```
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("\n<-----SEE MARKS DETAILS----->\n");
		System.out.println("Enter the marks in each of the "+n+" subjects :");
		for(i = 0; i < n; i++)
		{
			System.out.print("Enter the SEE marks in subject "+(i+1)+" : ");
			see[i] = ss.nextInt();
		}
	}
}
```

```
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("\n<-----CIE MARKS DETAILS----->\n");
		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();
		}
	}
}
```

```
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("\n<-----ENTER PERSONAL DETAILS----->\n");
		System.out.println("Enter the student USN :");
		usn = ss.next();
		System.out.println("Enter the student NAME :");
		name = ss.next();
		System.out.println("Enter the student SEMESTER :");
		sem = ss.nextInt();
```

```
        }
    }
```

```
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("\n<----------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);
```

```
                }
            }
            System.out.println("<------------------------------------------>");
            for(int i = 0; i < n; i++)
            {
                System.out.println("\nSTUDENT "+(i+1)+" FINAL MARKS OUT OF 100\n");
                for(int j = 0; j < 5; j++)
                {
                    System.out.println("Marks in Course "+(j+1)+" : "+tot[i][j]);
                }
            }
            System.out.println("<------------------------------------------>\n");
        }
}
```

```
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("\n <---- ENTER PERSONAL
                      DETAILS ----> \n");
System.out.println("enter the student USN");
   usn = ss.next();
  System.out.println("Enter the student
                      NAME:");
   name = ss.next();
  System.out.println("Enter the student
    Semester \n");
   sem = ss.nextInt();
}
}
```

```
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("\n<--- CIE MARK
                      DETAILS--->\n");
System.out.println("enter the marks in
  each of the "+n+" subjects :");
for(i=0;i<n;i++)
{
  System.out.println("enter the CIE mark
    in subject "+(i+1)+":");
    cie[i]= ss.nextInt();
}
}
}
```

```
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("\n<----SEE Marks
                    Detail---->\n");
System.out.println("Enter the marks
                    in each of the "+n+"
                    subjects :\n");

for(i=0;i<n;i++)
{
System.out.print("enter the SEE mark
                    in subject "+(i+1)+": ");

        see[i] = ss.nextInt();
    }
}
}
```

```
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 no 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("\n<---- Detail 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);
      }
    }
  }
```

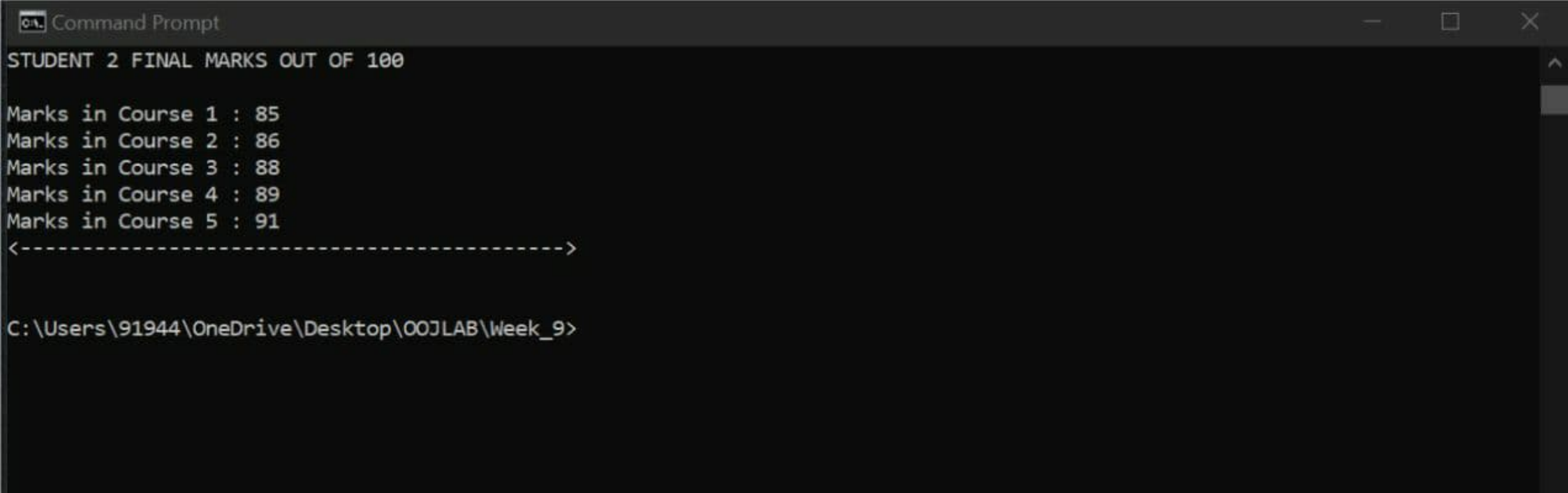
```
System.out.println("<---------->");
for (int i=0 ; i<n ; i++)
{
System.out.println("\n STUDENT" +(i+1) +
   "FINAL MARKS OUT OF 100\n");
for (int j =0 ; j<5 ;j++)
{
System.out.println("Marks in Course" +(j+1)
                  + " : " +tot[i][j]);
}
}
System.out.println("<---------->");
}
}
```

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
```

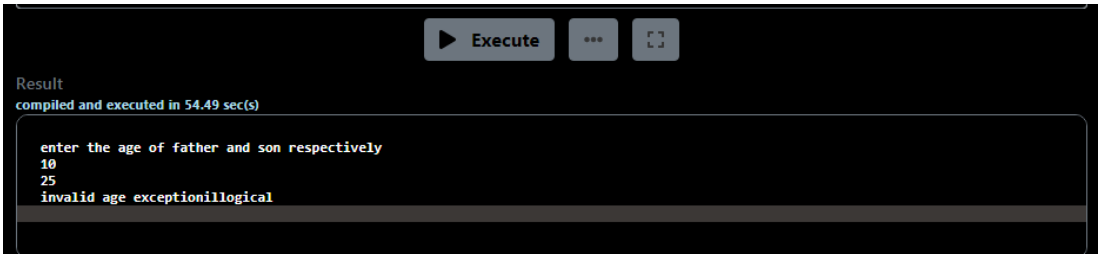
Command Prompt

```
<----------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 8:

```java
import java.util.*;
class Wrongage extends Exception{
    private String detail;
    Wrongage(String s)
    {
        detail=s;
    }
    public String toString(){
        return ("invalid age exception"+detail);
    }
}
class Father{
    int age;
    Father(int a){
        age=a;
    }
}
class Son extends Father{
    int age1;
    Son(int a,int b)
    {
        super(a);
        age1=b;
    }
}
public class abc{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        System.out.println("enter the age of father and son respectively");
        int m=sc.nextInt();
        int n=sc.nextInt();
        try{
        if(m<0)
                throw new Wrongage("negative");
        else if(n>=m)
                throw new Wrongage("illogical");
        else
        {
            Son ob=new Son(m,n);
            System.out.println("father's age:"+ob.age+"son's age"+ob.age1);
            }
        }
        catch (Wrongage e){
        System.out.println(e);
    }
}
}
```



```
import java.util.*;
class Wrongage extends Exception{
private String detail;
  Wrongage(String s){
   detail = s;
  }
public String toString() {
  return ["invalid age exception "+detail);
}}
class Fathes {
   int age;
   Fathes(int a){
    age = a;
  }
}
class Son extends Fathes {
int age1;
Son( int a, int b)
{
    super(a);
      age1 = b;
}}
```

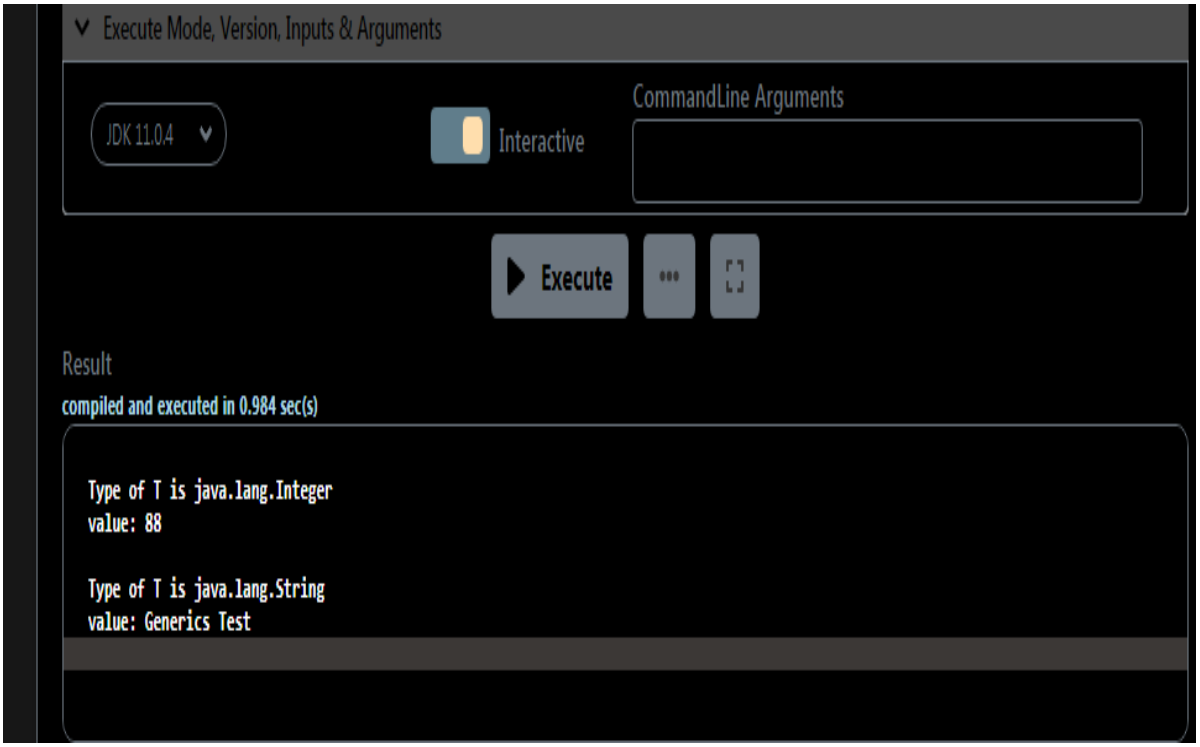
```
public class abc{
  public static void main(String[] args)
  {
Scanner sc= new Scanner(System.in);
System.out.println("enter the age of
        father & son respectively.");
int m = sc.nextInt();
int n = sc.nextInt();
try{
if (m<0)
    throw new Wrongage("negative");
else if (n>=m)
    throw new Wrongage("illogical");
 else{
    Son ob = new Son(m,n);
System.out.println("father's age :"+ob.
      age+"son's age:"+ob.age());
}
 catch(Wrongage e){
}}System.out.println(e);}
```

LAB 7

Project Name: generic

```
class Gen<T> {

T ob; // declare an object of type T

// Pass the constructor a reference to

// an object of type T.

Gen(T o) {

ob = o;

}

// Return ob.

T getob() {

return ob;

}

// Show type of T.

void showType() {

System.out.println("Type of T is " +

ob.getClass().getName());

}

}

public class GenDemo {

public static void main(String args[]) {

Gen<Integer>iob;

iob = new Gen<Integer>(88);

iob.showType();
```

```
iob.showType();

// Get the value in iOb. Notice that

// no cast is needed.

int v = iob.getob();

System.out.println("value: " + v);

System.out.println();

// Create a Gen object for Strings.

Gen<String>strob = new
Gen<String>("Generics Test");

// Show the type of data used by strOb.

strob.showType();

// Get the value of strOb. Again, notice

// that no cast is needed.

String str = strob.getob();

System.out.println("value: " + str);

}

}
```


Execute Mode, Version, Inputs & Arguments
JDK 11.0.4
Interactive
CommandLine Arguments
Execute
Result
compiled and executed in 0.984 sec(s)
Type of T is java.lang.Integer
value: 88
Type of T is java.lang.String
value: Generics Test

Lab 7

generic program:

```
class Gen<T>{
 T ob;
 Gen(T o){
 ob = o;
}
  T getob(){
   return ob;
  }
 void showType(){
System.out.println("Type of T is "+
                    ob.getClass().getName());
}
}
 public class GenDemo{
{ public static void main(String[] args)
  Gen<Integer> iob;
```

Date: / /

```
iob = new Gen<Integer>(88);
iob = iob.showType();
int v = iob.getob();
System.out.println("value :" +v);
System.out.println();

Gen<String> strob = new
Gen<String>("Generic Test");

strob.showType();

String str = strob.getob();
System.out.println("value :" + str);
}
}
```

```java
class thread1 implements Runnable
{
    Thread t;
    thread1()
    {
        t = new Thread(this,"thread1");
        t.start();
    }

    public void run()
    {
     for(;;)
    {
         try
         {
            System.out.println("BMS College Of Engineering");
            Thread.sleep(10000);
         }
        catch(InterruptedException ie)
        {
            System.out.println("Interrupted");
        }
    }
   }
}

class thread2 implements Runnable
{
    Thread t2;
    thread2()
    {
        t2 = new Thread(this,"thread2");
        t2.start();

    }

```

```java
     }

     public void run()
     {   for(;;)
     {
          try
          {
             System.out.println("CSE");
             Thread.sleep(2000);
          }
         catch(InterruptedException ie)
         {
             System.out.println("Interrupted");
         }
     }
   }
}

public class threadmain
{
    public static void main(String args[])
    {
       System.out.println("Enter CONTROL+C to stop");
        thread1 t1 = new thread1();
        thread2 t2 = new thread2();

    }
}
```

```
class Thread1 implements Run
{
 Thread t;
 Thread1() {
    t = new Thread(this, "The
    t.start();
 }

public void run()
  {  for(;;) {
     try {
   System.out.println("BMS coll
     Thread.sleep(10000);
   }
   catch (InterruptException ie
    System.out.println(" interup
  }}  }
}
```

Notes

```
class Thread2 implements Runnable
{
  Thread t2;
  Thread2(){
    t2 = new Thread(this, "Thread2");
    t2.start();
  }
public void run(){
  for(;;){
try{
System.out.println("CSE");
  Thread.sleep(2000);
} catch(InterruptedException ie){
  System.out.println("Interrupted");
}}}
}}
public class threadmain{
public static void main(String[] arg
{
System.out.println("Enter ctl+c to st
      Thread1 t1 = new Thread1();
      Thread2 t2 = new Thread2();
}}
}
```

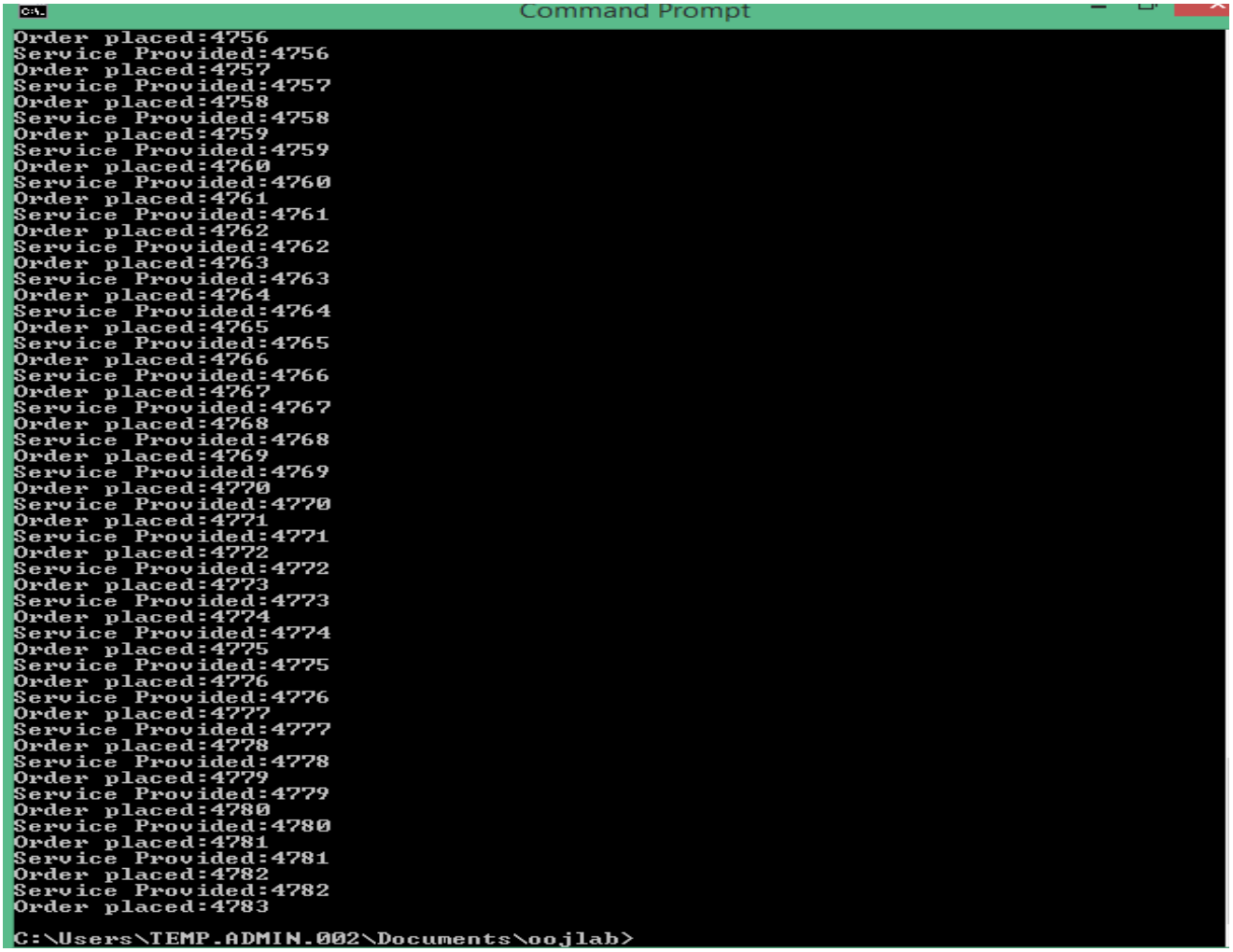
```
class CarService {

public static void main(String args[]){

Car_Queue q= new Car_Queue();

new Car_Owner(q);
new Car_Mechanic(q);

System.out.println("Press Ctrl+C to stop.");

}
}

class Car_Queue{

int n;

boolean valueSet = false;

synchronized int get()
{

while(!valueSet)

try{

wait();
```

```
}

catch (InterruptedException e)
{

System.out.println("InterruptedException caught");

}
System.out.println("Service Provided:"+n);

valueSet = false;

notify();

return n;

}

synchronized void put(int n)

{

while(valueSet)

try{

wait();
}
catch(InterruptedException e)
```

```
{

System.out.println("InterruptedException caught");

}

this.n=n;

valueSet = true;

System.out.println("Order placed:"+n);

notify();

}
}

class Car_Mechanic implements Runnable
{

Car_Queue q;

Car_Mechanic(Car_Queue q)
{

this.q=q;

new Thread(this,"Car_Mechanic").start();
}
```

```
public void run(){

int i=0;

while(true){

q.put(i++);



}
}
}

class Car_Owner implements Runnable {

Car_Queue q;

Car_Owner(Car_Queue q)
{

this.q=q;

new Thread(this,"Car_Owner").start();
}


public void run()
```

```
{


while(true)

{


q.get();

}

}}
```



```
class CarService {
public static void main(String args[])
{
Car_Queue q = new Car_queue();

new Car_Owner(q);
new Car_Mechanic(q);

System.out.println("press Ctrl+C to stop");
}
}
class Car_queue{

int n;

boolean valueSet = false;

synchronized int get()
{
while(!valueSet)
 try{
    wait();
 }
catch(InterruptedException e)
{
 System.out.println("InterruptedException caught");
}
 System.out.println("Service provided: "+n);
valueSet = false;
notify();
return n;
}
```

```
synchronized void put (int n)
{
 while (valueSet)
  try {
   wait();
  }
  catch (InterruptException e)
{
System.out.println ("InterruptedException
                                caught");
}
 this.n = n;
 valueSet = true;
 System.out.println ("Produced placed:"+n);
notify();
}
}

class Car_Mechanic implements Runnable
{
  Car_Queue q;
 Car_Mechanic (Car_Queue q)
 {
  this.q = q;
 new Thread (this, "Car_Mechanic").start();
}

 public void run(){

 int i = 0;
 while (true) {
q.put (i++);
 }
}
```

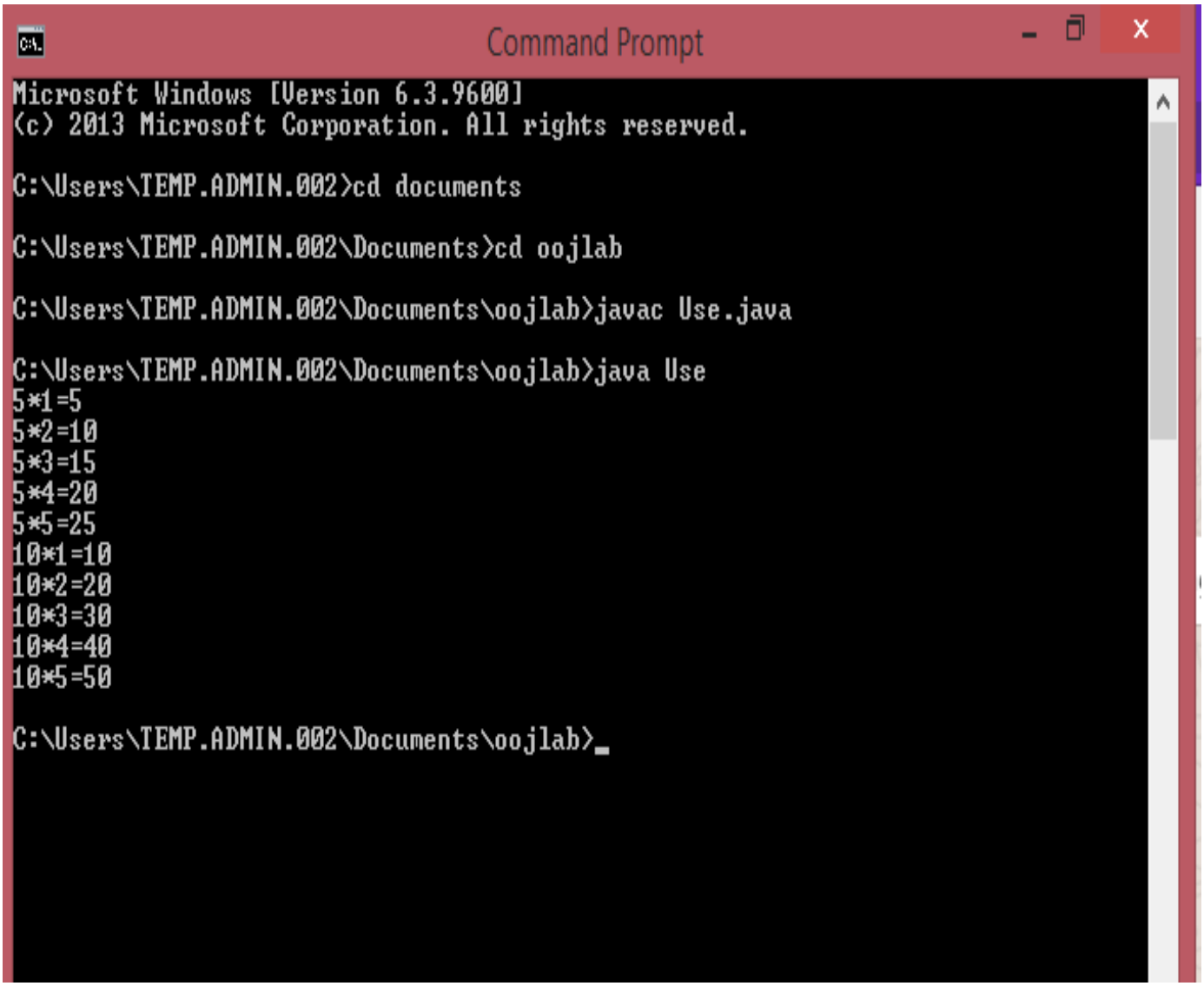
```
}
public void run()
{
while(true)
{
q.get();
}
}
}
```

```
class Table
{

void printTable(int n)
        {

synchronized(this)

{

for(int i=1;i<=5;i++)

{

System.out.println(+n+"*"+i+"="+(n*i));

try

{

Thread.sleep(400);

}

catch(Exception e)

{

System.out.println(e);
```

```
}

}

}

}
}


class Mythread1 extends Thread
{

Table t;

Mythread1(Table t)

{

this.t=t;

}

public void run()

{

t.printTable(5);
```

```
}
}


class Mythread2 extends Thread
{

Table t;

Mythread2(Table t)

{

this.t=t;

}

public void run()

{

t.printTable(10);

}

}
```

```
class Use
{

public static void main(String args[])

{

Table obj = new Table();

Mythread1 th1 = new Mythread1(obj);

Mythread2 th2 = new Mythread2(obj);

th1.start();

th2.start();

}

}
```


Command Prompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
C:\Users\TEMP.ADMIN.002>cd documents
C:\Users\TEMP.ADMIN.002\Documents>cd oojlab
C:\Users\TEMP.ADMIN.002\Documents\oojlab>javac Use.java
C:\Users\TEMP.ADMIN.002\Documents\oojlab>java Use
5*1=5
5*2=10
5*3=15
5*4=20
5*5=25
10*1=10
10*2=20
10*3=30
10*4=40
10*5=50
C:\Users\TEMP.ADMIN.002\Documents\oojlab>

```
class Table
{
void printTable(int n)
{
synchronized(this)
{
for(int i=1; i<=5; i++)
{
System.out.println(n+"*"+i+"="+(n*i));
try
{
Thread.sleep(400);
}
catch(Exception e)
{
System.out.println(e);
}}
}
}
}

class MyThread1 extends Thread
{
Table t;
MyThread1(Table t)
{
this.t=t;
}
public void run()
{
t.printTable(5);
}
}
```

```
class Mythread2 extends Thread
{
  Table t;
  Mythread2(Table t)
  {
    this.t = t;
  }
}

  class Use
  {
  public static void main(String a
  {
    Table obj = new Table();
    Mythread1 th1 = new Mythread1(o
    Mythread2 th2 = new Mythread2(ob

    th1.start();
    th2.start();
  }
}
```

Lab Program 10

Q) Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num 1 & Num 2. The division of Num 1 & Num 2 is displayed in the Result field when the Divide button is clicked. If Num 1 or Num 2 were not an integer, the program would throw a Number format Exception if Num 2 zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

A.
```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
public class integerdivision extends Frame implements ActionListener{
TextField n1, n2, res;
Label In1, In2, Ires;
Button b;
public integerdivision(){
setLayout(new FlowLayout());
Label In1 = new Label("Number 1", Label.RIGHT);
Label In2 = new Label("Number 2", Label.RIGHT);
Label Ires = new Label("RESULT", Label.RIGHT);
n1 = new TextField(12);
n2 = new TextField(8);
res = new TextField(10);
b = new Button("DIVIDE");
add(In1);
add(n1);
add(In2);
add(n2);
add(b);
add(Ires);
add(res);
```

```
b.addActionListener(this);
addWindowListener(new WindowAdapter1());
}
public void actionPerformed(ActionEvent ae){
if(ae.getSource()==b){
try{
int num1=Integer.parseInt(n1.getText());
int num2=Integer.parseInt(n2.getText());
int num3 = num1/num2;
res.setText(String.valueOf(num3));
}catch(NumberFormatException ne){
JOptionPane.showMessageDialog(this,ne,"ERROR",JOptionPane.ERROR_
MESSAGE);
}catch(ArithmeticException a){
JOptionPane.showMessageDialog(this,a,"ERROR",JOptionPane.ERROR_MESS
AGE);
}}}
public static void main(String args[]){
integerdivision i = new integerdivision();
i.setSize(new Dimension(400,400));
i.setTitle("INTEGER DIVISION OF TWO NUMBERS");
i.setVisible(true);
}
class WindowAdapter1 extends WindowAdapter{
public void windowClosing(WindowEvent we){
System.exit(0);
}}}
```

integerdivision - Notepad

File Edit Format View Help

```
import javax.swing.*;
public class integerdivision extends Frame implements ActionListener{
 TextField n1,n2,res;
 Label ln1,ln2,lres;
 Button b;
 public integerdivision(){
 setLayout(new FlowLayout());
 Label ln1=new Label("NUMBER 1",Label.RIGHT);
 Label ln2=new Label("NUMBER 2",Label.RIGHT);
 Label lres=new Label("RESULT",Label.RIGHT);
 n1=new TextField(12);
 n2=new TextField(8);
 res=new TextField(10);
 b=new Button("DIVIDE");
 add(ln1);
 add(n1);
 add(ln2);
 add(n2);
 add(b);
 add(lres);
 add(res);
 b.addActionListener(this);
 addWindowListener(new WindowAdapter1());
}
public void actionPerformed(ActionEvent ae)
{
 if(ae.getSource()==b)
```

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integerdivision - Notepad

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```
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
public class integerdivision extends Frame implements ActionListener{
 TextField n1,n2,res;
 Label ln1,ln2,lres;
 Button b;
 public integerdivision(){
 setLayout(new FlowLayout());
 Label ln1=new Label("NUMBER 1",Label.RIGHT);
 Label ln2=new Label("NUMBER 2",Label.RIGHT);
 Label lres=new Label("RESULT",Label.RIGHT);
 n1=new TextField(12);
 n2=new TextField(8);
 res=new TextField(10);
 b=new Button("DIVIDE");
 add(ln1);
 add(n1);
 add(ln2);
 add(n2);
 add(b);
 add(lres);
 add(res);
 b.addActionListener(this);
 addWindowListener(new WindowAdapter1());
}
public void actionPerformed(ActionEvent ae)
```

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integerdivision - Notepad

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```
 b.addActionListener(this);
 addWindowListener(new WindowAdapter1());
}
public void actionPerformed(ActionEvent ae)
{
 if(ae.getSource()==b)
 {
 try{
 int num1=Integer.parseInt(n1.getText());
 int num2=Integer.parseInt(n2.getText());
 int num3=num1/num2;
 res.setText(String.valueOf(num3));
 }catch(NumberFormatException ne ){
 JOptionPane.showMessageDialog(this,ne,"ERROR",
JOptionPane.ERROR_MESSAGE);
 }
 catch(ArithmeticException a){
 JOptionPane.showMessageDialog(this,a,"ERROR",
JOptionPane.ERROR_MESSAGE);
 }
}
}
public static void main(String args[])
 {
 integerdivision i=new integerdivision();
 i.setSize(new Dimension(400,400));
```

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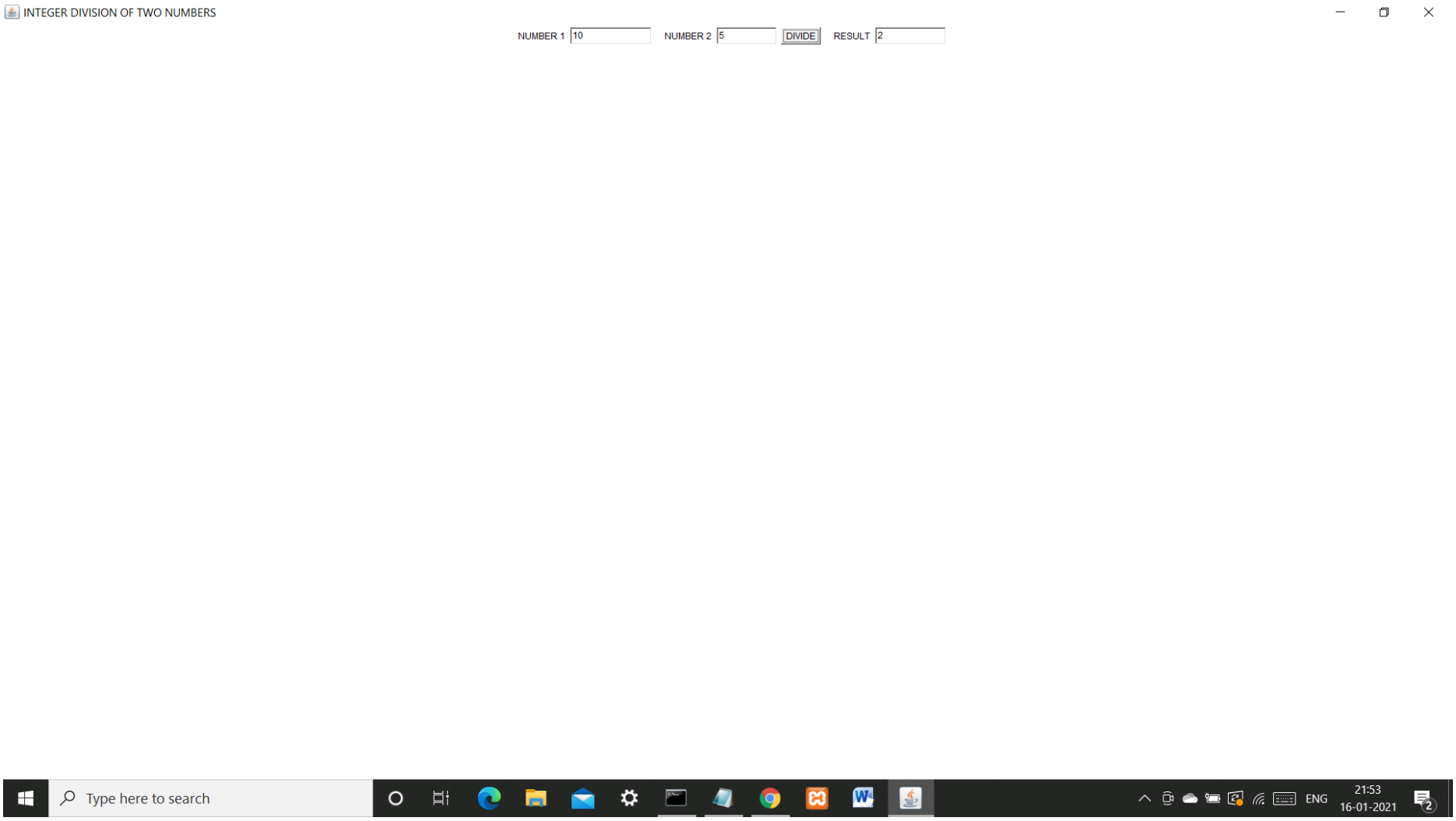
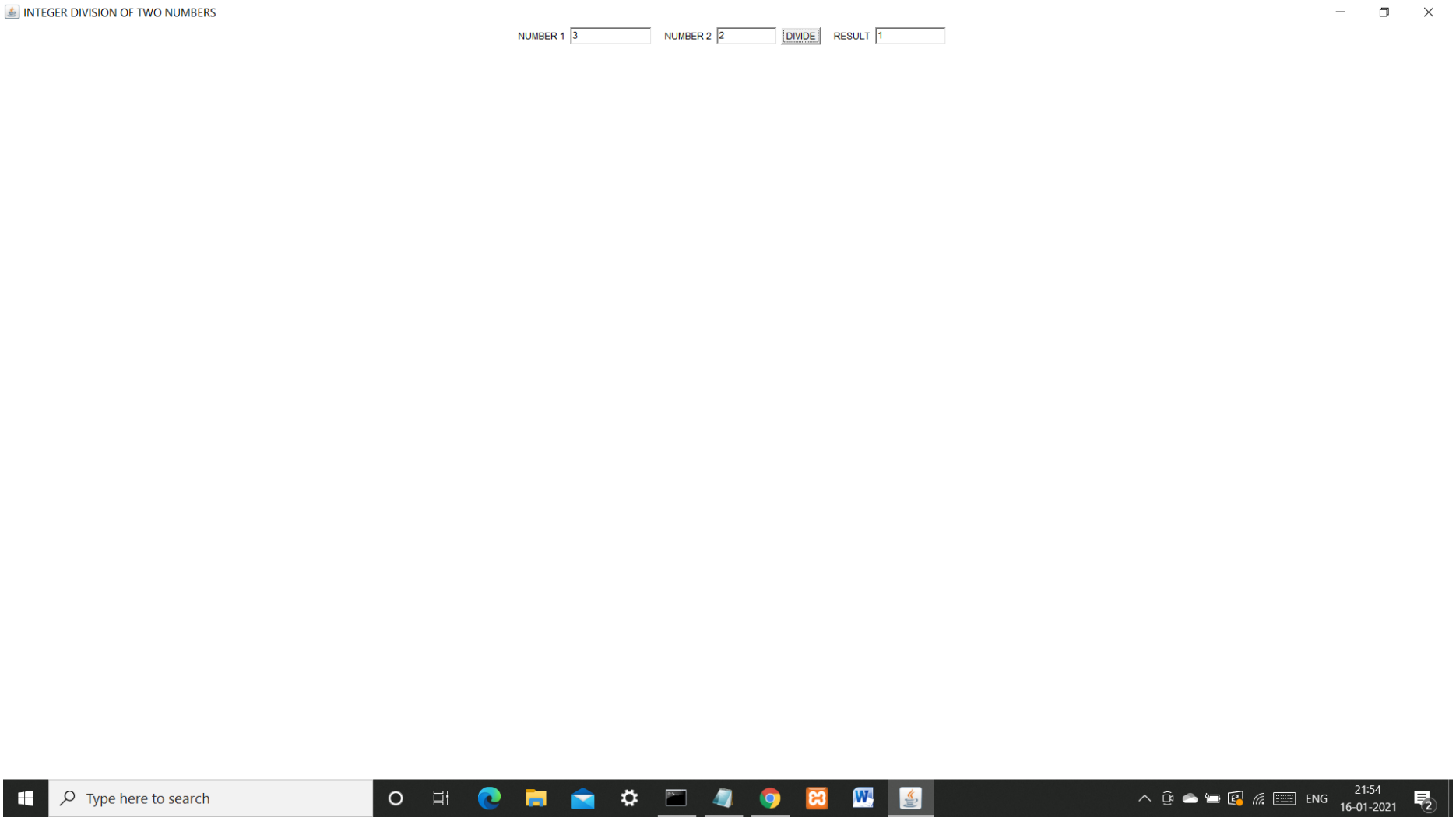
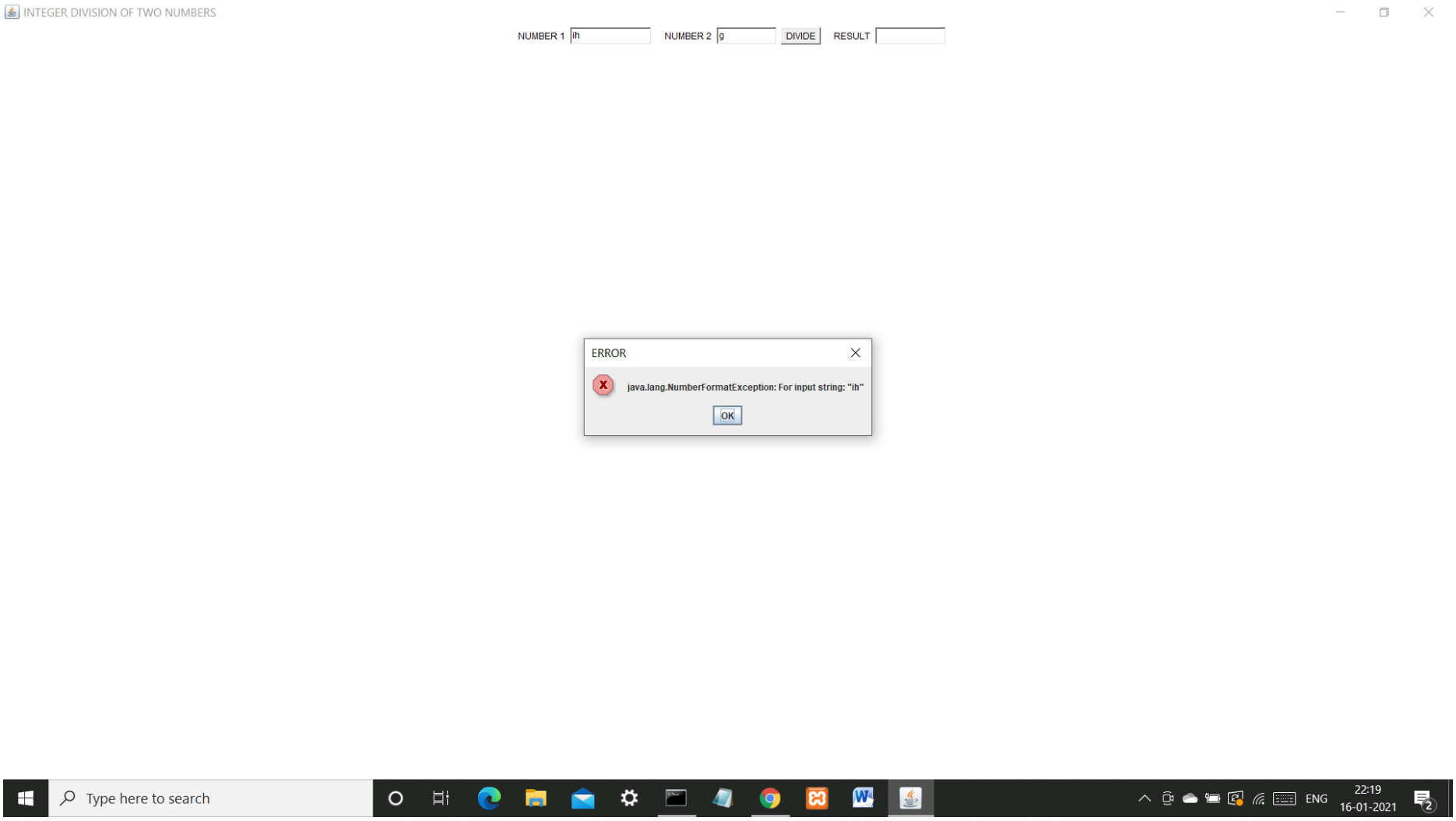

INTEGER DIVISION OF TWO NUMBERS
NUMBER 1 10
NUMBER 2 5
DIVIDE
RESULT 2
Type here to search
ENG
21:53
16-01-2021


INTEGER DIVISION OF TWO NUMBERS
NUMBER 1 3
NUMBER 2 2
DIVIDE
RESULT 1
Type here to search
ENG
21:54
16-01-2021


INTEGER DIVISION OF TWO NUMBERS
NUMBER 1 ih
NUMBER 2 g
DIVIDE
RESULT
ERROR
java.lang.NumberFormatException: For input string: "ih"
OK
Type here to search
ENG
22:19
16-01-2021