

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

```
import java.util.Scanner;

public class lab {

    public static void main(String[] args) {

        Scanner input = new Scanner(System.in);

        System.out.println("Enter the value of: ");

        System.out.print("a = ");

        double a = input.nextDouble();

        System.out.print("b = ");

        double b = input.nextDouble();

        System.out.print("c = ");

        double c = input.nextDouble();


        double r1,r2;


        double discriminant = b*b - 4*a*c;


        if(discriminant>0) {

            System.out.println("Real and Distinct roots.");

            r1 = (-b + Math.sqrt(discriminant)) / (2 * a);

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

            System.out.println("Roots are " +r1+ " and " +r2);
```

```

    }

    else if(discriminant==0) {

        System.out.println("Real and Equal roots.");

        r1 = -b / (2.0 * a);

        r2 = r1;

        System.out.println("Roots are " +r1+ " and " +r2);

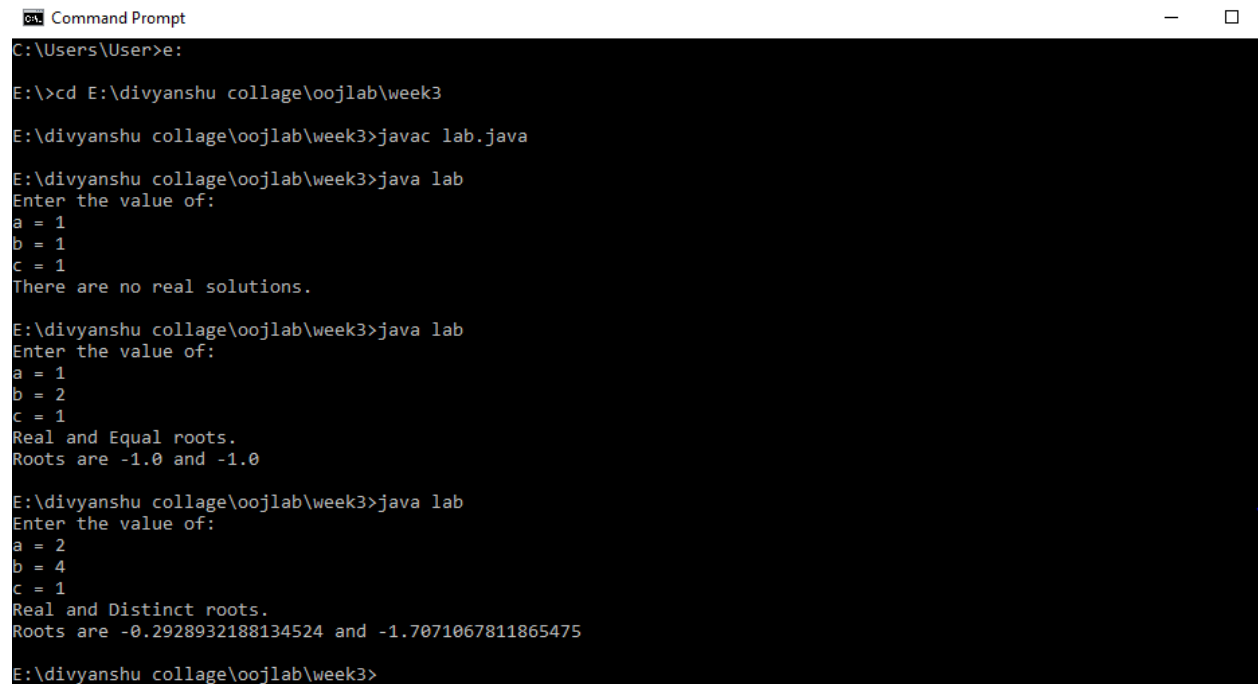
    }

    else

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

}
}

```



```

C:\Users\User>e:

E:\>cd E:\divyanshu collage\oojlab\week3

E:\divyanshu collage\oojlab\week3>javac lab.java

E:\divyanshu collage\oojlab\week3>java lab
Enter the value of:
a = 1
b = 1
c = 1
There are no real solutions.

E:\divyanshu collage\oojlab\week3>java lab
Enter the value of:
a = 1
b = 2
c = 1
Real and Equal roots.
Roots are -1.0 and -1.0

E:\divyanshu collage\oojlab\week3>java lab
Enter the value of:
a = 2
b = 4
c = 1
Real and Distinct roots.
Roots are -0.2928932188134524 and -1.7071067811865475

E:\divyanshu collage\oojlab\week3>

```

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.

```
import java.util.Scanner;

class Student
{
    private String usn;
    private String name;
    private int credits[];
    private double marks[];
    private int n;
    private double sgpa;
    private double totalcredits;

    void getdata()
    {
        int i;
        Scanner input=new Scanner(System.in);
        System.out.println("Enter the number of subjects ; ");
        n=input.nextInt();
        credits=new int[n];
        marks=new double[n];
        System.out.println("Enter the details of student : ");
        System.out.println("Enter the usn of student : ");
        usn=input.next();
        input.nextLine();
```

```

System.out.println("Enter the name of student : ");
name=input.next();

System.out.println("Enter the credits of subject and marks : ");
totalcredits=0;
for(i=0;i<n;i++)
{
    System.out.print("Enter the credit and marks of subject ");
    System.out.println(i+1);
    credits[i]=input.nextInt();
    totalcredits=totalcredits+credits[i];
    if(totalcredits>25)
    {
        System.out.println("Total credits are more than 25 enter again ");
        totalcredits=totalcredits-credits[i];
        i--;
    }
    else
        marks[i]=input.nextDouble();
}
}

void printdata()
{
    System.out.println("The details of student : ");
    System.out.print("USN of student : ");
    System.out.println(usn);
    System.out.print("Name of student : ");
    System.out.println(name);
    System.out.print("SGPA of student : ");
    System.out.println(sgpa);
}

```

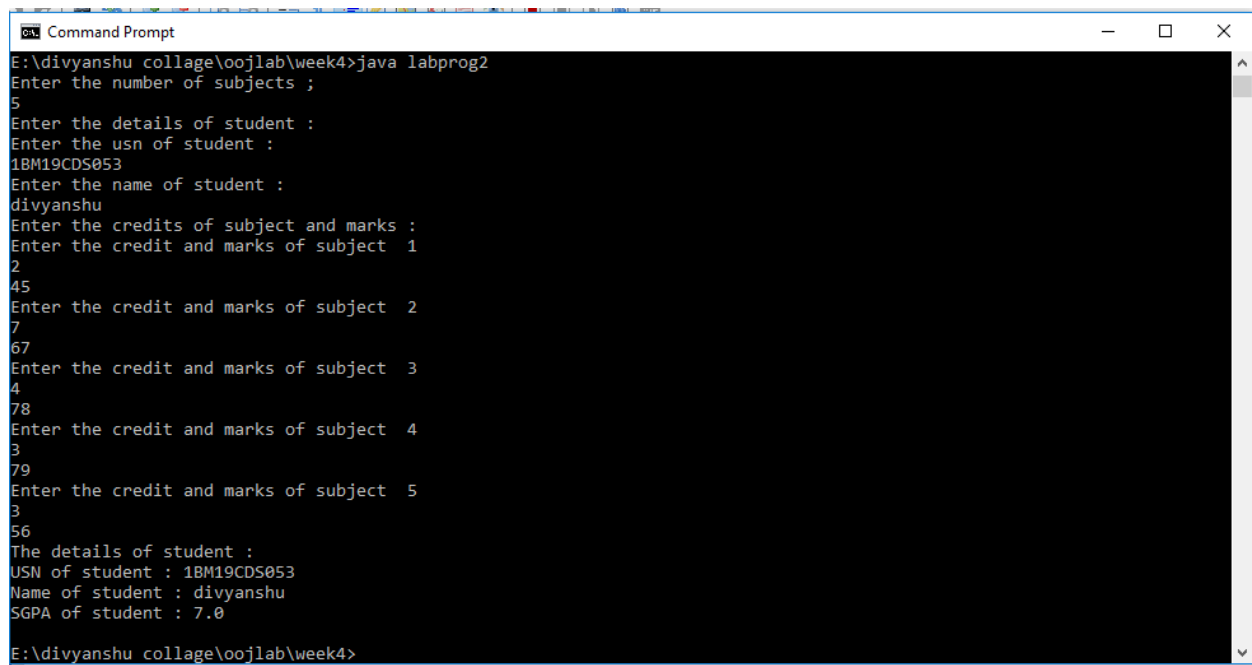
```

    }
    void calculate()
    {
        int i;
        int x;
        double sum=0,total=0;
        for(i=0;i<n;i++)
        {
            if(marks[i]>=90)
                x=10;
            else if(marks[i]>=80)
                x=9;
            else if(marks[i]>=70)
                x=8;
            else if(marks[i]>=60)
                x=7;
            else if(marks[i]>=50)
                x=6;
            else if(marks[i]>=40)
                x=5;
            else
                x=0;
            sum=sum + credits[i]*x;
            total=total+credits[i];
        }
        sgpa=sum/total;
    }
}

public class labprog2{

```

```
public static void main(String[] args){  
  
    Student s1=new Student();  
  
    s1.getdata();  
  
    s1.calculate();  
  
    s1.printdata();  
  
}  
  
}
```



```
Command Prompt  
E:\divyanshu collage\oojlab\week4>java labprog2  
Enter the number of subjects ;  
5  
Enter the details of student :  
Enter the usn of student :  
1BM19CDS053  
Enter the name of student :  
divyanshu  
Enter the credits of subject and marks :  
Enter the credit and marks of subject 1  
2  
45  
Enter the credit and marks of subject 2  
7  
67  
Enter the credit and marks of subject 3  
4  
78  
Enter the credit and marks of subject 4  
3  
79  
Enter the credit and marks of subject 5  
3  
56  
The details of student :  
USN of student : 1BM19CDS053  
Name of student : divyanshu  
SGPA of student : 7.0  
E:\divyanshu collage\oojlab\week4>
```

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.

```
import java.util.Scanner;

class Book{

    private String name;

    private String author;

    private double price;

    private int num_pages;

    Book(String s,String a,double p,int n)
    {
        name=s;
        author=a;
        price=p;
        num_pages=n;
    }

    Book()
    {
        name="NULL";
        author="NULL";
        price=0;
        num_pages=0;
    }

    void setdata()
    {
```

```

        Scanner input=new Scanner(System.in);
        System.out.println("Enter the name of the book : ");
        name=input.next();
        input.nextLine();
        System.out.println("Enter the author of the book : ");
        author=input.next();
        input.nextLine();
        System.out.println("Enter the price of the book : ");
        price=input.nextDouble();
        System.out.println("Enter the number of pages in the book : ");
        num_pages=input.nextInt();
    }

    void getdata()
    {
        System.out.println("The name of the book is : "+name);
        System.out.println("The author of the book is : "+author);
        System.out.println("The price of the book is : "+price);
        System.out.println("Number of pages in the book are : "+num_pages);
    }

    public String toString()
    {
        return("name of the book : "+name+"\nauthor of the book : "+author+"\nprice of the
book : "+price+"\nnumber of pages in the book : "+num_pages);
    }
}

public class labp3{
    public static void main(String args[]){

```



```
Scanner xx=new Scanner(System.in);
System.out.println("Enter the number of books : ");
int n=xx.nextInt();
Book b[]=new Book[n];
int i;
System.out.println("Enter the details of the book : ");
for(i=0;i<n;i++)
{
    System.out.println("Enter the details of the "+(i+1)+" book");
    b[i]=new Book();
    b[i].setdata();
}
System.out.println("The details of the books are : ");
for(i=0;i<n;i++)
{
    System.out.println("The details of the "+(i+1)+" book is : ");
    System.out.println(b[i]);
}
}
```

```
Command Prompt
E:\divyanshu collage\oojlab\week5>java labp3
Enter the number of books :
3
Enter the details of the book :
Enter the details of the 1 book
Enter the name of the book :
harry-potter
Enter the author of the book :
j.k-rolling
Enter the price of the book :
999
Enter the number of pages in the book :
599
Enter the details of the 2 book
Enter the name of the book :
helen-keller
Enter the author of the book :
w.r
Enter the price of the book :
699
Enter the number of pages in the book :
400
Enter the details of the 3 book
Enter the name of the book :
ghost-stories
Enter the author of the book :
s.k
Enter the price of the book :
899
Enter the number of pages in the book :
350
The details of the books are :
The details of the 1 book is :
name of the book : harry-potter
author of the book : j.k-rolling
price of the book : 999.0
number of pages in the book : 599
The details of the 2 book is :
name of the book : helen-keller
author of the book : w.r
price of the book : 699.0
number of pages in the book : 400
The details of the 3 book is :
name of the book : ghost-stories
author of the book : s.k
price of the book : 899.0
number of pages in the book : 350
```

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.

```
import java.util.Scanner;

abstract class shape
{
    private int a,b;
    void setshape(int x,int y)
    {
        a=x;
        b=y;
    }
    int geta()
    {
        return a;
    }
    int getb()
    {
        return b;
    }
    abstract public void print_area();
}

class rectangle extends shape
{
    private int area_rect;
    rectangle(int x,int y)
```

```

    {
        setshape(x,y);
    }
    public void print_area()
    {
        area_rect=geta()*getb();
        System.out.println("Area of rectangle is:"+area_rect);
    }
}

class triangle extends shape
{
    private double area_tri;
    triangle(int x,int y)
    {
        setshape(x,y);
    }
    public void print_area()
    {
        area_tri=(geta()*getb())/2;
        System.out.println("The area of triangle is:"+area_tri);
    }
}

class circle extends shape
{
    private double area_circle;
    circle(int y)
    {
        setshape(0,y);
    }
}

```

```

        public void print_area()
        {
            area_circle=((3.14)*getb()*getb());
            System.out.println("Area of circle is:"+area_circle);
        }
    }

    public class week81
    {
        public static void main(String[]args){
            Scanner xx=new Scanner(System.in);
            int a,b;
            System.out.println("Enter the length of rectangle : ");
            a=xx.nextInt();
            System.out.println("Enter the breadth of rectangle : ");
            b=xx.nextInt();
            rectangle r= new rectangle(a,b);
            r.print_area();
            System.out.println("Enter the height of triangle : ");
            a=xx.nextInt();
            System.out.println("Enter the base of triangle : ");
            b=xx.nextInt();
            triangle t= new triangle(a,b);
            t.print_area();
            System.out.println("Enter the radius of circle : ");
            a=xx.nextInt();
            circle c= new circle(a);
            c.print_area();
        }
    }
}

```

```
Command Prompt
at week81.main(week81.java:73)
E:\divyanshu collage\oojlab\week 8>java week81
Enter the length of rectangle :
3
Enter the breadth of rectangle :
4
Area of rectangle is:12
Enter the height of triangle :
4
Enter the base of triangle :
6
The area of triangle is:12.0
Enter the radius of circle :
3
Area of circle is:28.259999999999998
E:\divyanshu collage\oojlab\week 8>
E:\divyanshu collage\oojlab\week 8>
```

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 Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

1. Accept deposit from customer and update the balance. · Display the balance.
2. Compute and deposit interest
3. Permit withdrawal and update the balance
4. Check for the minimum balance, impose penalty if necessary and update the balance.

```
import java.util.Scanner;

import java.lang.Math;

class Account
{
    private String name;
    private double account_no;
    private char account_type;
    private double balance;

    void getdata(char ch)
    {
        Scanner xx=new Scanner(System.in);
        System.out.print("Enter the name of the customer : ");
        name=xx.next();
        xx.nextLine();
        System.out.print("Enter the account number of the customer : ");
```

```

        account_no=xx.nextDouble();

        System.out.print("Enter the balance of the customer : ");

        balance=xx.nextDouble();

        account_type=ch;

    }

    void updatebalance(double x)
    {
        balance=balance+x;
    }

    void updatebalance1(double x)
    {
        balance=balance-x;
    }

    void updatebalance2(double x)
    {
        balance=x;
    }

    double getbalance()
    {
        return balance;
    }

    void displaybalance()
    {
        System.out.println("The balance is : "+balance);
    }
}

class Saving_Account extends Account{

```



```

private double interest_rate;

Saving_Account()
{
    Scanner xx=new Scanner(System.in);

    getdata('S');

    System.out.print("Enter the interest rate : ");

    interest_rate=xx.nextDouble();

}

void getdeposit()
{
    Scanner xx=new Scanner(System.in);

    System.out.print("Enter the amount to be deposited : ");

    double x=xx.nextDouble();

    updatebalance(x);

}

void computeinterest()
{
    Scanner xx=new Scanner(System.in);

    System.out.print("Enter the number of years : ");

    double time=xx.nextDouble();

    double x=(getbalance()*Math.pow((1+((interest_rate)/100)),time));

    updatebalance2(x);

    System.out.println("The computed interest is : "+x);

    displaybalance();

}

void withdrawl()
{
    System.out.print("Enter the amount to be withdrawn : ");

```

```

        Scanner xx=new Scanner(System.in);
        double x=xx.nextDouble();
        while(x>getbalance())
        {
            System.out.println("The amount withdran is more than the balance enter again :
");
            x=xx.nextDouble();
        }
        updatebalance1(x);
        displaybalance();
    }
}

```

```

class Current_Account extends Account{
    private double min_balance;
    private int cheque_book;
    Current_Account()
    {
        Scanner xx=new Scanner(System.in);
        getdata('C');
        System.out.print("Enter the minimum balance : ");
        min_balance=xx.nextDouble();
    }

    void getdeposit()
    {
        Scanner xx=new Scanner(System.in);
        System.out.print("Enter the amount to be deposited : ");
        double x=xx.nextDouble();
    }
}

```

```

        updatebalance(x);
    }
    void issuecheck()
    {
        Scanner xx=new Scanner(System.in);
        System.out.print("Enter the amount of the check : ");
        double x=xx.nextDouble();
        if(x>(getbalance()-min_balance))
        {
            System.out.println("You have issued check of more than the minmum balance
and you have been charged the penalty of 100 rupees");
            updatebalance1(100);
        }
        else
        {
            updatebalance1(x);
        }
        displaybalance();
    }
    void withdrawl()
    {
        System.out.print("Enter the amount to be withdrawn : ");
        Scanner xx=new Scanner(System.in);
        double x=xx.nextDouble();
        while(x>(getbalance()-min_balance))
        {
            System.out.println("The amount withdran is more than the balance enter again :
");
            x=xx.nextDouble();

```

```

    }
    updatebalance1(x);
    displaybalance();
}
}

```

```

public class week82{
    public static void main(String args[])
    {
        Scanner input=new Scanner(System.in);
        char ch;
        System.out.println("Enter the type of account you want (C/S) : ");
        ch=input.next().charAt(0);
        if(ch=='S' || ch=='s')
        {
            Saving_Account s=new Saving_Account();
            int x=1;
            while(x!=0)
            {
                System.out.println("Enter 0 for exit : ");
                System.out.println("Enter 1 for deposit : ");
                System.out.println("Enter 2 for balance enquiry : ");
                System.out.println("Enter 3 to calculate interest : ");
                System.out.println("Enter 4 for withdrawal : ");
                x=input.nextInt();
                if(x==0)
                    break;
                else if(x==1)
                {

```

```

        s.getdeposit();
    }
    else if(x==2)
    {
        s.displaybalance();
    }
    else if(x==3)
    {
        s.computeinterest();
    }
    else if(x==4)
    {
        s.withdrawl();
    }
}

}

else
{
    Current_Account s=new Current_Account();
    int x=1;
    while(x!=0)
    {
        System.out.println("Enter 0 for exit : ");
        System.out.println("Enter 1 for deposit : ");
        System.out.println("Enter 2 for balance enquiry : ");
        System.out.println("Enter 3 to apply for cheque : ");
        System.out.println("Enter 4 for withdrawl : ");
        x=input.nextInt();
    }
}

```

```
        if(x==0)
            break;
        else if(x==1)
        {
            s.getdeposit();
        }
        else if(x==2)
        {
            s.displaybalance();
        }
        else if(x==3)
        {
            s.issuecheck();
        }
        else if(x==4)
        {
            s.withdrawl();
        }
    }
}
}
```

```
Command Prompt
E:\divyanshu collage\oojlab\week 8>java week82
Enter the type of account you want (C/S) :
C
Enter the name of the customer : divyanshu
Enter the account number of the customer : 3965874
Enter the balance of the customer : 1000
Enter the minimum balance : 500
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to apply for cheque :
Enter 4 for withdrawl :
1
Enter the amount to be deposited : 200
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to apply for cheque :
Enter 4 for withdrawl :
2
The balance is : 1200.0
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to apply for cheque :
Enter 4 for withdrawl :
4
Enter the amount to be withdrawn : 100
The balance is : 1100.0
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to apply for cheque :
Enter 4 for withdrawl :
3
Enter the amount of the check : 700
You have issued check of more than the minmum balance and you have been charged the penalty of 100 rupees
The balance is : 1000.0
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to apply for cheque :
Enter 4 for withdrawl :
3
Enter the amount of the check : 230
The balance is : 770.0
Enter 0 for exit :
Enter 1 for deposit :
```

Command Prompt

```
Enter 4 for withdrawl :
3
Enter the amount of the check : 230
The balance is : 770.0
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to apply for cheque :
Enter 4 for withdrawl :
0

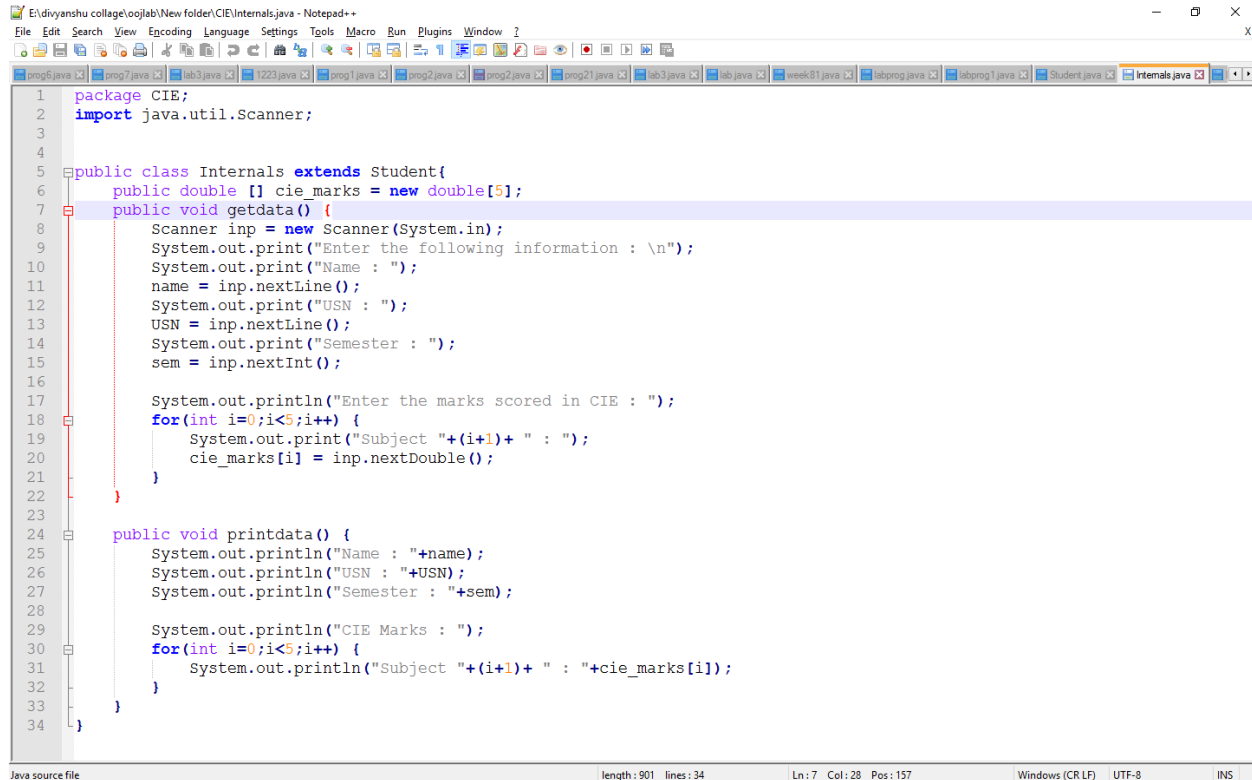
E:\divyanshu collage\oojlab\week 8>java week82
Enter the type of account you want (C/S) :
s
Enter the name of the customer : dhruv
Enter the account number of the customer : 345698
Enter the balance of the customer : 2500
Enter the interest rate : 5
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
1
Enter the amount to be deposited : 200
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
2
The balance is : 2700.0
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
3
Enter the number of years : 2
The computed interest is : 2976.75
The balance is : 2976.75
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
4
Enter the amount to be withdrawn : 800
```



```
Command Prompt
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
1
Enter the amount to be deposited : 200
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
2
The balance is : 2700.0
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
3
Enter the number of years : 2
The computed interest is : 2976.75
The balance is : 2976.75
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
4
Enter the amount to be withdrawn : 800
The balance is : 2176.75
Enter 0 for exit :
Enter 1 for deposit :
Enter 2 for balance enquiry :
Enter 3 to claculate interest :
Enter 4 for withdrawl :
0
E:\divyanshu collage\oojlab\week 8>
```

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.



```
1 package CIE;
2 import java.util.Scanner;
3
4
5 public class Internals extends Student{
6     public double [] cie_marks = new double[5];
7     public void getdata() {
8         Scanner inp = new Scanner(System.in);
9         System.out.print("Enter the following information : \n");
10        System.out.print("Name : ");
11        name = inp.nextLine();
12        System.out.print("USN : ");
13        USN = inp.nextLine();
14        System.out.print("Semester : ");
15        sem = inp.nextInt();
16
17        System.out.println("Enter the marks scored in CIE : ");
18        for(int i=0;i<5;i++) {
19            System.out.print("Subject "+(i+1)+ " : ");
20            cie_marks[i] = inp.nextDouble();
21        }
22    }
23
24    public void printdata() {
25        System.out.println("Name : "+name);
26        System.out.println("USN : "+USN);
27        System.out.println("Semester : "+sem);
28
29        System.out.println("CIE Marks : ");
30        for(int i=0;i<5;i++) {
31            System.out.println("Subject "+(i+1)+ " : "+cie_marks[i]);
32        }
33    }
34 }
```

Java source file length: 901 lines: 34 Ln: 7 Col: 28 Pos: 157 Windows (CR LF) UTF-8 INS

E:\divyanshu collage\ooglab\New folder\CIE\Student.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

prog6.java prog7.java lab3.java 1223.java prog1.java prog2.java prog2.java prog21.java lab3.java lab.java week81.java labprog.java labprog1.java Student.java Internals.java

```
1 package CIE;
2 import java.util.Scanner;
3
4 public class Student {
5     public String name;
6     public String USN;
7     public int sem;
8 }
```

Java source file length: 129 lines: 8 Ln: 8 Col: 2 Pos: 130 Windows (CR LF) UTF-8 INS

```
E:\divyanshu collage\oobjab\New folder\SEE\Externals.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
1 package SEE;
2 import CIE.*;
3 import java.util.Scanner;
4
5 public class Externals extends Student{
6     public double see_marks[] = new double[5];
7     public void getdata() {
8         Scanner inp = new Scanner(System.in);
9         System.out.println("Enter SEE marks of the student : ");
10        for(int i=0;i<5;i++) {
11            System.out.print("Subject "+(i+1)+" : ");
12            see_marks[i] = inp.nextDouble();
13        }
14    }
15
16    public void printdata() {
17        System.out.println("SEE marks : ");
18        for(int i=0;i<5;i++) {
19            System.out.println("Subject "+(i+1)+" : "+see_marks[i]);
20        }
21    }
22 }
```

Java source file length: 555 lines: 22 Ln: 14 Col: 1 Pos: 386 Windows (CR LF) UTF-8 INS

```
E:\divyanshu collage\oobjab\New folder\program6.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
1 import CIE.*;
2 import SEE.*;
3 import java.util.Scanner;
4
5 class Program6 {
6     public static void main(String[] args) {
7         Scanner inp = new Scanner(System.in);
8         System.out.print("Number of students : ");
9         int n = inp.nextInt();
10        double total[] = new double[5];
11        Internals in[] = new Internals[n];
12        Externals ext[] = new Externals[n];
13        for(int i=0;i<n;i++) {
14            System.out.println("Student "+(i+1));
15            in[i] = new Internals();
16            ext[i] = new Externals();
17            in[i].getdata();
18            ext[i].getdata();
19        }
20
21        System.out.println("-----Student Details-----");
22        for(int i=0;i<n;i++) {
23            System.out.println("Student "+(i+1));
24            in[i].printdata();
25            ext[i].printdata();
26            System.out.println("Total Marks : ");
27            for(int j=0;j<5;j++) {
28                System.out.println("Subject "+(j+1)+" : "+(in[i].cie_marks[j] + ext[i].see_marks[j]/2));
29            }
30        }
31    }
32 }
33
34
35
```

Java source file length: 883 lines: 37 Ln: 31 Col: 59 Pos: 815 Windows (CR LF) UTF-8 INS

```
E:\divyanshu collage\ooglab\New folder\program6.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
1223.java C:\prog1.java C:\prog2.java C:\prog21.java C:\lab3.java C:\lab.java C:\week81.java C:\labprog.java C:\labprog1.java C:\Student.java C:\Internals.java C:\Externals.java C:\program6.java C:\generic.java

4
5 class Program6 {
6     public static void main(String[] args) {
7         Scanner inp = new Scanner(System.in);
8         System.out.print("Number of students : ");
9         int n = inp.nextInt();
10        double total[] = new double[5];
11        Internals in[] = new Internals[n];
12        Externals ext[] = new Externals[n];
13        for(int i=0;i<n;i++) {
14            System.out.println("Student "+(i+1));
15            in[i] = new Internals();
16            ext[i] = new Externals();
17            in[i].getdata();
18            ext[i].getdata();
19
20
21        }
22
23
24        System.out.println("-----Student Details-----");
25        for(int i=0;i<n;i++) {
26            System.out.println("Student "+(i+1));
27            in[i].printdata();
28            ext[i].printdata();
29            System.out.println("Total Marks : ");
30            for(int j=0;j<5;j++) {
31                System.out.println("Subject "+(j+1)+ " : "+(in[i].cie_marks[j] + ext[i].see_marks[j])/2);
32            }
33        }
34    }
35
36
37 }
```

Java source file length: 883 lines: 37 Ln: 31 Col: 59 Pos: 815 Windows (CR LF) UTF-8 INS

```
E:\divyanshu collage\oojlab\New folder>java Program6
Number of students : 2
Student 1
Enter the following information :
Name : ashutosh
USN : 18M19CS027
Semester : 3
Enter the marks scored in CIE :
Subject 1 : 43
Subject 2 : 45
Subject 3 : 42
Subject 4 : 34
Subject 5 : 35
Enter SEE marks of the student :
Subject 1 : 76
Subject 2 : 78
Subject 3 : 87
Subject 4 : 86
Subject 5 : 98
Student 2
Enter the following information :
Name : akshya
USN : 18M19CS067
Semester : 3
Enter the marks scored in CIE :
Subject 1 : 36
Subject 2 : 37
Subject 3 : 35
Subject 4 : 38
Subject 5 : 45
Enter SEE marks of the student :
Subject 1 : 67
Subject 2 : 69
Subject 3 : 89
Subject 4 : 96
Subject 5 : 87
-----Student Details-----
Student 1
Name : ashutosh
USN : 18M19CS027
Semester : 3
CIE Marks :
```

-----Student Details-----

Student 1

Name : ashutosh

USN : 1BM19CS027

Semester : 3

CIE Marks :

Subject 1 : 43.0

Subject 2 : 45.0

Subject 3 : 42.0

Subject 4 : 34.0

Subject 5 : 35.0

SEE marks :

Subject 1 : 76.0

Subject 2 : 78.0

Subject 3 : 87.0

Subject 4 : 86.0

Subject 5 : 98.0

Total Marks :

Subject 1 : 81.0

Subject 2 : 84.0

Subject 3 : 85.5

Subject 4 : 77.0

Subject 5 : 84.0

Student 2

Name : akshya

USN : 1BM19CS067

Semester : 3

CIE Marks :

Subject 1 : 36.0

Subject 2 : 37.0

Subject 3 : 35.0

Subject 4 : 38.0

Subject 5 : 45.0

SEE marks :

Subject 1 : 67.0

Subject 2 : 69.0

Subject 3 : 89.0

Subject 4 : 96.0

Subject 5 : 87.0

Total Marks :

Subject 1 : 69.5

Subject 2 : 71.5

```
Student 2
Name : akshya
USN : 1BM19CS067
Semester : 3
CIE Marks :
Subject 1 : 36.0
Subject 2 : 37.0
Subject 3 : 35.0
Subject 4 : 38.0
Subject 5 : 45.0
SEE marks :
Subject 1 : 67.0
Subject 2 : 69.0
Subject 3 : 89.0
Subject 4 : 96.0
Subject 5 : 87.0
Total Marks :
Subject 1 : 69.5
Subject 2 : 71.5
Subject 3 : 79.5
Subject 4 : 86.0
Subject 5 : 88.5
```

Program 7

Write a program to demonstrate generics with multiple object parameters.

```
import java.util.Scanner;

class Test<T> {
    T obj;

    Test(T obj) {
        this.obj = obj;
    }

    void display() {
        System.out.println("Type of T : " +obj.getClass().getName());
    }
}
```



```
        T getObject() {  
            return obj;  
        }  
    }  
}
```

```
class generic{  
    public static void main(String[] args) {  
        Test<Integer> i = new Test<Integer>(15);  
        i.display();  
        System.out.println("Value : "+i.getObject());  
  
        Test<Double> d = new Test<Double>(215.14);  
        d.display();  
        System.out.println("Value : "+d.getObject());  
  
        Test<String> s = new Test<String>("Hello World!");  
        s.display();  
        System.out.println("Value : "+s.getObject());  
    }  
}
```

Command Prompt

```
E:\divyanshu collage\oojlab\week10]>javac generic.java
```

```
E:\divyanshu collage\oojlab\week10]>java generic
```

```
Type of T : java.lang.Integer
```

```
Value : 15
```

```
Type of T : java.lang.Double
```

```
Value : 215.14
```

```
Type of T : java.lang.String
```

```
Value : Hello World!
```

```
E:\divyanshu collage\oojlab\week10]>
```

Program 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=father's age.

```
import java.util.Scanner;

class WrongAge extends Exception
{
    public WrongAge(String s)
    {
        // Call constructor of parent Exception
        super(s);
    }
}

class Father{
    int fatherAge;

    Father() {
        Scanner inp = new Scanner(System.in);
        System.out.print("Enter father's age : ");
        fatherAge = inp.nextInt();
    }
}

class Son extends Father{
    int sonAge;
```

```

Son(){
    super();
    Scanner inp = new Scanner(System.in);
    try {
        if(fatherAge<=0) {
            throw new WrongAge("Age cannot be less than or equal to zero!!!");
        }
        else {
            System.out.print("Enter age of son : ");
            sonAge = inp.nextInt();
            try {
                if(sonAge>=fatherAge) {
                    throw new WrongAge("Age of son cannot be greater than or
equal to age of father!!!");
                }
                else {
                    System.out.println("Entered ages are correct!");
                }
            }

            catch(WrongAge e) {
                System.out.println(e);
            }
        }
    }
    catch(WrongAge e) {
        System.out.println(e);
    }
}

```

```
    }  
}
```

```
class ageException {  
    public static void main(String[] args) {  
        Son s = new Son();  
    }  
}
```

```
E:\divyanshu collage\oojlab\week10]>javac ageException.java  
E:\divyanshu collage\oojlab\week10]>java ageException  
Enter father's age : -1  
WrongAge: Age cannot be less than or equal to zero!!!  
  
E:\divyanshu collage\oojlab\week10]>java ageException  
Enter father's age : 54  
Enter age of son : 45  
Entered ages are correct!  
  
E:\divyanshu collage\oojlab\week10]>java ageException  
Enter father's age : 45  
Enter age of son : 48  
WrongAge: Age of son cannot be greater than or equal to age of father!!!
```

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

```
class NewThread implements Runnable {  
    String name;// name of thread  
    long time1;  
    int x;  
    Thread t;  
    NewThread(String threadname,long time,int x1) {  
        name = threadname;  
        x=x1;  
        time1=time;  
        t = new Thread(this, name);  
        System.out.println("New thread: " + t);  
        t.start(); // Start the thread  
    }  
    // This is the entry point for thread.  
    public void run() {  
        try {  
            for(int i = x; i > 0; i--) {  
                System.out.println(name);  
                Thread.sleep(time1);  
            }  
        } catch (InterruptedException e) {  
            System.out.println(name + "Interrupted");  
        }  
        System.out.println(name + " exiting.");  
    }  
}
```

```
class MultiThreadDemo {  
    public static void main(String args[]) {  
        // start threads  
        new NewThread("BMS COLLEGE OF ENGINEERING",10000,2);  
        new NewThread("CSE",2000,10);  
    }  
}
```

```
E:\divyanshu collage\oojlab\week11>java MultiThreadDemo  
New thread: Thread[BMS COLLEGE OF ENGINEERING,5,main]  
New thread: Thread[CSE,5,main]  
BMS COLLEGE OF ENGINEERING  
CSE  
CSE  
CSE  
CSE  
CSE  
CSE  
BMS COLLEGE OF ENGINEERING  
CSE  
CSE  
CSE  
CSE  
CSE  
BMS COLLEGE OF ENGINEERING exiting.  
CSE exiting.
```

Program 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 `ArithmeticException`. Display the exception in a message dialog box.

```
import
java.awt.*;

import java.awt.event.*;

class SampleDialog extends Dialog implements ActionListener
{
    Division div;
    SampleDialog(Frame parent, String title)
    {
        super(parent, title, false);
        div=(Division)parent;
        setLayout(new FlowLayout());
        setSize(400, 150);
        add(new Label(div.msg));
        Button b;
        add(b = new Button("OK"));
        b.addActionListener(this);
    }

    public void actionPerformed(ActionEvent ae)
    {
        dispose();
    }
}

public class Division extends Frame implements ActionListener
{
    String msg = "";
    String msg1 = "";
    TextField n1, n2, res;
```



```

Button b;
Label result = new Label("Result :", Label.RIGHT);

public Division()
{
    setLayout(new FlowLayout());
    Label num1 = new Label("Number 1 : ", Label.RIGHT);
    Label num2 = new Label("Number 2 :", Label.RIGHT);
    Button div = new Button("Divide");
    n1 = new TextField(10);
    n2 = new TextField(10);
    res = new TextField(35);

    add(num1);
    add(n1);
    add(num2);
    add(n2);
    b = (Button)add(div);
    add(result);
    add(res);

    n1.addActionListener(this);
    n2.addActionListener(this);
    b.addActionListener(this);

    addWindowListener(new WindowAdapter() {
        public void windowClosing(WindowEvent we) {
            System.exit(0);
        }
    });
}

public static void main(String[] args)
{
    Division appwin = new Division();
    appwin.setSize(new Dimension(450, 180));
    appwin.setTitle("Integer-Division");
    appwin.setVisible(true);
}

```

```

    }

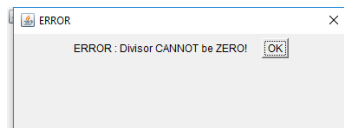
    public void actionPerformed(ActionEvent ae)
    {
        if(!(n1.getText().equals("")) && !(n2.getText().equals("")))
        {
            try
            {
                msg1 = ""+(Integer.parseInt(n1.getText()) /
Integer.parseInt(n2.getText()));
                res.setText(msg1);
            }
            catch(NumberFormatException e)
            {
                msg = "ERROR : Enter ONLY Integers!";
                res.setText("");
                SampleDialog d = new SampleDialog(this,
"ERROR");

                d.setVisible(true);
            }
            catch(ArithmeticException e)
            {
                msg = "ERROR : Divisor CANNOT be ZERO!";
                res.setText("");
                SampleDialog d = new SampleDialog(this,
"ERROR");

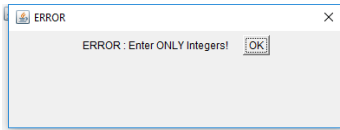
                d.setVisible(true);
            }
        }
        else
        {
            msg = "ERROR : Number fields should NOT be EMPTY!";
            res.setText("");
            SampleDialog d = new SampleDialog(this, "ERROR");
            d.setVisible(true);
        }
        //repaint();
    }
}

```

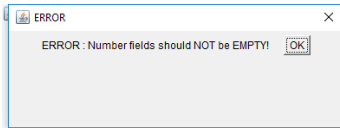
Number 1 : Number 2 : Result :



Number 1 : Number 2 : Result :



Number 1: Number 2: Result:



Number 1: Number 2: Result:

