
37         do{
38             System.out.print("\n1.Rectangle\n2.Triangle\n3.Circle\n4.Exit\nEnter Your Choice:");
39             i=ss.nextInt();
40             if(i==1){
41                 Rectangle r=new Rectangle();
42                 r.printArea();
43             }
44             else if(i==2){
45                 Triangle t=new Triangle();
46                 t.printArea();
47             }
48             else if(i==3){
49                 Circle c=new Circle();
50                 c.printArea();
51             }
52             else if(i==4)
53                 break;
54             else{
55                 System.out.println("Enter Valid Choice!!");
56             }
57         }while(i>0);
58     }
59 }
```



1.Rectangle

2.Triangle

3.Circle

4.Exit

Enter Your Choice:1

Enter Length:2

Enter Breadth:2.2

Area of Rectangle is 4.4

1.Rectangle

2.Triangle

3.Circle

4.Exit

Enter Your Choice:2

Enter Base Length:34

Enter Height:11

Area of Triangle is 187.0

1.Rectangle

2.Triangle

3.Circle

4.Exit

Enter Your Choice:3

Enter Radius:23

Area of Circle is 1661.06

1.Rectangle

2.Triangle

3.Circle

4.Exit

Enter Your Choice:4

Process finished.

Lab 5 Program:

code:

```

import java.util.Scanner;

class Account {
    String ac; // account number
    char t; // type of account
    int ano; // account number
    float bal = 0, wit = 0; // balance and withdrawal amount

    Scanner ss = new Scanner(System.in);

    void dep() {
        System.out.print("Enter Amount to be Deposited : ");
        wit = ss.nextFloat();
        bal += wit;
        System.out.print("Balance = " + bal);
    }

    void withd() {
        System.out.print("Enter Amount to be withdrawn : ");
        wit = ss.nextFloat();
        bal -= wit;
        System.out.print("Balance = " + bal);
    }

    void bal() {
        System.out.print("Balance = " + bal);
    }
}

class sav acct extends Account {
    void interest() {
        float per; double in; int yr;
        System.out.print("Enter Rate of Interest (%) and years Invested : ");
        per = ss.nextFloat();
        yr = ss.nextInt();
        in = bal * Math.pow((1 + (per / 100)), yr);
        System.out.print("Deposit Interest = " + in);
    }
}

```

```

class curv_acct extends Account {
    void pen() {
        if (bal <= 2000)
        {
            bal -= 100;
            System.out.print("In Penalty of Rs. 100 levied");
            System.out.print("In Balance = " + bal);
        }
        else
            System.out.print("In Minimum Balance Maintained");
    }
}

```

```

class Bank Main
{
    public static void main(String args[])
    {
        Scanner ss = new Scanner(System.in);
        System.out.println("***** Bank *****");
        Account A = new Account();
        System.out.print("Enter Name:");
        A.cn = ss.next();
        System.out.print("Enter Account No:");
        A.acno = ss.nextInt();
        System.out.print("Enter 5 for Saving or
                        6 for Current:");
        A.t = ss.next().charAt(0);
        int i;
        if (A.t == 'S' || A.t == 's')
        {
            sav_acct sav = new sav_acct();
            do {
                System.out.print("In 1. Deposit\n2. Withdraw
                                \n3. View Balance
                                \n4. View Deposit Interest
                                \n5. Exit
                                \nEnter Choice:");
                i = ss.nextInt();
            }
            while (i != 5);
        }
    }
}

```

```

if (i == 1)
    sav.dep();
else if (i == 2)
    sav.withd();
else if (i == 3)
    sav.bal();
else if (i == 4)
    sav.interest();
else if (i == 5)
    break;
else
    System.out.print("Enter Valid choice!!");

} while (i > 0);

}

if (A.t == 'E' || A.t == 'e') {
    curr_acct cur = new curr_acct();
    do {
        System.out.print("\n1. Deposit\n2. Withdraw\n3. View Balance\n4. Exit\nEnter choice : ");
        i = ss.nextInt();
        if (i == 1)
            cur.dep();
        else if (i == 2) {
            cur.withd();
            cur.pen();
        }
        else if (i == 3)
            cur.bal();
        else if (i == 4)
            break;
        else
            System.out.print("Enter Valid choice!!");
    } while (i > 0);
}
}

```

```
< Bank.java
Saved

1 import java.util.Scanner;
2 class Account{
3     String cn;
4     char t;
5     int ano;
6     float bal=0,wit=0;
7     Scanner ss=new Scanner(System.in);
8     void dep(){
9         System.out.print("Enter Amount to be Deposited:");
10        bal=ss.nextFloat();
11        System.out.print("Balance = "+bal);
12    }
13    void withd(){
14        System.out.print("Enter Amount to be Withdrawn:");
15        wit=ss.nextFloat();
16        bal-=wit;
17        System.out.print("Balance = "+bal);
18    }
19    void bal(){
20        System.out.print("Balance = "+bal);
21    }
22 }
23 class sav_acct extends Account{
24     void interest(){
25         float per;double in,int yr;
26         System.out.print("Enter Rate of Interest(%) and years Invested:");
27         per=ss.nextFloat();
28         yr=ss.nextInt();
29         in=bal*Math.pow((1+(per/100)),yr);
30         System.out.print("Deposit Interest = "+in);
31     }
32 }
33 class curr_acct extends Account{
34     void pen(){
35         if(bal<=2000)
36         {
37             bal-=100;
38             System.out.print("\nPenalty of rs.100 levied");
39             System.out.print("\nBalance = "+bal);
40         }
41         else
42         {
43             System.out.print("\nMinimum Balance Maintained");
44         }
45     }
46 }
47 class BankMain
48 {
49     public static void main(String args[])
50     {
51         Scanner ss=new Scanner(System.in);
52         System.out.println("*****Bank*****");
53         Account A=new Account();
54         System.out.print("Enter Name:");
55         A.cn=ss.next();
56         System.out.print("Enter Account No:");
57         A.ano=ss.nextInt();
58         System.out.print("Enter S for Savings or C for Current:");
59         A.t=ss.next().charAt(0);
60         int i;
61         if(A.t=='S'||A.t=='s'){
62             sav_acct sav=new sav_acct();
63             do{
64                 System.out.print("\n\n1.Deposit\n2.Withdraw\n3.View Balance\n4.View Deposit Interest\n5.Exit\nEnter Choice:");
65                 i=ss.nextInt();
66                 if(i==1){
67                     sav.dep();
68                 }
69                 else if(i==2){
70                     sav.withd();
71                 }
72                 else if(i==3){
73                     sav.bal();
74                 }
75                 else if(i==4){
76                     sav.interest();
77                 }
78                 else if(i==5){
79                     break;
80                 }
81                 else{
82                     System.out.print("Enter Valid Choice!!");
83                 }
84             }while(i>0);
85         }
86         if(A.t == 'C'||A.t=='c'){
87             curr_acct cur=new curr_acct();
88             do{
89                 System.out.print("\n1.Deposit\n2.Withdraw\n3.View Balance\n4.Exit\nEnter Choice:");
90                 i=ss.nextInt();
91                 if(i==1){
92                     cur.dep();
93                 }
94                 else if(i==2){
95                     cur.withd();
96                     cur.pen();
97                 }
98                 else if(i==3){
99                     cur.bal();
100                }
101                else if(i==4){
102                    break;
103                }
104                else{
105                    System.out.print("Enter Valid Choice!!");
106                }
107            }while(i>0);
108        }
109    }
110 }
```

x Terminal

```
*****Bank*****
Enter Name:Ahmed
Enter Account No:123456
Enter S for Savings or C for Current:S
```

```
1.Deposit
2.Widthdraw
3.View Balance
4.View Deposit Interest
5.Exit
Enter Choice:1
Enter Amount to be Deposited:5000
Balance = 5000.0
```

```
1.Deposit
2.Widthdraw
3.View Balance
4.View Deposit Interest
5.Exit
Enter Choice:2
Enter Amount to be Withdrawn:600
Balance = 4400.0
```

```
1.Deposit
2.Widthdraw
3.View Balance
4.View Deposit Interest
5.Exit
Enter Choice:3
Balance = 4400.0
```

```
1.Deposit
2.Widthdraw
3.View Balance
4.View Deposit Interest
5.Exit
Enter Choice:4
Enter Rate of Interest(%) and years Invested:4 2
Deposit Interest = 4759.039650878913
```

```
1.Deposit
2.Widthdraw
3.View Balance
4.View Deposit Interest
5.Exit
Enter Choice:5
```

```
Process finished.
```

x Terminal

```
1.Deposit  
2.Widthdraw  
3.View Balance  
4.Exit  
Enter Choice:1  
Enter Amount to be Deposited:3000  
Balance = 3000.0
```

```
1.Deposit  
2.Widthdraw  
3.View Balance  
4.Exit  
Enter Choice:2  
Enter Amount to be Withdrawn:1200  
Balance = 1800.0  
Penalty of rs.100 levied  
Balance = 1700.0
```

```
1.Deposit  
2.Widthdraw  
3.View Balance  
4.Exit  
Enter Choice:3  
Balance = 1700.0
```

```
1.Deposit  
2.Widthdraw  
3.View Balance  
4.Exit  
Enter Choice:5  
Enter Valid Choice!!
```

```
1.Deposit  
2.Widthdraw  
3.View Balance  
4.Exit  
Enter Choice:4
```

```
Process finished.
```

Student.java:

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

Internals.java:

```
package CIE;  
public class Internals extends Student {  
    public int marks [] = new int [5];  
}
```

External.java:

```
package SEE;  
public class External extends CIE Student {  
    public int marks [] = new int [5];  
}
```

Driver Class:

```
import CIE.*;  
import SEE.*;  
import java.util.Scanner;  
public class TotalMarks {  
    public static void main (String args [])  
    {  
        Scanner ss = new Scanner (System.in);  
        System.out.println ("Enter the number of  
        Students : ");  
        int n = ss.nextInt ();  
        CIE.Internals m1 [] = new CIE.Internals [n];  
        SEE.External m2 [] = new SEE.External [n];  
    }  
}
```

RAHIL

```

for (int i=0; i<n; i++)
{
    m1[i] = new CIE. Internals();
    m2[i] = new SEE. External();
    System.out.println("Enter name of student:");
    m1[i].name = ss.next();
    m2[i].name = m1[i].name;
    for (int j=0; j<5; j++)
    {
        System.out.println("Enter cie marks in subject");
        m1[i].marks[j] = ss.nextInt();
        System.out.println("Enter see marks in subject");
        m2[i].marks[j] = ss.nextInt();
    }
}
for (int i=0; i<n; i++)
{
    System.out.println("\nStudent " + (i+1) + "\nName : "
        + m1[i].name + "\n\nCIE : ");
    for (int j=0; j<5; j++)
        System.out.println(m1[i].marks[j]);
    System.out.println("\nSEE : ");
    for (int j=0; j<5; j++)
        System.out.println(m2[i].marks[j]);
    System.out.println("\nFinal : ");
    for (int j=0; j<5; j++)
        System.out.println((m2[i].marks[j]/2)
            + m1[i].marks[j]);
}
}

```

```
1 package CIE;  
2 public class Student{  
3     public String name;  
4     public String usn;  
5     public int sem;  
6 }
```

```
1 package CIE;
2 import CIE.*;
3 public class Internals extends CIE.Student{
4     public float c[] = new float[5];
5 }
```

```
1 package SEE;           I
2 import CIE.*;          I
3 public class External extends CIE.Student{      I
4     public float s[] = new float[5];            I
5 }
```

```
1 import CIE.*;
2 import SEE.*;
3 import java.util.Scanner;
4
5 class TotalMarks extends Internals{
6     public static void main(String args[])
7     {
8         CIE.Internals ob1[] = new CIE.Internals();
9         SEE.External ob2[] = new SEE.External();
10        int n;
11        float t[];
12        Scanner ss = new Scanner(System.in);
13        System.out.print("Enter Number of Students:");
14        n = ss.nextInt();
15        CIE.Internals ob1[] = new CIE.Internals[n];
16        SEE.External ob2[] = new SEE.External[n];
17        for(int i=0;i<n;i++)
18        {
19            CIE.Internals ob1[i] = new CIE.Internals();
20            SEE.External ob2[i] = new SEE.External();
21            System.out.print("Enter Details of Student "+(i+1)+",");
22            System.out.print("Name:");
23            ob1[i].name = ss.next();
24            System.out.print("USN:");
25            ob1[i].usn = ss.next();
26            System.out.print("Sem:");
27            ob1[i].sem = ss.next();
28            System.out.print("CIE Marks(for SO),");
29            for(int j=0;j<5;j++)
30            {
31                System.out.print("Subject "+(j+1)+":");
32                ob1[i].c[j] = ss.nextFloat();
33            }
34            System.out.print("SEE Marks(for SO),");
35            for(int j=0;j<5;j++)
36            {
37                System.out.print("Subject "+(j+1)+":");
38                ob2[i].s[j] = ss.nextFloat();
39            }
40            System.out.print("Total Marks:");
41            for(int i=0;i<n;i++)
42            {
43                t[i] = (ob1[i].c[0]+ob2[i].s[0]);
44            }
45        }
46    }
47}
```

Enter cie marks in subject 2

46

Enter see marks in subject 2

94

Enter cie marks in subject 3

48

Enter see marks in subject 3

96

Enter cie marks in subject 4

48

Enter see marks in subject 4

90

Enter cie marks in subject 5

48

Enter see marks in subject 5

94

Student 1

Name : abc

CIE :

45

46

47

48

49

SEE

90

92

94

95

98

Final :

90

92

94

95

99

- a) Write a program to demonstrate generic with multiple object parameters.

Code:

```

import java.util.Scanner;
class Gen< I, S, F > {
    I id;
    S name;
    F sal;
    void display() {
        System.out.print("Entered Details, ID: " + id);
        System.out.print(" Name: " + name);
        System.out.print(" Salary: " + sal);
    }
}
class GenExample {
    public static void main(String args[]) {
        Scanner ss = new Scanner(System.in);
        Gen< Integer, String, Float > ob1 = new Gen< Integer,
                                                String,
                                                Float >();
        System.out.print("Enter ID: ");
        ob1.id = ss.nextInt();
        System.out.print("Enter Name: ");
        ob1.name = ss.next();
        System.out.print("Enter Salary: ");
        ob1.sal = ss.nextFloat();
        ob1.display();
    }
}

```

Output: Enter ID: 22

Enter Name: rahil

Enter Salary: 25000.00

```
1 import java.util.Scanner;
2 class Gen<I,S,F>{
3     I id;
4     S name;
5     F sal;
6     void display(){
7         System.out.print("\nEntered Details,\nID:"+id);
8         System.out.print("\nName:"+name+"\nSalary:"+sal);
9     }
10 }
11 class GenExample{
12     public static void main(String args[]){
13         Scanner ss=new Scanner(System.in);
14         Gen<Integer,String,Float> ob1=new Gen<Integer,String,Float>();
15         System.out.print("Enter ID:");
16         ob1.id=ss.nextInt();
17         System.out.print("Enter Name:");
18         ob1.name=ss.next();
19         System.out.print("Enter Salary:");
20         ob1.sal=ss.nextFloat();
21         ob1.display();
22     }
23 }
```

```
D:\jdk\bin\programs>javac GenExample.java
D:\jdk\bin\programs>java GenExample
Enter ID:11
Enter Name:xyz
Enter Salary:10000.45

Entered Details,
ID:11
Name:xyz
Salary:10000.45
```

Lab 3 Program:

WAP that demonstrates the Exceptions in inheritance tree. Create a base class called "Father" and derived which takes the age and throws the exception Wrong Age () when the input age = father's age.

Code:

```

import java.util.Scanner;

class Father {
    int fage;
    Scanner ss = new Scanner(System.in);

    Father() {
        System.out.print("Enter Father's Age : ");
        fage = ss.nextInt();
    }
}

class FatherSonAge {
    public static void main (String args []) {
        Scanner ss = new Scanner(System.in);
        Son ob2 = new Son ();
        System.out.print ("Enter Son's Age : ");
        ob2.sage = ss.nextInt();
        try {
            if (ob2.fage <= ob2.sage)
                throw new Exception ("Not Valid");
        } catch (Exception e) {
            System.out.println ("Father's age cannot be
                less or Equal to Son's Age In " + e);
        }
        System.out.print ("Details, \n");
        System.out.print ("Father's Age : " + ob2.fage);
        System.out.print ("In Son's Age : " + ob2.sage);
    }
}

```

```
1 import java.util.Scanner;
2 class Father{
3     int fage;
4     Scanner ss=new Scanner(System.in);
5     Father(){
6         System.out.print("Enter Father's Age:");
7         fage=ss.nextInt();
8     }
9 }
10 class Son extends Father{
11     int sage;
12 }
13 class FatherSonAge{
14     public static void main(String args[]){
15         Scanner ss=new Scanner(System.in);
16         Son ob2=new Son();
17         System.out.print("Enter Son's Age:");
18         ob2.sage=ss.nextInt();
19         try{
20             if(ob2.fage<=ob2.sage)
21                 throw new Exception("Not Valid");
22         }catch(Exception e){
23             System.out.println("Father's age cannot be Lesser or Equal to Son's Age\n"+e);
24         }
25         System.out.print("Details,\n");
26         System.out.print("Father's Age:"+ob2.fage);
27         System.out.print("\nSon's Age:"+ob2.sage);
28     }
29 }
```

```
D:\jdk\bin\programs>javac FatherSonAge.java
D:\jdk\bin\programs>java FatherSonAge
Enter Father's Age:50
Enter Son's Age:50
Father's age cannot be Lesser or Equal to Son's Age
java.lang.Exception: Not Valid
Details,
Father's Age:50
Son's Age:50
D:\jdk\bin\programs>
```

Write a program which creates two threads, one thread displaying "BMS College of Engineering" once every 10 seconds and another displaying "CSE" once every 2 seconds.

Code:

```

import java.util.*;
class Thread2 implements Runnable{
    Thread t;
    Thread2(){
        t = new Thread(this, "CSE");
        t.start();
    }
    public void run(){
        try{
            for(int i=0; i<10; i++){
                System.out.println("CSE ");
                Thread.sleep(2000);
            }
        } catch(InterruptedException e){
            System.out.println("Thread 2 Done - CSE");
        }
    }
}
class Thread1{
    public static void main(String args[]){
        Thread2 t = new Thread2();
        try{
            for(int i=0; i<5; i++){
                System.out.println("BMS College of Engineering");
                Thread.sleep(10000);
            }
        } catch(InterruptedException e){
            System.out.println("Thread 1 Done - BMSE");
        }
    }
}

```

Thread1.java

```
1 import java.util.*;
2 class Thread2 implements Runnable{
3     Thread t;
4     Thread2 (){
5         {
6             t=new Thread(this,"CSE");
7             t.start();
8         }
9     public void run(){
10         try{
11             for(int i=0;i<10;i++){
12                 System.out.println("CSE");
13                 Thread.sleep(2000);
14             }
15         }
16         catch(InterruptedException e){
17             System.out.println("Thread 2 Done - CSE");
18         }
19     }
20 }
21 }
22 class Thread1{
23     public static void main(String args[])
24     {
25         Thread2 x=new Thread2();
26         try{
27             for(int i=0;i<5;i++){
28                 System.out.println("BMS College of Engineering");
29                 Thread.sleep(10000);
30             }
31         }
32         catch(InterruptedException e){
33             System.out.println("Thread 1 Done - BMSCE");
34         }
35     }
36 }
37 }
```

```
D:\jdk\bin\programs>java Thread1
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
D:\jdk\bin\programs>
```

Program 10:

Write a program that creates an user interface to perform integer divisions. The user enters two numbers in the text fields, Num1, 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 integers, 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 java.awt.*;
import java.awt.event.*;
public class Division implements ActionListener {
    Frame f = new Frame();
    Label l1 = new Label("First Number");
    Label l2 = new Label("Second Number");
    Label l3 = new Label();
    Label l4 = new Label();
    TextField t1 = new TextField();
    TextField t2 = new TextField();
    Button b1 = new Button("Div");
    Division() {
        l1.setBounds(100, 100, 100, 20);
        l2.setBounds(100, 140, 100, 20);
        l3.setBounds(100, 180, 100, 20);
        l4.setBounds(100, 220, 300, 20);
        t1.setBounds(250, 100, 150, 20);
        t2.setBounds(250, 140, 150, 20);
        b1.setBounds(200, 275, 50, 20);
        f.add(l1);
        f.add(l2);
        f.add(l3);
        f.add(l4);
        f.add(t1);
        f.add(t2);
        f.add(b1);
    }
}

```

```
b1.addActionListener(this);  
f.setLayout(null);  
f.setVisible(true);  
f.setSize(500, 350);  
}  
public void actionPerformed(ActionEvent e){  
try{  
    int n1 = Integer.parseInt(t1.getText());  
    int n2 = Integer.parseInt(t2.getText());  
    l3.setText("Result : " + String.valueOf(n1/n2));  
    l4.setText("Division Successful!");  
} catch (Exception ex){  
    l4.setText(String.valueOf(ex));  
    l3.setText("Result : Error");  
}  
}  
public static void main(String args[]){  
    new Division();  
}
```

```
import java.awt.*;
import java.awt.event.*;
public class Division implements ActionListener{
    Frame f=new Frame();
    Label l1=new Label("First Number");
    Label l2=new Label("Second Number");
    Label l3=new Label();
    Label l4=new Label();
    TextField t1=new TextField();
    TextField t2=new TextField();
    Button b1=new Button("Div");
    Division(){
        l1.setBounds(100,100,100,20);
        l2.setBounds(100,140,100,20);
        l3.setBounds(100,180,100,20);
        l4.setBounds(100,220,300,20);
        t1.setBounds(250,100,150,20);
        t2.setBounds(250,140,150,20);
        b1.setBounds(200,275,50,20);
        f.add(l1);
        f.add(l2);
        f.add(l3);
        f.add(l4);
        f.add(t1);
        f.add(t2);
        f.add(b1);
        b1.addActionListener(this);
        f.setLayout(null);
        f.setVisible(true);
        f.setSize(500,350);
    }
    public void actionPerformed(ActionEvent e) {
        try {
            int n1=t1.getText();
            int n2=t2.getText();
            int result=n1/n2;
            l3.setText(result+"");
        } catch (Exception e1) {
            l3.setText("Error");
        }
    }
}
```

```
l4.setBounds(100,220,300,20);
t1.setBounds(250,100,150,20);
t2.setBounds(250,140,150,20);
b1.setBounds(200,275,50,20);
f.add(l1);
f.add(l2);
f.add(l3);
f.add(l4);
f.add(t1);
f.add(t2);
f.add(b1);
b1.addActionListener(this);
f.setLayout(null);
f.setVisible(true);
f.setSize(500,350);
}
public void actionPerformed(ActionEvent e) {
    try {
        int n1=Integer.parseInt(t1.getText());
        int n2=Integer.parseInt(t2.getText());
        l3.setText("Result : "+String.valueOf(n1/n2));
        l4.setText("Division Successful!");
    } catch (Exception ex) {
        l4.setText(String.valueOf(ex));
        l3.setText("Result : Error");
    }
}
public static void main(String args[]) {
    new Division();
}
}
```

First Number

50

Second Number

2

Result 25

Division Successful



First Number

12

Second Number

aa

java.lang.NumberFormatException: For input string: "aa"

Dr. H.

-

□

X

First Number

50

Second Number

0

Result 25

java.lang.ArithmaticException / D!=ZERO

Div