OBJECT ORIENTED JAVA PROGRAMMING LAB RECORD

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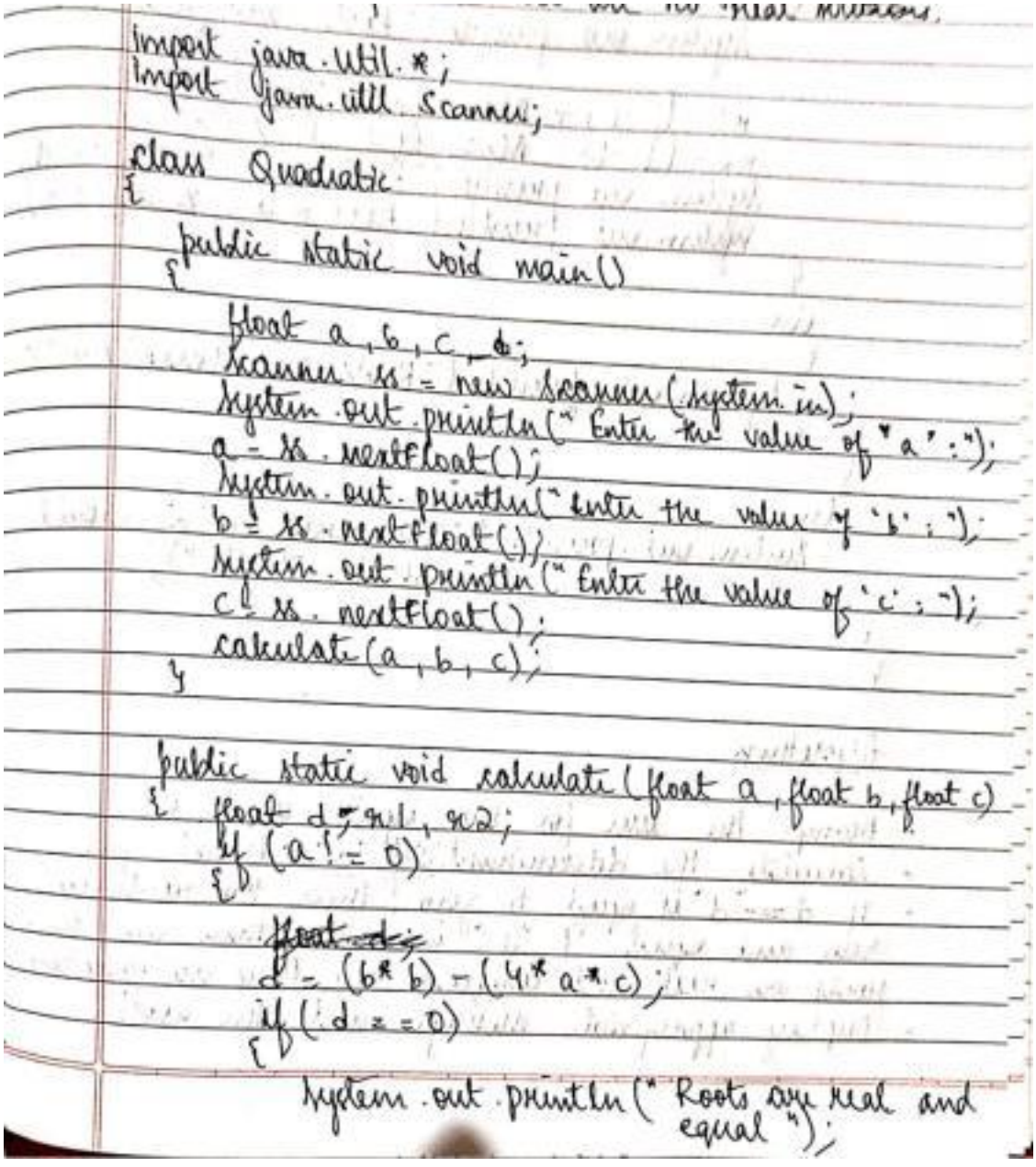
LAB PROGRAM 1 :

Develop a Java program that prints all real solutions to the quadratic equation ax2 +bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2 -4ac is negative, display a message stating that there are no real solutions.



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

class Quadratic
{
    public static void main()
    {
        float a, b, c, d;
        Scanner ss = new Scanner(System.in);
        System.out.println("Enter the value of 'a':");
        a = ss.nextFloat();
        System.out.println("enter the value of 'b':");
        b = ss.nextFloat();
        System.out.println("Enter the value of 'c':");
        c = ss.nextFloat();
        calculate(a, b, c);
    }

    public static void calculate(float a, float b, float c)
    {   float d, r1, r2;
        if (a != 0)
        {
            float d;
            d = (b*b) - (4*a*c);
            if (d == 0)
            {
                System.out.println("Roots are real and
                                    equal");
```

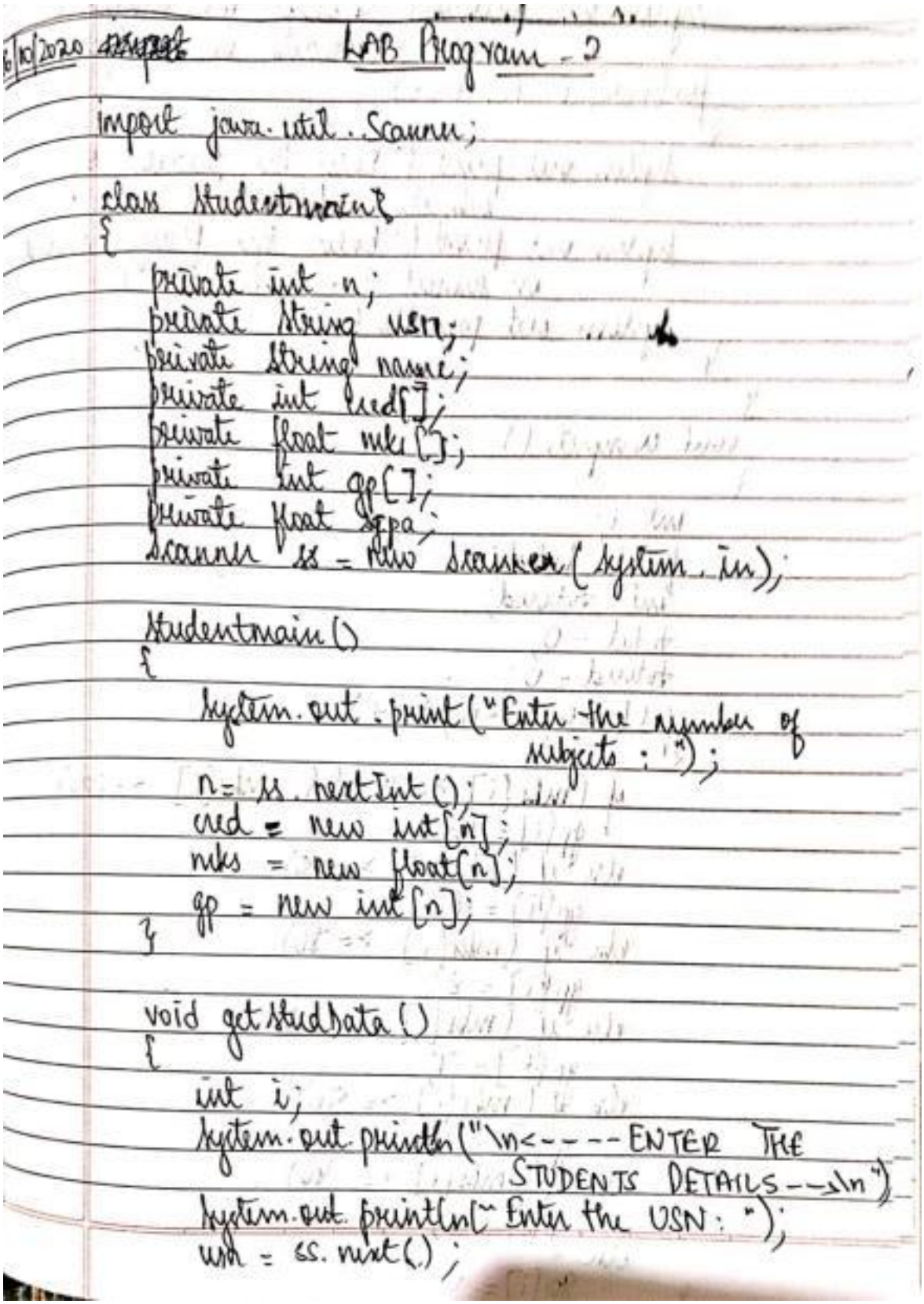
```
        x1 = (-b) / (2 * a);
        x2 = x1;
        System.out.printf("Root 1 is : %.4f" + x1);
        System.out.printf("Root 2 is : %.4f" + x2);
    }
    else if (d > 0)
    {
        System.out.println("Roots are real and
                                    unequal");
        x1 = ((-b) + Math.sqrt(d)) / (2 * a);
        x2 = ((-b) - Math.sqrt(d)) / (2 * a);
        System.out.printf("Root 1 is : %.4f" + x1);
        System.out.printf("Root 2 is : %.4f" + x2);
    }
    else
    {
        System.out.println("Roots are Imaginary");
    }
}
else
    System.out.println("The value of 'a' should
                                    not be zero");
}
}
```

OUTPUT :

```
C:\Users\91944\OneDrive\Desktop\week2>java quadratic
Enter the value of 'a' (co-efficient of x^2) :
0
The value of 'a' SHOULD NOT be zero!!

C:\Users\91944\OneDrive\Desktop\week2>java quadratic
Enter the value of 'a' (co-efficient of x^2) :
1
Enter the value of 'b' (co-efficient of x) :
4
Enter the value of 'c' (constant) :
4
Roots are REAL and EQUAL
Root 1 : -2.0000
Root 2 : -2.0000

C:\Users\91944\OneDrive\Desktop\week2>java quadratic
Enter the value of 'a' (co-efficient of x^2) :
1
Enter the value of 'b' (co-efficient of x) :
-1
Enter the value of 'c' (constant) :
-6
Roots are REAL and UNEQUAL
Root 1 : 3.0000
Root 2 : -2.0000

C:\Users\91944\OneDrive\Desktop\week2>java quadratic
Enter the value of 'a' (co-efficient of x^2) :
3
Enter the value of 'b' (co-efficient of x) :
4
Enter the value of 'c' (constant) :
5
Roots are IMAGINARY
```

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.

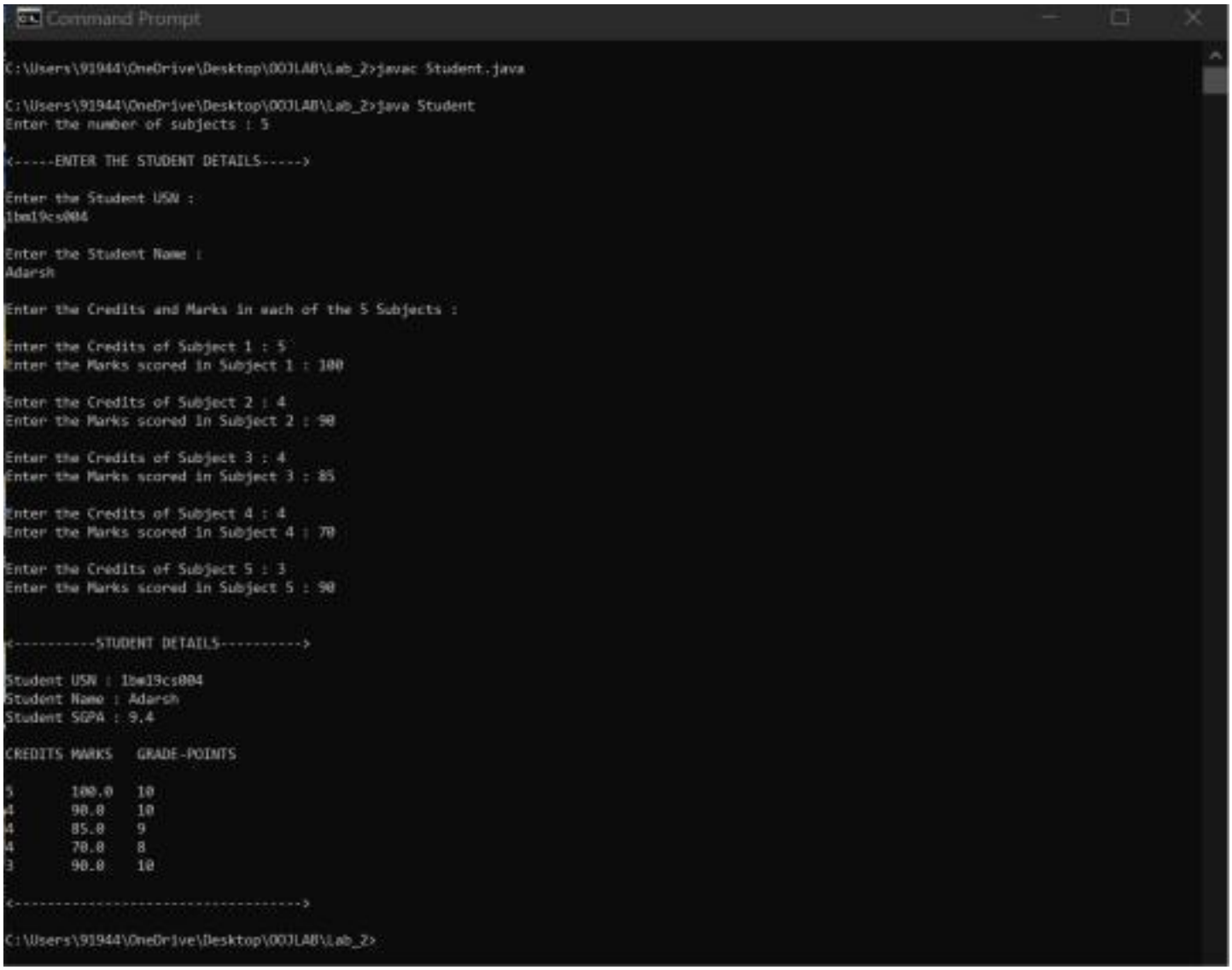


```
6/10/2020                LAB Program - 2

import java.util.Scanner;

class Studentmain2
{
    private int n;
    private String usn;
    private String name;
    private int cred[];
    private float mks[];
    private int gp[];
    private float sgpa;
    Scanner ss = new Scanner(System.in);

    Studentmain()
    {
        System.out.print("Enter the number of
                                    subjects : ");
        n= ss.nextInt();
        cred = new int[n];
        mks = new float[n];
        gp = new int[n];
    }

    void getStudData()
    {
        int i;
        System.out.println("\n<----ENTER THE
                                STUDENTS DETAILS---->\n");
        System.out.println("Enter the USN: ");
        usn = ss.next();
```

```
System.out.println("Enter the Student Name:");
name = ss.next();
System.out.println("\nEnter the marks & credits in 5 subjects:\n");
for(i=0; i<n; i++)
{
    System.out.print("Enter the Credits of subject "+(i+1)+" :");
    System.out.print("Enter the Marks scored in subject "+(i+1)+" :");
    System.out.println();
}
}
void compute()
{
    int i;
    float total;
    int totcred;
    total=0;
    totcred=0;
    for(i=0; i<n; i++)
    {
        if (mks[i] >=90 && mks[i] <=100)
            gp[i] = 10;
        else if (mks[i] >=80)
            gp[i] = 9;
        else if (mks[i] >=70)
            gp[i] = 8;
        else if (mks[i] >=60)
            gp[i] = 7;
        else if (mks[i] >=50)
            gp[i] = 6;
        else if (mks[i] >= 40)
            gp[i] = 4;
        else
            gp[i] = 0;
```

```
System.out.println("Enter the Student Name:");
name = ss.next();
System.out.println("\nEnter the marks & credits in 5 subjects:\n");
for(i=0; i<n; i++)
{
    System.out.print("Enter the Credits of subject "+(i+1)+" :");
    System.out.print("Enter the Marks scored in subject "+(i+1)+" :");
    System.out.println();
}
}
void compute()
{
    int i;
    float total;
    int totcred;
    total=0;
    totcred=0;
    for(i=0; i<n; i++)
    {
        if (mks[i] >=90 && mks[i] <=100)
            gp[i] = 10;
        else if (mks[i] >=80)
            gp[i] = 9;
        else if (mks[i] >=70)
            gp[i] = 8;
        else if (mks[i] >=60)
            gp[i] = 7;
        else if (mks[i] >=50)
            gp[i] = 6;
        else if (mks[i] >= 40)
            gp[i] = 4;
        else
            gp[i] = 0;
```

OUTPUT :


Command Prompt
C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_2>javac Student.java
C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_2>java Student
Enter the number of subjects : 5
<-----ENTER THE STUDENT DETAILS----->
Enter the Student USN :
1bm19cs004
Enter the Student Name :
Adarsh
Enter the Credits and Marks in each of the 5 Subjects :
Enter the Credits of Subject 1 : 5
Enter the Marks scored in Subject 1 : 100
Enter the Credits of Subject 2 : 4
Enter the Marks scored in Subject 2 : 90
Enter the Credits of Subject 3 : 4
Enter the Marks scored in Subject 3 : 85
Enter the Credits of Subject 4 : 4
Enter the Marks scored in Subject 4 : 70
Enter the Credits of Subject 5 : 3
Enter the Marks scored in Subject 5 : 90
<----------STUDENT DETAILS---------->
Student USN : 1bm19cs004
Student Name : Adarsh
Student SGPA : 9.4
CREDITS MARKS GRADE-POINTS
5 100.0 10
4 90.0 10
4 85.0 9
4 70.0 8
3 90.0 10
<---------->
C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_2>

LAB 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.

13/10/2020 Lab Program - 3

```
import java.util.Scanner;

class Book
{
    String name;
    String author;
    float price;
    int num_pages;
    Scanner ss = new Scanner(System.in);

    Book()
    {
        name = "";
        author = "";
        price = 0.0f;
        num_pages = 0;
    }

    void accept()
    {
        System.out.println("Enter the Book Name:");
        name = ss.next();
        System.out.println("Enter the AUTHOR of the
                                        book:");
        author = ss.next();
        System.out.println("Enter the PRICE of the book:
        price = ss.nextFloat();
        System.out.println("Enter the NUMBER OF PAG
                                .. in the book:");
        num_pages = ss.nextInt();
    }
```

```
public String toString()
{
    return (name+"\t\t"+author+"\t\t"+price+
            "\t\t"+num_pages);
}
}
class Booksmain
{
public static void main(String args[])
{
    Scanner ss = new Scanner(System.in);
    System.out.print("\n Enter the number
                      of books : ");
    int n = ss.nextInt();
    Book b[] = new Book[n];
    for(int i = 0; i<n; i++)
    {
        b[i] = new Book();
        System.out.println("\n Enter the details of
                            Book "+(i+1)+"\n");
        b[i].accept();
    }
    System.out.println("DETAILS OF ALL BOOKS\n");
    System.out.println("\nNAME\tAUTHOR\t\t
                        PRICE\t\tNUMBER OF PAGES");
    for(int i=0; i<n; i++)
    {
        System.out.println(b[i]);
    }
    System.out.println("\n<----------->\n");
}
}
```

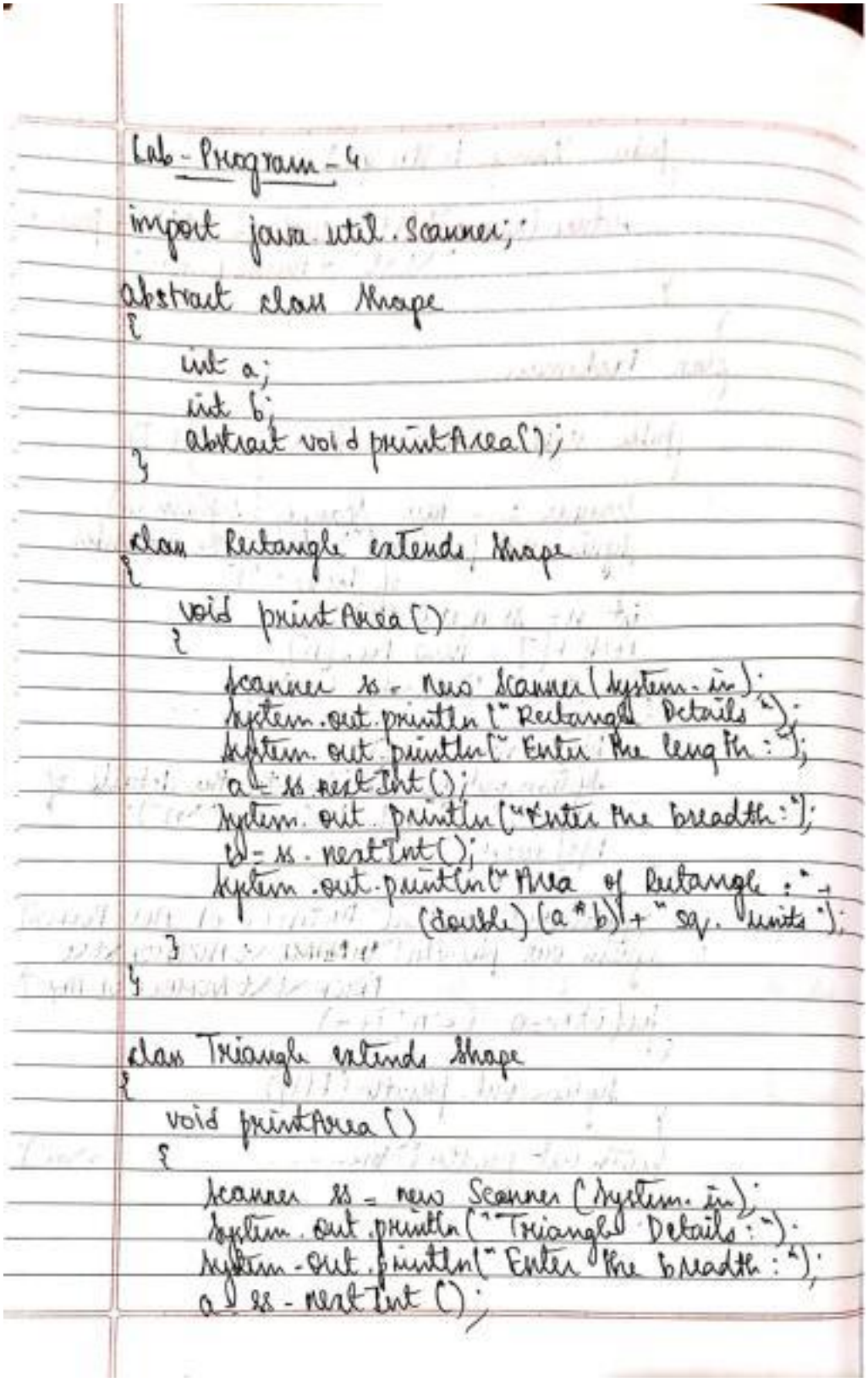
OUTPUT :

```
C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_3>javac Booksmain.java

C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_3>java Booksmain

Enter the number of books :
2

<----------ENTER THE DETAILS OF BOOK 1---------->

Enter the book NAME :
Dark
Enter the AUTHOR of the book :
Mcgraw
Enter the PRICE of the book :
199
Enter the NUMBER OF PAGES in the book :
125

<------------------------------------------------>


<----------ENTER THE DETAILS OF BOOK 2---------->

Enter the book NAME :
Horror
Enter the AUTHOR of the book :
Johns
Enter the PRICE of the book :
100
Enter the NUMBER OF PAGES in the book :
200

<------------------------------------------------>
```

```
<--------------DETAILS OF ALL BOOKS--------------->


NAME            AUTHOR          PRICE           NUMBER OF PAGES

Dark            Mcgraw          Rs.199.0                125
Horror          Johns           Rs.100.0                200

<------------------------------------------------>


C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_3>
```

LAB PROGRAM – 4

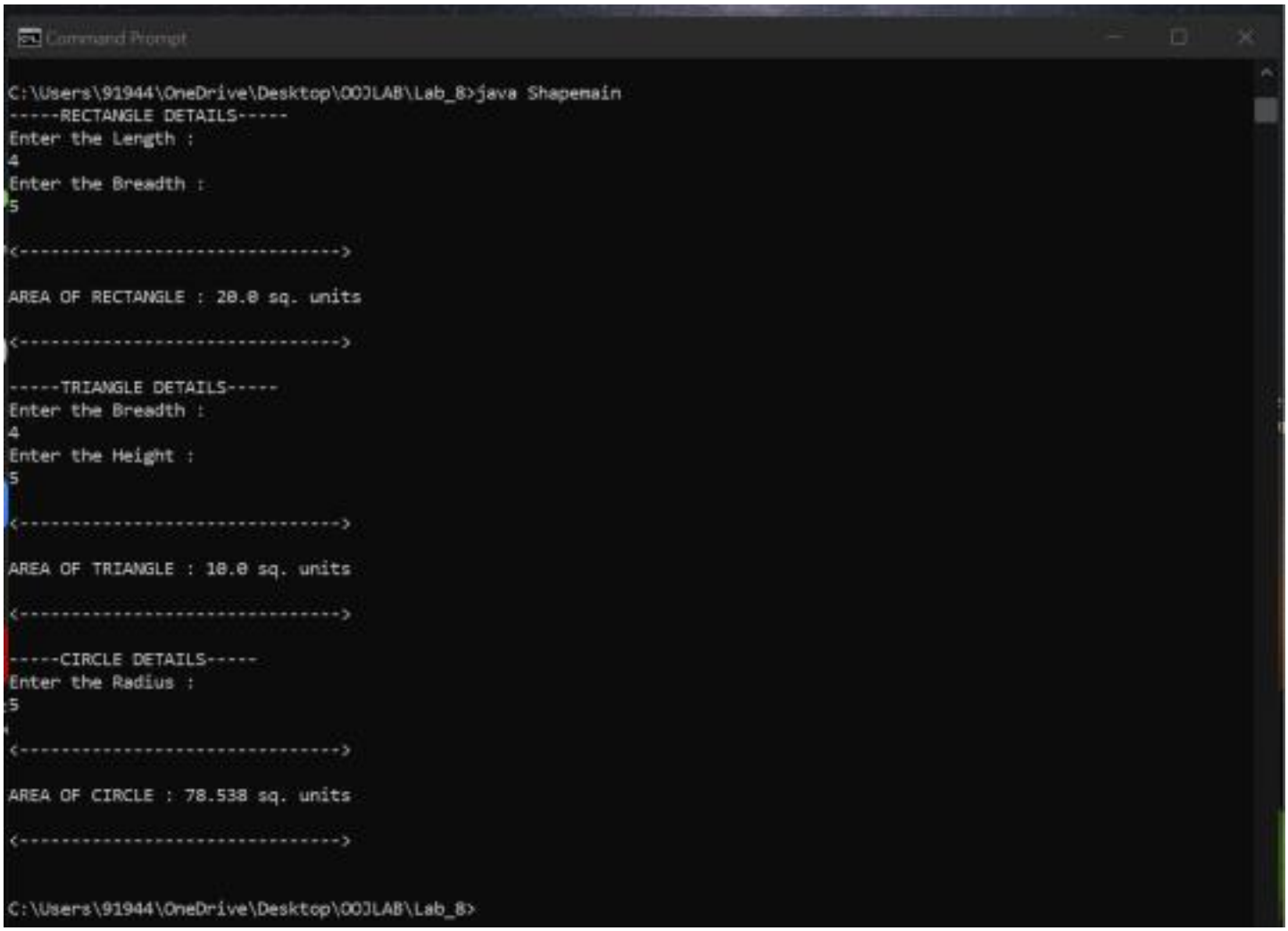
Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.



```
Lab - Program - 4

import java.util.Scanner;
abstract class Shape
{
    int a;
    int b;
    abstract void printArea();
}

class Rectangle extends Shape
{
    void printArea()
    {
        Scanner ss = new Scanner(System.in);
        System.out.println("Rectangle Details");
        System.out.println("Enter the length:");
        a = ss.nextInt();
        System.out.println("Enter the breadth:");
        b = ss.nextInt();
        System.out.println("Area of Rectangle:" +
                (double)(a*b) + "sq. units");
    }
}

class Triangle extends Shape
{
    void printArea()
    {
        Scanner ss = new Scanner(System.in);
        System.out.println("Triangle Details:");
        System.out.println("Enter the breadth:");
        a = ss.nextInt();
```

```
System.out.println("Enter the height:");
b = ss.nextInt();
System.out.println("Area of Triangle: "+
        (double)(0.5*a*b)+" sq.units");
    }
}

class Circle extends Shape
{
    void printArea()
    {
        Scanner ss = new Scanner(System.in);
        System.out.println("Circle Details");
        System.out.println("Enter the radius:");
        a = ss.nextInt();
        System.out.println("Area of circle: %0.3f
            sq.units", (double)(3.1415*a*a));
    }
}

class Shapemain
{
    public static void main(String args[])
    {
        Rectangle r = new Rectangle();
        r.printArea();
        Triangle t = new Triangle();
        t.printArea();
        Circle c = new Circle();
        c.printArea();
    }
}
```

OUTPUT :



LAB 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: • 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.

Lab Program - 5

```
import java.util.Scanner;
class Account
{
    String name;
    String accno;
    char acctype;

    Scanner ss = new Scanner(System.in);
    Account()
    {
        name = "";
        accno = "";
    }
    void accept()
    {
        System.out.println("Enter ACCOUNT DETAILS");
        System.out.println("Enter the NAME :");
        name = ss.next();
        System.out.println("Enter Account Number:");
        accno = ss.next();
        System.out.println("Enter the Account Type
                (S - Savings or C - Current)");
        acctype = ss.next().charAt(0);
    }
}

class Sav_acct extends Account
{
    double ci, deposit, withdraw, amt, balance;
    int ch;
    double time, r = 0.05;
    Scanner ss = new Scanner(System.in);
```

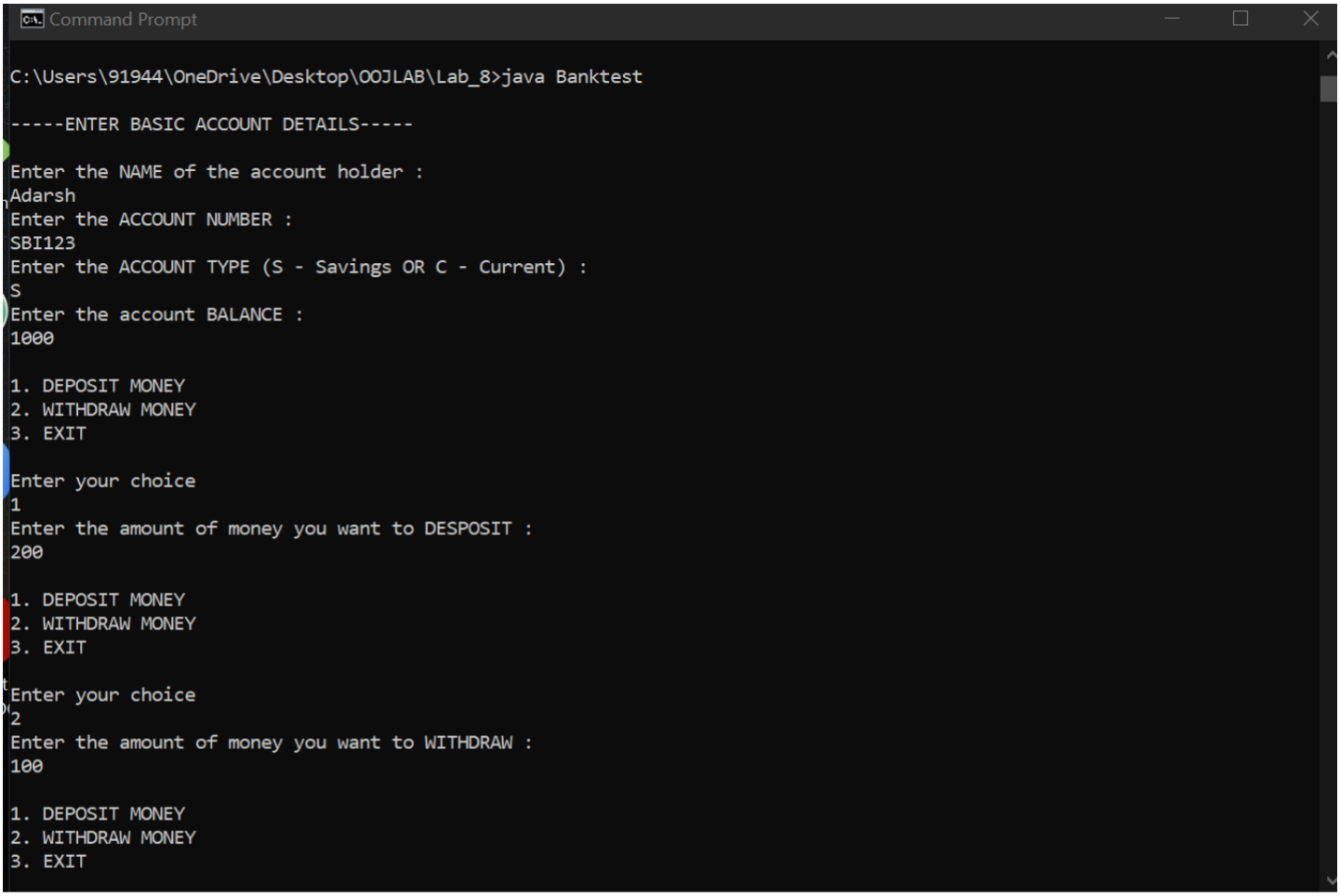
```
void accept()
{
    System.out.println("Enter account BALANCE");
    balance = ss.nextDouble();
    do
    {
        System.out.println("\n1. Deposit Money");
        System.out.println("2. Withdraw Money");
        System.out.println("3. EXIT");
        System.out.println("\nEnter your choice:");
        ch = ss.nextInt();
        if (ch==1)
            deposit();
        else if (ch==2)
            withdrawamt();
        else if (ch==3)
            break;
        else
            System.out.println("Invalid Choice");
    }
    while(ch!=3);
    System.out.println("Enter the time (in years)
        for which interest has to calculated:");
    time = ss.nextDouble();
    display();
}
void deposit()
{
    System.out.println("Enter the amt you
        want to DEPOSIT");
    deposit = ss.nextDouble();
    balance += deposit;
}
```

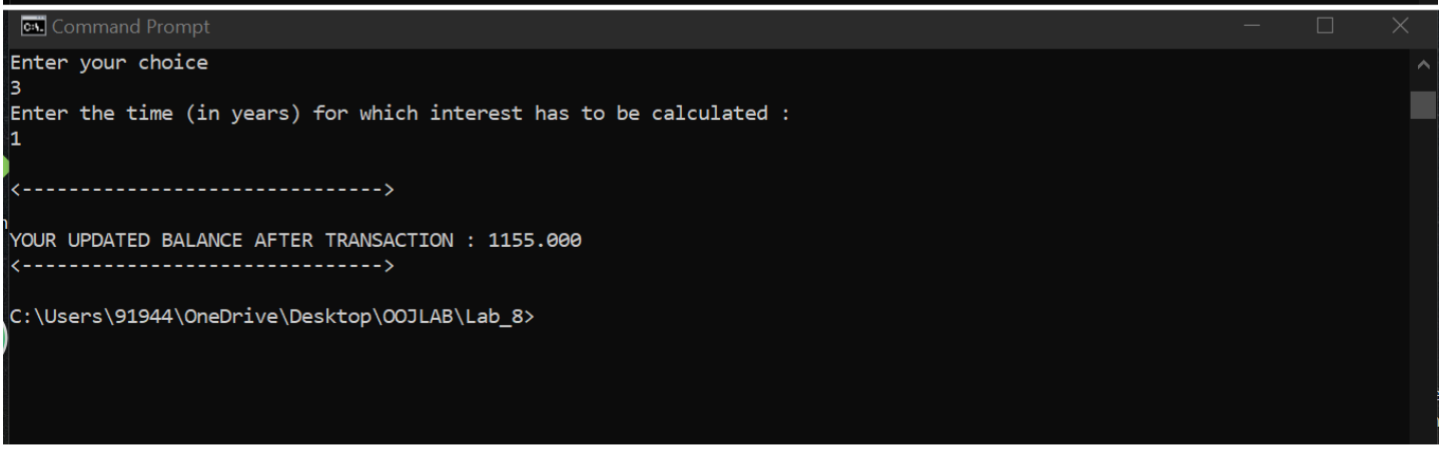
```
void withdrawamt()
{
    System.out.println("Enter the amount
                you want to WITHDRAW");
    withdraw = ss.nextDouble();
    balance -= withdraw;
}

void displaydet()
{
    amt = balance * Math.pow((1+r), time);
    System.out.println("YOUR UPDATED BALANCE:
                %0.3f", amt);
}
}

class Curr_ac extends Account
{
    double balance;
    double deposit;
    double withdraw;
    double amt;
    int ch;
    double min_bal = 1000;
    int penalty = 25;
    Scanner ss = new Scanner(System.in);

    void acceptch()
    {
        System.out.println("Enter the account BALANCE");
        balance = ss.nextDouble();
        do
        {
            System.out.println("\n1. Deposit Money");
            System.out.println("2. Withdraw Money");
```

```
        System.out.println("3. EXIT");
        System.out.println("Enter your choice");
        ch = ss.nextInt();
        if (ch == 1)
          deposit amt();
        else if (ch == 2)
          withdrawamt();
        else if (ch == 3)
          break;
        else
          System.out.println("Invalid Choice!");
      }
      while (ch != 3);
      displaydet();
    }
    void deposit amt()
    {
      System.out.println("Enter the amt you
                want to DEPOSIT:");
      deposit = ss.nextDouble();
      balance += deposit;
    }
    void withdrawalamt()
    {
      System.out.println("Enter the amt you
                want to WITHDRAW:");
      withdraw = ss.nextDouble();
      balance -= withdraw;
    }

    void displaydet()
    {
      System.out.println("YOUR
      if (balance < min-bal)
      {
```

```
        System.out.println(" Your balance is less
                than the minimum balance required ");
        System.out.println(" So, a Penalty of Rs. "
                +penalty+ " has been imposed! ");
        balance -= penalty;
    }
    System.out.printf(" Your updated balance :
                %0.3f\n ", balance);
    System.out.println(" Cheque Book facility is
                provided ");
  }
}

class Bank
{
  public static void main(String args[])
  {
    Account a = new Account();
    a.accept();
    if (a.acctype == 'S')
    {
      Sav_acct s = new Sav_acct();
      s.acceptch();
    }
    else if (a.acctype == 'C')
    {
      Curr_acct c = new Curr_Acct();
      c.acceptch();
    }
    else
      System.out.println(" Enter a VALID
                account type ");
  }
}
```

OUTPUT :


Command Prompt
C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_8>java Banktest
-----ENTER BASIC ACCOUNT DETAILS-----
Enter the NAME of the account holder :
Adarsh
Enter the ACCOUNT NUMBER :
SBI123
Enter the ACCOUNT TYPE (S - Savings OR C - Current) :
S
Enter the account BALANCE :
1000
1. DEPOSIT MONEY
2. WITHDRAW MONEY
3. EXIT
Enter your choice
1
Enter the amount of money you want to DESPOSIT :
200
1. DEPOSIT MONEY
2. WITHDRAW MONEY
3. EXIT
Enter your choice
2
Enter the amount of money you want to WITHDRAW :
100
1. DEPOSIT MONEY
2. WITHDRAW MONEY
3. EXIT


Command Prompt
Enter your choice
3
Enter the time (in years) for which interest has to be calculated :
1
<------------------------------>
YOUR UPDATED BALANCE AFTER TRANSACTION : 1155.000
<------------------------------>
C:\Users\91944\OneDrive\Desktop\OOJLAB\Lab_8>

LAB 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.

Lab Program - 6

Student.java

```
package CIE;
import java.util.Scanner;

public class Student
{
    public String usn;
    public String name;
    public int sem;
    Scanner ss = new Scanner(System.in);

    public Student()
    {
        usn="";
        name="";
        sem=0;
    }

    public void accept()
    {
        System.out.println("Enter Personal Details\n");
        System.out.println("Enter the USN:");
        usn = ss.next();
        System.out.println("Enter the Name:");
        name = ss.next();
        System.out.println("Enter the Semester:");
        sem = ss.nextInt();
    }
}
```

// Internals.java file.

```
package CIE
import java.util.Scanner;
public class Internals extends Student
{
    public int n=5;
    public int cie[] = new int[n];
    public int i;
    Scanner ss = new Scanner(System.in);

    public void acceptcie()
    {
        System.out.println(" CIE marks Details ");
        System.out.println(" Enter the marks in each
                of the "+n+" subjects : ");
        for(i=0; i<n; i++)
        {
            System.out.print(" Enter the CIE marks in
            subject "+(i+1)+" : ");
            cie[i] = ss.nextInt();
        }
    }
}
```

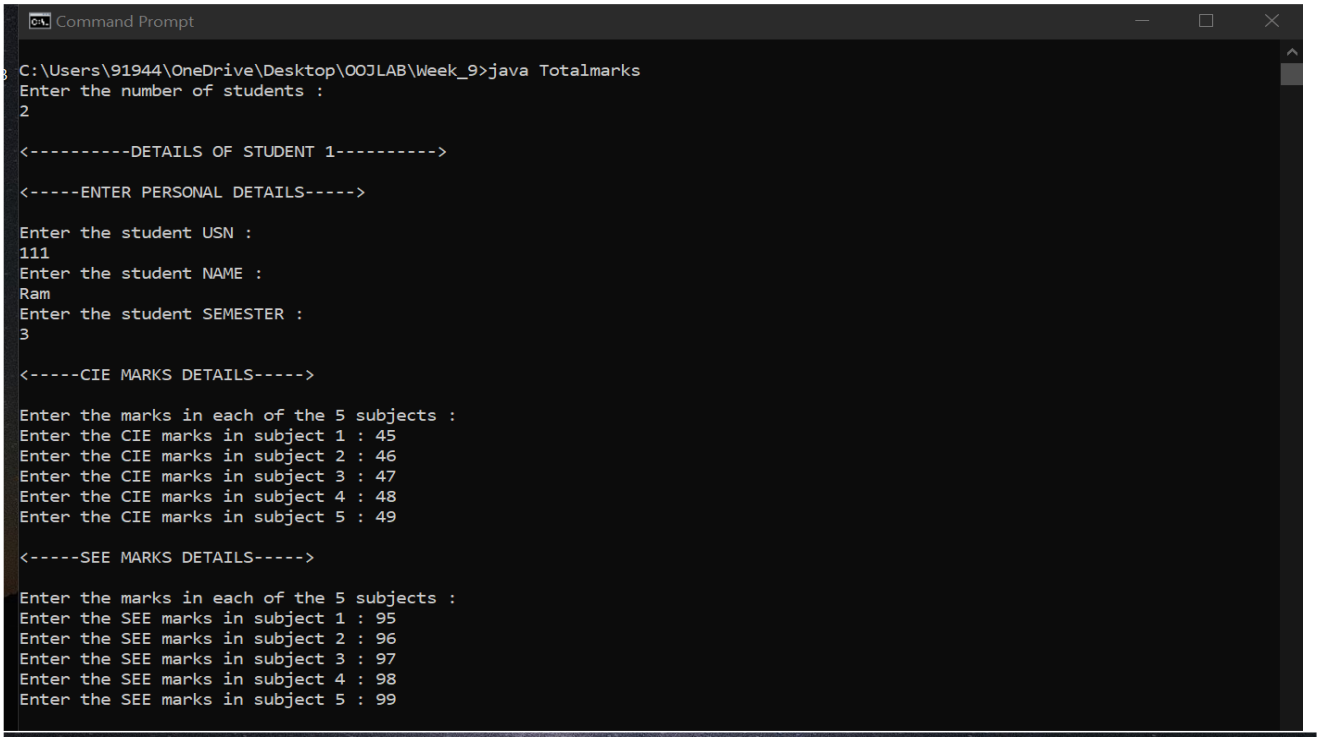
//External.java file.

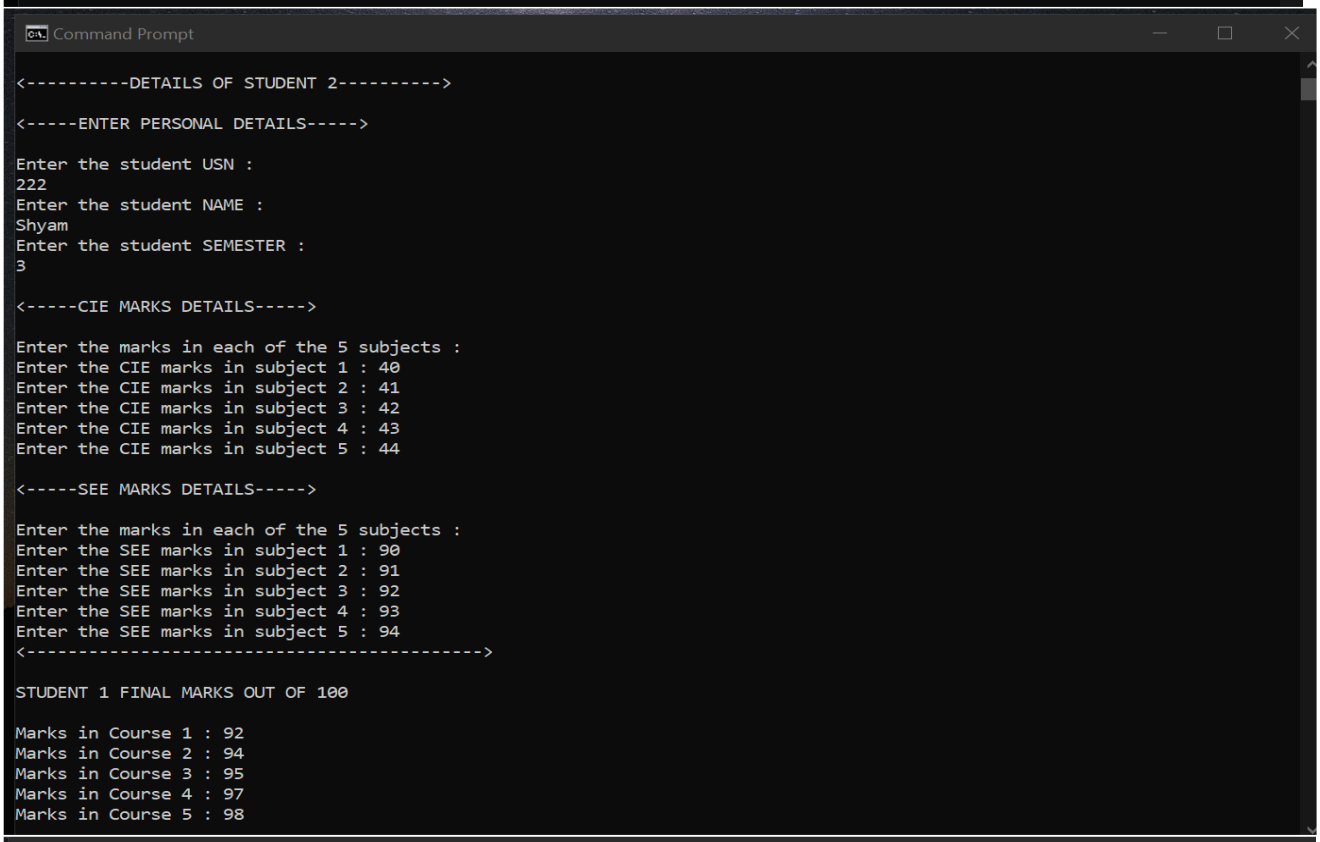
```
package SEE;
import java.util.Scanner;
import CIE.Student;

public class Externals extends CIE.Student
{
```

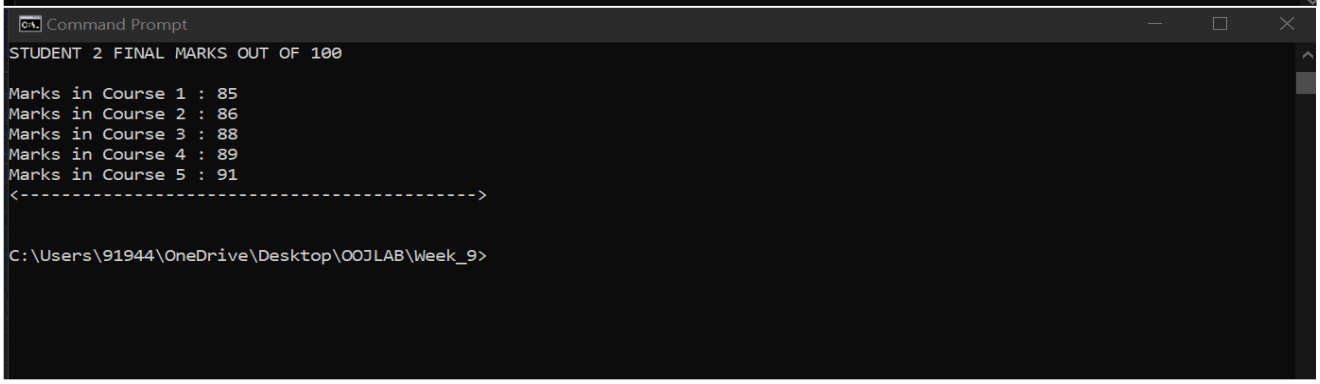
```
public int n=5;
public int see[] = new int[n];
public int i;
Scanner ss = new Scanner (System.in);

public void acceptsee()
{
   System.out.println("\nSEE marks Details");
   System.out.println("Enter the marks in
                  each of the "+n+" subjects:");
   for(i=0; i<n; i++)
   {
      System.out.println("Enter the SEE marks
                  in subject "+(i+1)+" :");
      see[i]= ss.nextInt();
   }
}
}

// Totalmarks.java (Driver class)
import CIE.*;
import SEE.*;
import java.util.Scanner;
class Totalmarks
{
   public static void main(String args[])
   {
      int n;
      int tot[][];
      Scanner ss = new Scanner(System.in);
      System.out.println("Enter the number of
                  students :");
```

```
n = ss.nextInt();
tot = new int[n][5];
CIE.Internals ci[] = new CIE.Internals[n];
SEE.Externals se[] = new SEE.Externals[n];
for(int i=0; i<n; i++)
{
    System.out.println("Details of Student " +
                       (i+1));
    ci[i] = new CIE.Internals();
    se[i] = new SEE.Externals();
    ci[i].accept();
    ci[i].acceptcie();
    se[i].acceptsee();
    for(int j=0; j<5; j++)
        tot[i][j] = ci[i].cie[j] +
                    (se[i].see[j]/2);
}
for(int i=0; i<n; i++)
{
    System.out.println("Student " + (i+1) +
                       " final marks out of 100");
    for(int j=0; j<5; j++)
    {
        System.out.println("Marks in course "
                           + (j+1) + " : " + tot[i][j]);
    }
}
}
```

OUTPUT :


Command Prompt
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_9>java Totalmarks
Enter the number of students :
2
<----------DETAILS OF STUDENT 1---------->
<-----ENTER PERSONAL DETAILS----->
Enter the student USN :
111
Enter the student NAME :
Ram
Enter the student SEMESTER :
3
<-----CIE MARKS DETAILS----->
Enter the marks in each of the 5 subjects :
Enter the CIE marks in subject 1 : 45
Enter the CIE marks in subject 2 : 46
Enter the CIE marks in subject 3 : 47
Enter the CIE marks in subject 4 : 48
Enter the CIE marks in subject 5 : 49
<-----SEE MARKS DETAILS----->
Enter the marks in each of the 5 subjects :
Enter the SEE marks in subject 1 : 95
Enter the SEE marks in subject 2 : 96
Enter the SEE marks in subject 3 : 97
Enter the SEE marks in subject 4 : 98
Enter the SEE marks in subject 5 : 99


Command Prompt
<----------DETAILS OF STUDENT 2---------->
<-----ENTER PERSONAL DETAILS----->
Enter the student USN :
222
Enter the student NAME :
Shyam
Enter the student SEMESTER :
3
<-----CIE MARKS DETAILS----->
Enter the marks in each of the 5 subjects :
Enter the CIE marks in subject 1 : 40
Enter the CIE marks in subject 2 : 41
Enter the CIE marks in subject 3 : 42
Enter the CIE marks in subject 4 : 43
Enter the CIE marks in subject 5 : 44
<-----SEE MARKS DETAILS----->
Enter the marks in each of the 5 subjects :
Enter the SEE marks in subject 1 : 90
Enter the SEE marks in subject 2 : 91
Enter the SEE marks in subject 3 : 92
Enter the SEE marks in subject 4 : 93
Enter the SEE marks in subject 5 : 94
<-->
STUDENT 1 FINAL MARKS OUT OF 100
Marks in Course 1 : 92
Marks in Course 2 : 94
Marks in Course 3 : 95
Marks in Course 4 : 97
Marks in Course 5 : 98


Command Prompt
STUDENT 2 FINAL MARKS OUT OF 100
Marks in Course 1 : 85
Marks in Course 2 : 86
Marks in Course 3 : 88
Marks in Course 4 : 89
Marks in Course 5 : 91
<-->
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_9>

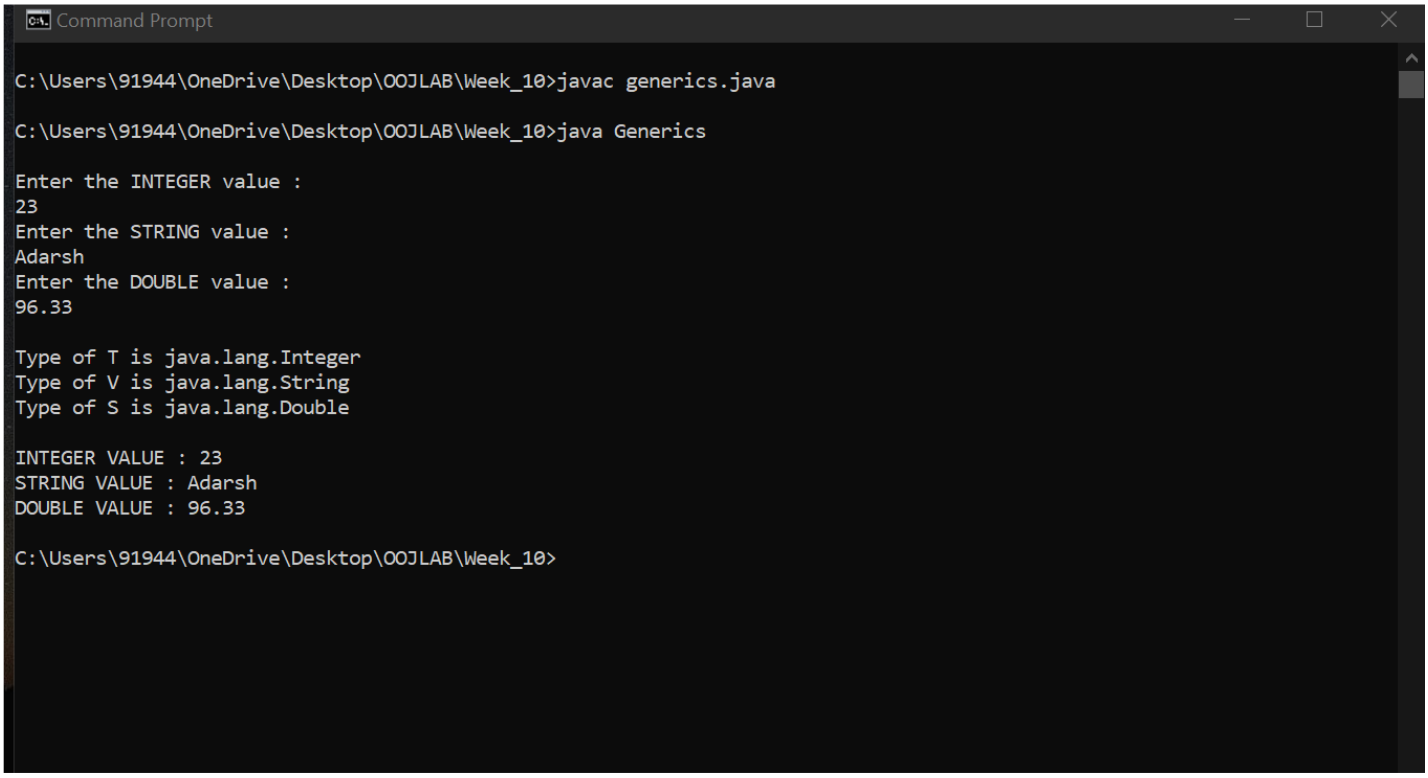
LAB PROGRAM – 7

Write a program to demonstrate generics with multiple object parameters.

```
Lab Program – 7.

import java.util.Scanner;
class ThreeGen<T, V, S>
{
    T ob1;
    V ob2;
    S ob3;

    ThreeGen(T o1, V o2, S o3)
    {
        ob1 = o1;
        ob2 = o2;
        ob3 = o3;
    }

    void showTypes()
    {
        System.out.println("\nType of T is " +
                           ob1.getClass().getName());
        System.out.println("Type of V is " +
                           ob2.getClass().getName());
        System.out.println("Type of S is " +
                           ob3.getClass().getName());
    }
    T getob1()
    {
        return ob1;
    }
    V getob2()
    {
        return ob2;
    }
```

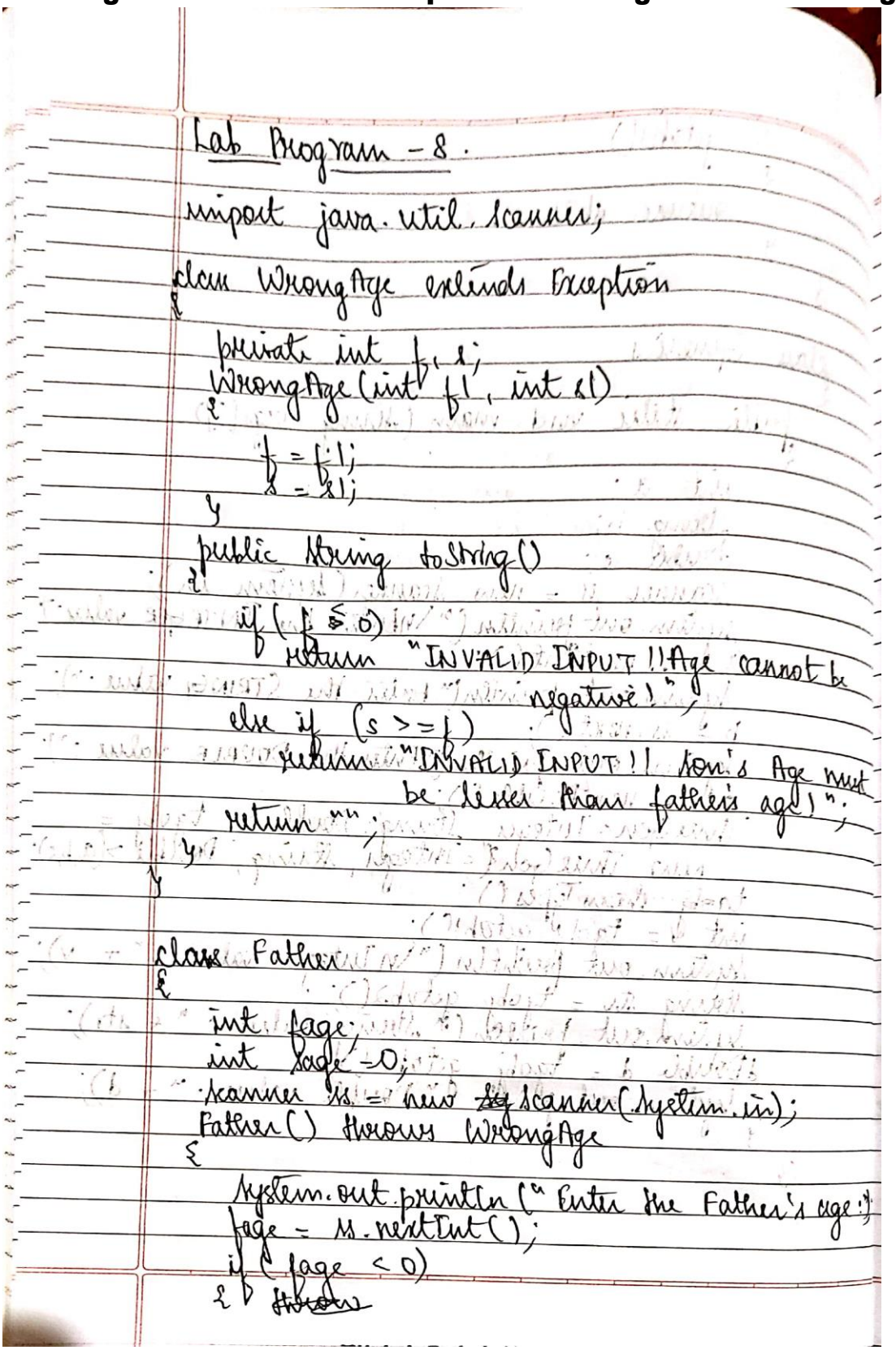
```
S getob3()
{
    return ob3;
}
}

class Generics
{
public static void main(String args[])
{
    int a;
    String b;
    Double c;
    Scanner ss = new Scanner(System.in);
    System.out.println("\nEnter the INTEGER value:");
    a = ss.nextInt();
    System.out.println("Enter the STRING value:");
    b = ss.next();
    System.out.println("Enter the DOUBLE value:");
    c = ss.nextDouble();
    ThreeGen<Integer, String, Double> tgobj =
        new ThreeGen<Integer, String, Double>(a,b,c);
    tgobj.showTypes();
    int v = tgobj.getob1();
    System.out.println("\n Integer value :" + v);
    String str = tgobj.getob2();
    System.out.println(" String value : " + str);
    Double d = tgobj.getob3();
    System.out.println(" Double value :" + d);
}
}
```

OUTPUT :


Command Prompt
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>javac generics.java
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>java Generics
Enter the INTEGER value :
23
Enter the STRING value :
Adarsh
Enter the DOUBLE value :
96.33
Type of T is java.lang.Integer
Type of V is java.lang.String
Type of S is java.lang.Double
INTEGER VALUE : 23
STRING VALUE : Adarsh
DOUBLE VALUE : 96.33
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>

LAB PROGRAM – 8

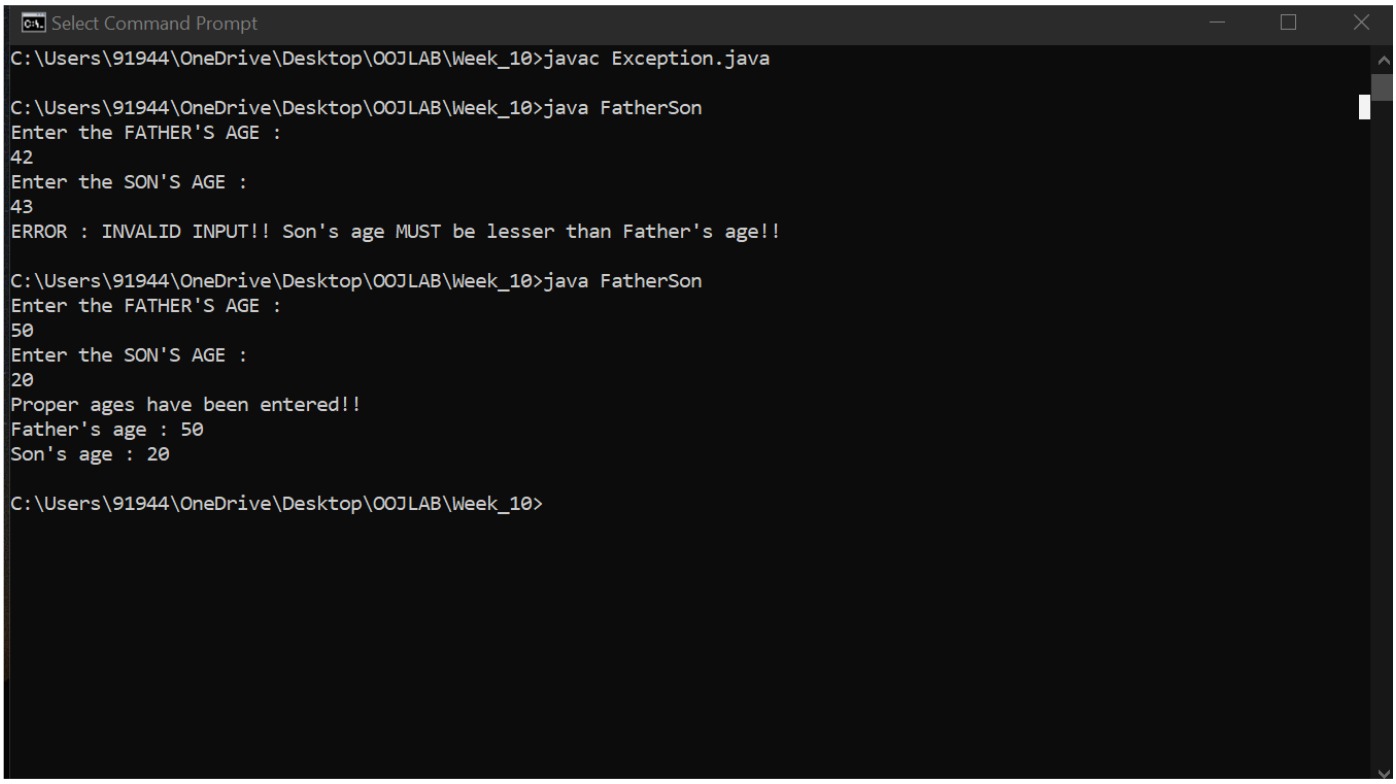
Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception Wrong Age( ) when the nput age<0. In Son class, implement a constructor that cases both father and son's age and throws an exception if son's age is >=father's age.



```
Lab Program - 8.

import java.util.Scanner;

class WrongAge extends Exception
{
  private int f, s;
  WrongAge(int f1, int s1)
  {
    f = f1;
    s = s1;
  }
  public String toString()
  {
    if (f <= 0)
      return "INVALID INPUT !! Age cannot be
                negative!";
    else if (s >= f)
      return "INVALID INPUT !! Son's Age must
                be lesser than father's age!";
    return "";
  }
}

class Father
{
  int fage;
  int sage = 0;
  Scanner ss = new Scanner(System.in);
  Father() throws WrongAge
  {
    System.out.println("Enter the Father's age:");
    fage = ss.nextInt();
    if (fage < 0)
    { throw
```

```
            throw new WrongAge(fage, sage);
        }
    }
}

class Son extends Father
{
    Scanner ss = new Scanner(System.in);
    Son() throws WrongAge
    {
        System.out.println("Enter the son's age:");
        sage = ss.nextInt();
        if(sage <= fage)
        {
            throw new WrongAge(fage, sage);
        }
        else
        {
            System.out.println("Proper ages have been entered!!");
            System.out.println("Father's Age : " + fage);
            System.out.println("Son's Age : " + sage);
        }
    }
}

class FatherSon
{
    public static void main(String args[])
    {
        try {
            Son s = new Son();
        }
        catch(WrongAge e) {
            System.out.println("ERROR : " + e);
        }
    }
}
```

OUTPUT :


Select Command Prompt
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>javac Exception.java
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>java FatherSon
Enter the FATHER'S AGE :
42
Enter the SON'S AGE :
43
ERROR : INVALID INPUT!! Son's age MUST be lesser than Father's age!!
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>java FatherSon
Enter the FATHER'S AGE :
50
Enter the SON'S AGE :
20
Proper ages have been entered!!
Father's age : 50
Son's age : 20
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_10>

LAB PROGRAM – 9

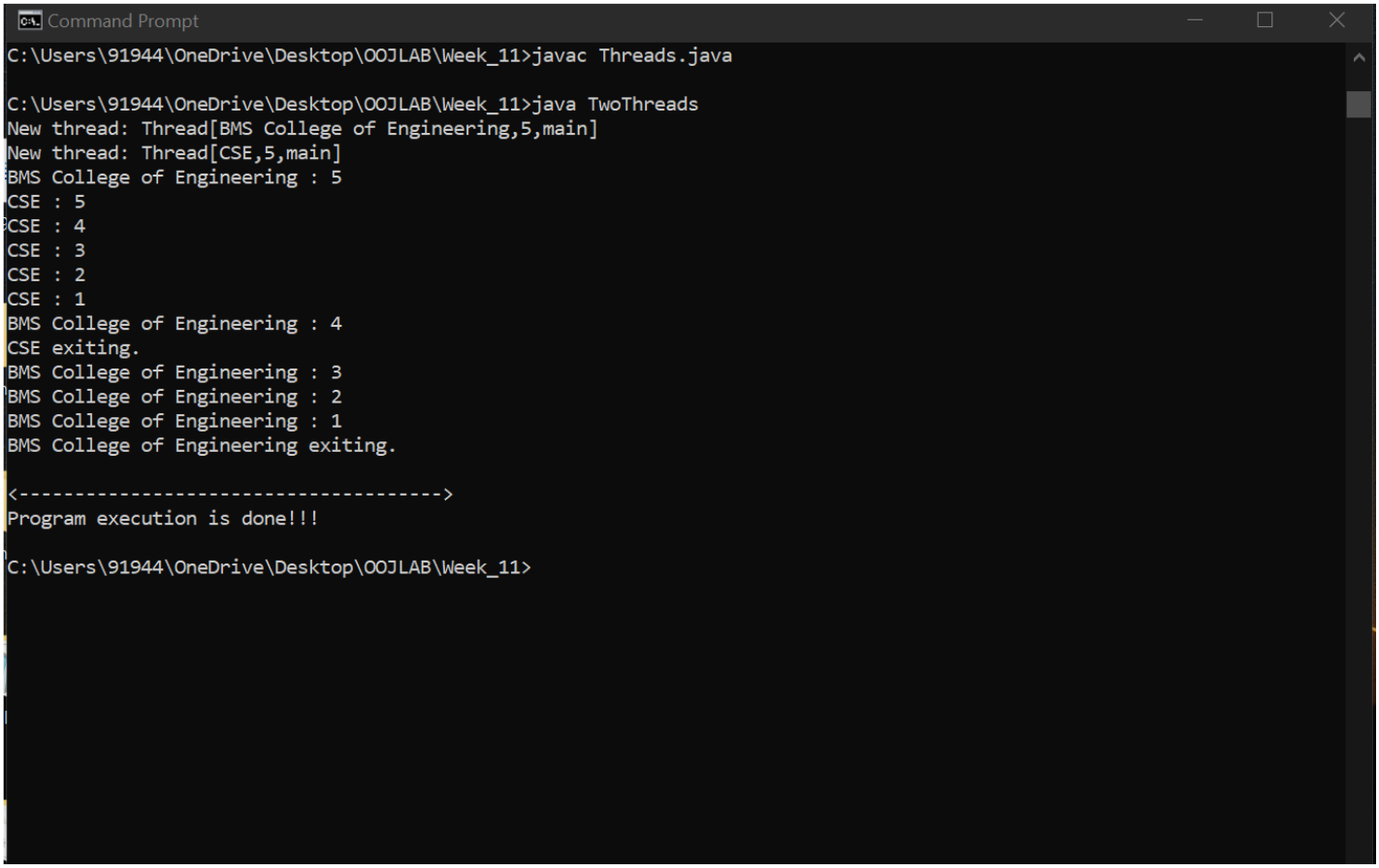
Write a program which creates two threads, one thread displaying "BMS College of Engineering" once every ten seconds and another displaying "CSE" once every two seconds.

Lab Program – 9

```
class CollegeThread implements Runnable
{
    String name;
    int time;
    Thread t;
    CollegeThread (String threadname, int sleeptime)
    {
        name = threadname;
        time = sleeptime;
        t = new Thread (this, name);
        System.out.println("New Thread : " + t);
        t.start();
    }

    public void run()
    {
        try
        {
            for(int i=5; i>0; i--)
            {
                System.out.println(name + " : " + i);
                Thread.sleep(time);
            }
        }
        catch(InterruptedException e)
        {
            System.out.println(name + " Interrupted");
        }
        System.out.println(name + " exiting");
    }
}
```

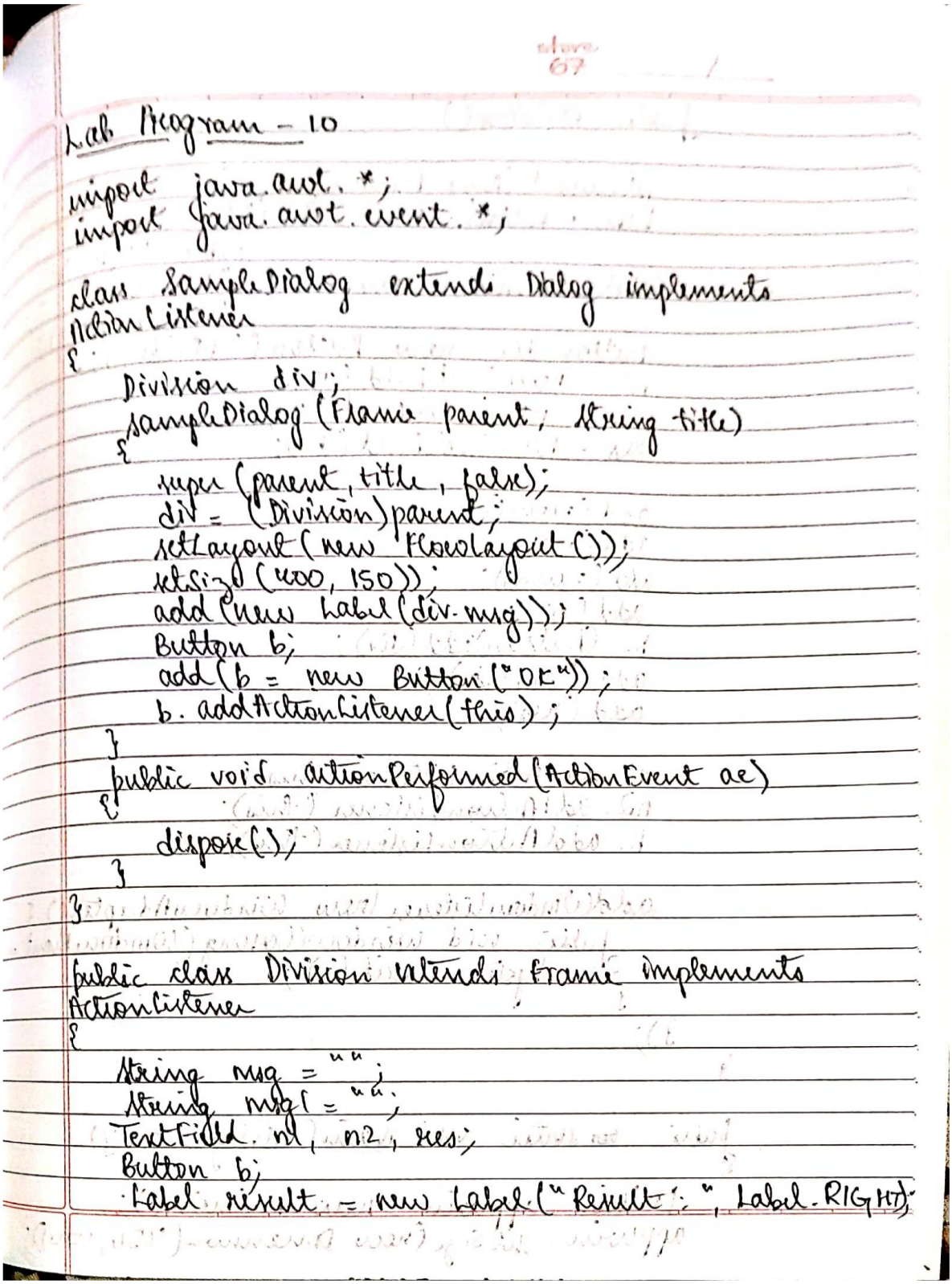
```
class TwoThreads
{
  public static void main(String args[])
  {
    new CollegeThread("BMS College of Engineering", 10000);
    new CollegeThread("CSE", 2000);
    try
    {
      Thread.sleep(52000);
      System.out.println("<---------->");
    }
    catch(InterruptedException e)
    {
      System.out.println("Main Thread Interrupted");
    }
    System.out.println("Program Execution done!");
  }
}
```

OUTPUT:


Command Prompt
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_11>javac Threads.java
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_11>java TwoThreads
New thread: Thread[BMS College of Engineering,5,main]
New thread: Thread[CSE,5,main]
BMS College of Engineering : 5
CSE : 5
CSE : 4
CSE : 3
CSE : 2
CSE : 1
BMS College of Engineering : 4
CSE exiting.
BMS College of Engineering : 3
BMS College of Engineering : 2
BMS College of Engineering : 1
BMS College of Engineering exiting.
<-------------------------------------->
Program execution is done!!!
C:\Users\91944\OneDrive\Desktop\OOJLAB\Week_11>

LAB 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.



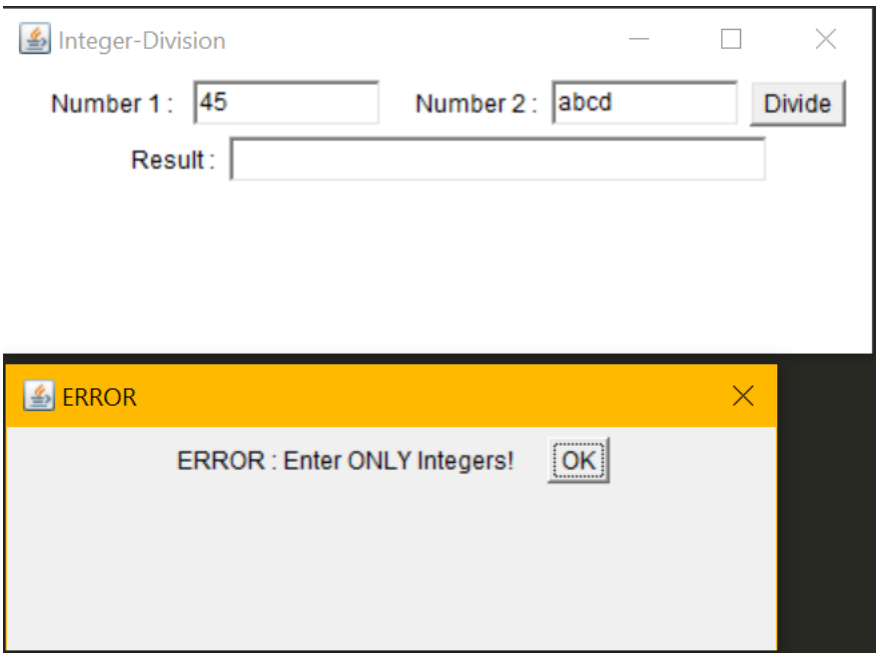
```
Lab Program - 10

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(200, 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);
```

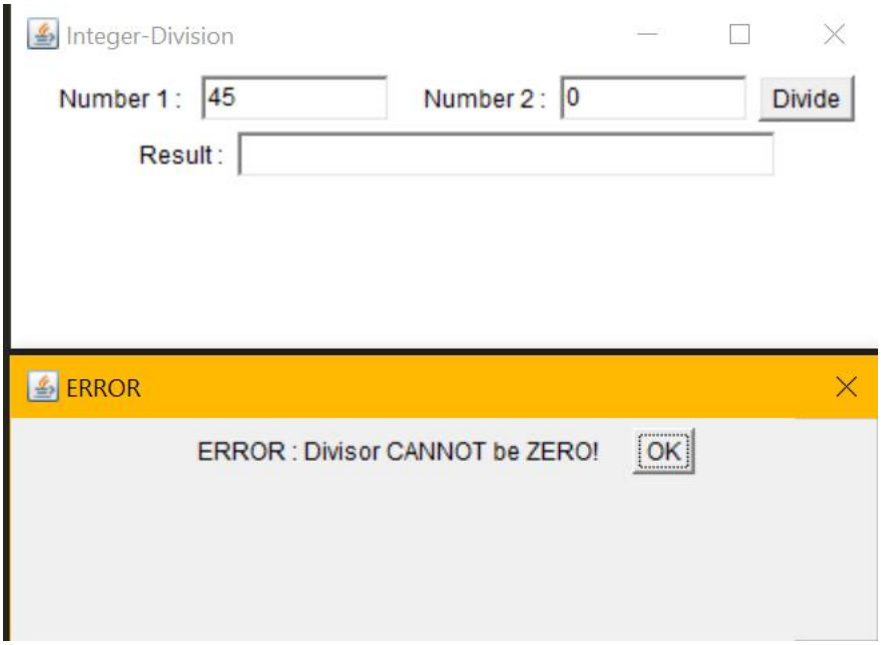
```
public Division()
{
    setLayout(new FlowLayout());
    Label num1 = new Label("Number 1 :"
                           Label.RIGHT);
    Label num2 = new Label("Number 2 :"
                           Label.RIGHT);
    Button div = new Button("Divide");
    n1 = new TextField(10);
    n2 = new TextField(10);
    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, 100));
```

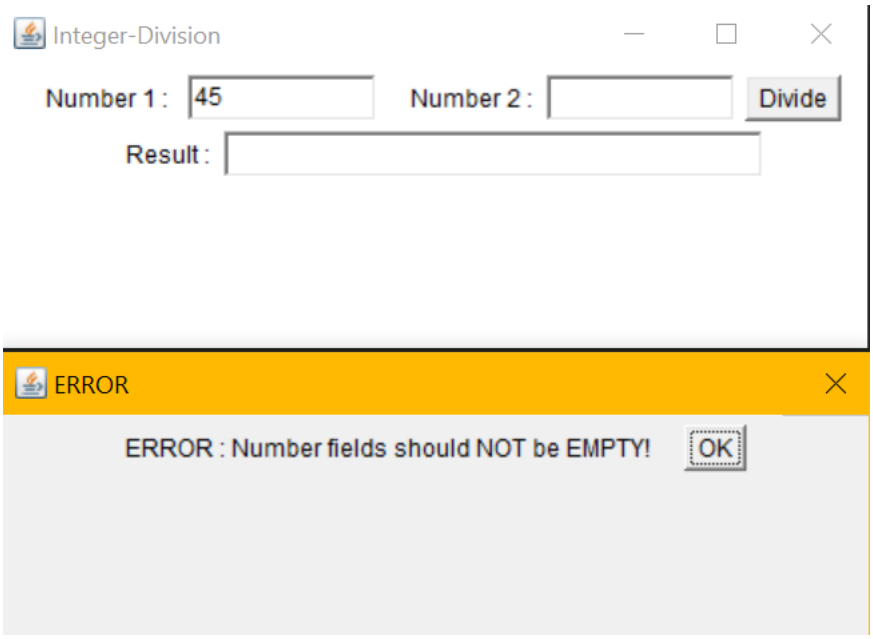
```
appwin.setTitle("Integer - Division");
appwin.setVisible(true);
}
public void actionPerformed(ActionEvent ae)
{
if(!(n1.getText().equals("")) && !(n2.getText().
                    equals("")))
{
    try
    {
        msg1 = "" + (Integer.parseInt(n1.getText()) /
                     Integer.parseInt(n2.getText()));
        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 : Division 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);
}
}
}
```

OUTPUT:




Integer-Division
Number 1 :
45
Number 2 :
0
Divide
Result :
ERROR
ERROR : Divisor CANNOT be ZERO!
OK


Integer-Division
Number 1 :
45
Number 2 :
Divide
Result :
ERROR
ERROR : Number fields should NOT be EMPTY!
OK