LAB. PROGRAMS.

NAME: ANSHUL H. SURA
USN: 1BM19CS020

Week 3 (Lab 1) **LAB-1**

Q-1) Develop a Java Program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solutions.

→
```
import java.util.Scanner;
import java.lang.Math;
class quadeqn
{
    public static void main(String args[])
    {   int a,b,c,d;
        double r1, r2;
        Scanner get = new Scanner (System.in);
        System.out.println("Enter three coeffecients
                according to decreasing power
                of x:\n");
        a=get.nextInt();
        b=get.nextInt();
        c=get.nextInt();
        System.out.println("a="+a+" b="+b+" c="+c);
        d=b*b-4*a*c;
        if(d>0)
        { System.out.println("Roots are real and unequal");
          r1=(-b+Math.sqrt(d))/(2*a);
          r2=(-b-Math.sqrt(d))/(2*a);
          System.out.println("\nr1="+r1+" r2="+r2);
        }
        else
        if(d==0)
```


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```
{ System.out.println(" Roots are real and equal");
  r1 =(-b)/(2*a);
  System.out.println("\nr = " +r1);
 }
else
 if(d<0)
System.out.println(" Roots are imaginary");
 }
}
```


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Command Prompt

```
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C:\Users\AKSHAT SURANA>cd C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac quadeqn.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java quadeqn
Enter the three coefficients according to decresing power of x:

1
2
3
a=1 b=2 c=3
Roots are imaginary

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java quadeqn
Enter the three coefficients according to decresing power of x:

-4
8
0
a=-4 b=8 c=0
Roots are real and unequal

r1= -0.0 r2=2.0

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java quadeqn
Enter the three coefficients according to decresing power of x:

1
-2
1
a=1 b=-2 c=1
Roots are real and equal

r= 1.0

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-2

NAME: ANSHUL H. SURANA
USN: 1BM19CS020

Week 4 (Lab 2) [LAB-2]

Q-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 int marks[];
    private double sgpa;

    void getDetails (int n)
{
    System.out.println("Enter Students details:\n");
    Scanner get = new Scanner (System.in);
    System.out.println(" USN:");
    usn= get.next();
    System.out.println("Name:");
    name = get.next();
    marks = new int [n];
    credits = new int [n];
    System.out.println("Enter marks and credits
                        respectively:");
    for (int i=0; i<n; i++)
{ System.out.println("\nSubject" + (i+1));
    marks [i]= sl.nextInt();
```

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```
    credits [i] = sl.nextInt();
  }
}

void calcsgpa (int n)
{   double sum =0, sgpa, sumc=0;
    for (int i=0; i<n; i++)
    { sum= (marks [i] /10+1) * credits [i] +sum;
      sum= credits [i] +sumc;
    }
    sgpa = sum/sumc;
    System.out.println (" SGPA :" +sgpa);
}
void printDetails (int n)
{
    System.out.println ("\n USN :" + usn);
    System.out.println (" NAME :" +name);
    System.out.println (" MARKS\t CREDIT");

    for (int i=0; i<n; i++)
    System.out.println(marks [i]+ " \t"+ credits [i]);
    calcsgpa(n);
  }
}
class StudentMain
{
    public static void main (String ss[])
    {   int n;
        System.out.println ("Enter the no. of subjects:");
        Scanner get= new Scanner (System.in);
        n= get.nextInt();
        Student s1= new Student();
        s1.getDetails (n);
        s1.printDetails (n);
    }
```

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Command Prompt

```
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C:\Users\AKSHAT SURANA>cd C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac sgpa.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java StudentMain
Enetr the no of subjects:
3
Enter Students details:

USN:
1
Name:
Rahul
Enter marks and credits respectively:

Subject 1
80
8

Subject 2
67
6

Subject 3
95
9

USN:1
NAME:Rahul
MARKS   CREDIT
80      8
67      6
95      9
SGPA :8.869565217391305

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-3.

LAB-3

NAME: ANSHUL H. SURAN
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Q-3) Create a class Book which contains four members: name, author, price, num_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

→
```
import java.util.Scanner;
class book
{ String name, author;
    int price, num_pages;

  void book()
  { name = " ";
    author = " ";
    price = 0;
    num_pages = 0;
  }
void get1()
{
 Scanner get = new Scanner (System.in);
 System.out.println("\n Enter the name:");
 name = get2.next();
 System.out.println(" Enter the author:");
 author = get2.next();
 System.out.println(" Enter the price:");
 price = get2.nextInt();
 System.out.println(" Enter the no. of pages:");
 price = get2.nextInt();
}
```


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```
void out()
{ System.out.println ("NAME: "+name);
  System.out.println ("AUTHOR: "+author);
  System.out.println ("PRICE: "+price);
  System.out.println ("PAGES: "+num_pages);
}
public String toString()
{ return ("\nNAME: "+name+"\nAUTHOR:"+
          author+"\nPRICE:"+price+"\nPAGES:
          "+num_pages);
}
}
class Main
{ public static void main (String args[])
  { Scanner get=new Scanner (System.in);
    int n, ch;
    System.out.println ("Enter the no. of books
                         to be entered:");
    n= get.nextInt();
    book b[]= new book[n];
    for (int i=0; i<n; i++)
    { b[i]= new book();
      b[i].get();
    }
    System.out.println ("Display");
    ch= get.nextInt();
    switch(ch)
    { case 1: for (int i=0; i<n; i++)
        { b[i].out(); }
        break;
      case 2: for (int i=0, i<n; i++)
        { System.out.println(b[i]); }
        break;
      default: System.out.println ("Enter valid no.");
} } }
```

Akshith Suram

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Command Prompt

```
C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java book2Main
Enter the no of books to be entered:
1

Enter the name:
Javabook
Enter the author:
Balasubramanyam
Enter the price:
790
Enter the no of pages:
1500
Display
1.Function Method
2.String method
Enter choice:
1
NAME: Javabook
AUTHOR: Balasubramanyam
PRICE: 1500
PAGES: 0

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-4.

LAB-4

NAME: ANSHUL H. SURANA
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Q-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.*;
abstract class Shape
{
    int l, b, r;
  Scanner input = new Scanner (System.in);
  abstract void printArea();
}
class Rectangle extends Shape
{
    void printArea()
  {
    System.out.println ("FOR RECTANGLE");
    System.out.println(" Enter length and breadth
    l = input.nextInt();
    b = input.nextInt();
  System.out.println(" The are of Rectangle
                is :" + l*b);
  }
}
class Triangle extends Shape
{ void printArea()
  { System.out.println(" FOR TRIANGLE ");
```


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```
System.out.print("Enter Base and Height");
    b = input.nextInt();
    h= input.nextInt();
  }
}
class Circle extends Shape
{   void printArea()
    { System.out.println("FOR CIRCLE");
      System.out.println("Enter Radius:");
      r= input.nextInt();
      System.out.println("The area of Circle is
                    " +3.14f * r * r );

    }
}

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


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Command Prompt

```
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C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac Abstract3.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java Abstract
For  Rectangle
Enter length and breadth:
10
15
The area of Rectangle is: 150
For  Triangle
Enter Base And Height:
5
10
The area of Triangle is: 25
For Circle
Enter Radius:
4
The area of Cricle is: 50.24

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-5

[LAB-5]

NAME: ANSHUL H. SURAMA
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Q-5) Develop a Java Program to create a class Bank that maintains two kinds of account for its customers, one called the savings account and the other current account. The savings account provides compound interest & withdrawal facilities but no cheque book facilities. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance & if the balance falls below the level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From these derive the classes Cur-act and Sav-act to make them more specific to their requirements. Include the necessary methods in order to achieve following task

- Accept deposit from customer & update the balance. • Display the balance. • Compute and deposit interest. • Permit withdrawal & update the balance. • Check for the minimum balance, impose penalty if necessary & update the balance.

Anshul H. Surama

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```
import java.util.Scanner;
import java.lang.Math;

class Account
{ String name, type, accno;
  double balance;

  void deposit()
  { Scanner get = new Scanner(System.in);
    double depo;
    System.out.println("Enter deposit:");
    depo = get.nextDouble();
    balance = balance + depo;
  }
  void withdraw()
  { Scanner get = new Scanner(System.in);
    double withdraw;
    System.out.println("Enter the amount
                        to withdraw:(<"+balance+"
    withdraw = get.nextDouble();
    balance = balance - withdraw;
    System.out.println("Balance:"+balance);
  }
}
class Curr_acct extends Account
{ int intr = 6;
  boolean cheque = true;
  void dispblnc()
  { System.out.println("Balance:"+balance);
  }
  void create()
{
```


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```
{ Scanner get = new Scanner (System.in);
  System.out.println ("Name:");
  name = get.next();
  accno = "current";
  System.out.println ("Account No:");
  accno = get.next();
  System.out.println ("Balance:");
  balance = get.nextDouble();
}
void check()
{ System.out.println("\n Minimum Balance:"+
                                    5000);
  if (balance < 5000)
  {
    System.out.println ("Penalty is
      imposed please deposit minimum
    +(5000-balance+200) +" Rs\nRS
                  200 Service charge");
    deposit();
    balance = balance - 200;
  }
  else
  { System.out.println("Balance:" +balance+
                                "Safe");}
  }
}
class Sav_acct extends Account
{ double intr = 7;
  boolean cheque = false;
  void displbnc()
{ System.out.println("Balance:"+balance)
  }
```


Ayshul H. Suma

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```
void create()
{ Scanner get = new Scanner(System.in);
  System.out.println("Name:");
  name = get.next();
  accno = "savings";
  System.out.println("Account No:");
  accno = get.next();
  System.out.println("Balance:");
  balance = get.nextDouble();
}
void calcint()
{ double interest;
  Scanner get = new Scanner(System.in)
  System.out.println("Enter time:");
  int time;
  time = get.nextInt();
  interest = balance * Math.pow(1+intr/10
                                  time) - balance;
  System.out.println("Interest:"+interest
  balance = balance + interest;
  System.out.println("Balance:"+balance
}
}
class Bank
{ public static void main(String args[])
  { Scanner get = new Scanner(System.in)
    String type;
    Sav_acct accs = new Sav_acct();
    Curr_acct accr = new Curr_acct();
    System.out.println("Enter type of account:
                        (current/savings)");
    type = get.next();
```


Anshul H. Suvarna

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```
if (type.equals("savings"))
    accs.create();
else if (type.equals("current"))
    acct.create();

int ch;
do
{ System.out.println("\n1. Deposit \n2. Display
        Balance \n3. Deposit Interest
    \n4. Withdraw \n5. Check \n6. Cheque
                Book (under development)
                \n7. Exit");
    ch = get.nextInt();
    switch (ch)
  { case 1: if (type.equals("savings"))
            accs.deposit();
        else
            acct.deposit();
        break;
    case 2: if (type.equals("savings"))
            accs.displbnc();
        else
            acct.displbnc();
        break;
    case 3: if (type.equals("savings"))
            accs.calcintt();
        else
            System.out.println("This account does
                not have this provision");
        break;
    case 4: if (type.equals("savings"))
            accs.withdraw();
        else
```


Anshul H. Sharma

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```
acc.withdraw();
    break;
case 5: if (type.equals("saving"))
    System.out.println("This account
                does not have
            this provision");
        else
            acc.check();
            break;
case 6: if (type.equals("savings"))
    System.out.println("This account
                does not have provision");
    break;
default: if (ch!=7)
        System.out.println("Enter valid
                option");
}

while (ch!=7);
}
```


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Command Prompt

```
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C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac bank.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java Bank
Enter type of account: (current/savings)
savings
Name :
Rohan
Account No :
18900970
Balance :
15000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
1
Enter the deposit :
2000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
2
Balance : 17000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
```

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Command Prompt

```
2000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
2
Balance : 17000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
3
Enter time:
3
Interest : 3825.7310000000034
Balance : 20825.731000000003

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
4
Enter the amount to withdraw: (<20825.731000000003)
2000
Balance : 18825.731000000003

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
```

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```
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5
This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
6
This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
7

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java Bank
Enter type of account: (current/savings)
current
Name :
Rohit
Account No :
1508770
Balance :
10000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
1
```

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Command Prompt

```
current
Name :
Rohit
Account No :
1508770
Balance :
10000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
1
Enter the deposit :
5000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
2
Balance : 15000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
3
This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
```

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Command Prompt

```
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
3
This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
4
Enter the amount to withdraw: (<15000.0)
5000
Balance : 10000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5

Minimum Balance : 5000
Balance : 10000.0Safe

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
6
```

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Command Prompt

```
6.Cheque Boook(under developemnt)
7.Exit
5

Minimum Balance : 5000
Balance : 10000.0Safe

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
6
This account does have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
7

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-6

[LAB-6]

NAME: ANSHUL H. SURANA
USN: 1BM19CS020

Q-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 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

→ Internals

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

    public void get()
{ System.out.println (" Enter Details");
  System.out.println (" USN :");
      usn = get.next();
  System.out.println (" NAME :");
  name = get.next()
```

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```
System.out.println ("SEMESTER");
    Sem = get.nextInt();
System.out.println ("CIE Marks");
    for (int i=0; i<5; i++)
{ System.out.println ("Subject" (1+i));
    cie [i] = get.nextInt();
}

public void disp()
{ System.out.println ("\n USN :"+usn);
    System.out.println ("NAME :" +name);
    System.out.println ("SEMESTER :"+sem);
    System.out.println ("CIE :");
    for (int i=0; i<5; i++)
{ System.out.println (cie [i]); }
    System.out.println ("SEE:");
}
}
```

Student

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

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

Externals.

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

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```
public class Externals extends CIE.Student
{ public int see[]= new int[5];
  Scanner get=new Scanner (System.in);

  public void getm()
  { for (int i=0; i<5; i++)
    { System.out.println( see[i]);
    }
  }
```

TotalMarks

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

Class TotalMarks
{ public static void main (String args[])
  { Scanner get= new Scanner (System.in);
    int n;
  System.out.println ("Enter the no of students:");
   n= get.nextInt();
  CIE.Internals ints[]= new CIE.Internals[n];
  SEE.Externals exts[]= new SEE.Externals[n];

  for (int i=0; i<n; i++)
  { int s[i] = new CIE.Internals();
    exts [i]= new SEE.Externals();
    ints[i]= get i()
  }
  for (int i=0 ; i<n; i++)
  { ints[i].disp i();
```

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```
        int  total=0;
    exts[i].dispsm();
    for(int j=0;  j<5; j++)
  { total= total + ints[i].cie[j] +
                        exts[i].see[j]; }
    System.out.println("TOTAL MARKS:"+
                        total);
    }

}
```

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Command Prompt

```
Microsoft Windows [Version 10.0.10586]
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C:\Users\AKSHAT SURANA>cd C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>javac Student.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>javac Internals.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>javac Externals.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>javac Totalmarks.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>java TotalMarks
Enetr the no of students:
2
Enter Details:
USN :
1
NAME :
Ketan
SEMESTER :
3
CIE MARKS :
Subject 1
40
Subject 2
28
Subject 3
24
Subject 4
35
Subject 5
38
SEE MARKS :
Subject 1
80
Subject 2
85
Subject 3
72
Subject 4
```

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Command Prompt

```
Subject 2
28
Subject 3
24
Subject 4
35
Subject 5
38
SEE MARKS :
Subject 1
80
Subject 2
85
Subject 3
72
Subject 4
94
Subject 5
70
Enter Details:
USN :
1
NAME :
Rohit
SEMESTER :
5
CIE MARKS :
Subject 1
25
Subject 2
20
Subject 3
34
Subject 4
38
Subject 5
39
SEE MARKS :
Subject 1
87
Subject 2
75
Subject 3
```

Search the web and Windows

22:48
28-12-2020

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Command Prompt

```
Subject 1
25
Subject 2
20
Subject 3
34
Subject 4
38
Subject 5
39
SEE MARKS :
Subject 1
87
Subject 2
75
Subject 3
80
Subject 4
89
Subject 5
95

USN :1
NAME :Ketan
SEMESTER :3
CIE :
40      28      24      35      38
SEE :
80      85      72      94      70
TOTAL MARKS : 566

USN :1
NAME :Rohit
EMESTER :5
IE :
5      20      34      38      39
EE :
7      75      80      89      95
OTAL MARKS : 582

:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS\package>
```

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LAB-7.

NAME: ANSHUL H. SUVARNA
USN: 1BM19CS020

LAB-7

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

```
class Gen <T,U,V>
{   T ob;
    U ob2;
    V ob3;
    Gen(T o, U o2, V o3)
    {   ob=o;
        ob2=o2;
        ob3=o3;
    }
    void showType()
    {
    System.out.println("ob" is of Type of T is"
                + ob.getClass().getName()).
    System.out.println(ob2+" is of Type
        of U is" + ob2.getClass().getName())
    System.out.println(ob3+" is of Type
        of V is" + ob3.getClass().getName());
    }
}

Class Main
{
    public static void main (String args[])
    {
        Gen<Integer, String, Double>
        obj = new Gen<Integer, String, Double>
                (100, "Anshul", 9.35);
        obj.showType();
    }
}
```

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Command Prompt

```
Microsoft Windows [Version 10.0.10586]
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C:\Users\AKSHAT SURANA>cd C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac generics.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java GenDemo
Type of T is java.lang.Integer
Integer:
value: 100

Type of T is java.lang.String
String:
value: Successful Testing

Type of T is java.lang.Double
Double:
value: 3.14159

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>_
```

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LAB-8

LAB-8

NAME: ANSHUL H. SUVARNA
USN: 1BM19CS020

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 WrongAge() when the input age = father's age

```
import java.util.*;
class fatherAgeException extends Exception
{ public String toString()
  { return("Father's age is less than 0")
  }
}
class sonAgeException extends Exception
{ int a;
  sonAgeException (int age)
  { a = age;
  }
  Public String toString()
{ if (a<0)
  return ("Son's age is less than 0"
else
  return ("Son's age is more than or equal
          to father's age");
}
}
```

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```
class Father
{   public int age1;
    Scanner s = new Scanner (System.in);
    father()
  { System.out.print(" Enter father's age :");
      age1 = s.nextInt();
  }

  void ex1() throws FatherAgeException
  {   if (age1<0)
        throw new FatherAgeException();
    }
}

class son extends father
{ public int age2;
    son()
{ System.out.print(" Enter son's age ");
    age2 = s.nextInt();
}

void ex2() throws SonAgeException
{ if(age2<0 || age2>= super.age1)
  throw new SonAgeException(age2);
  System.out.println(" No logical error
                        in the entered data");
  }
}

class Main
{ public static void main(String args[])
  { son s= new son();
      try
  { s.ex1(); }
  catch (FatherAge Exception e)
  { System.out.println(e); }
```


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```
try
{ s.ex2(); }
catch (SonAgeException e)
{ System.out.println(e);
  }
}
}
```

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Command Prompt

```
Microsoft Windows [Version 10.0.10586]
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C:\Users\AKSHAT SURANA>cd C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac father.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java InhMain
Enter father's age: 40
Enter son's age: 24
No logical error in the entered data

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java InhMain
Enter father's age: 35
Enter son's age: 55
Son's age is more than or equal to father's age

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-9

LAB-9

NAME: ANSHUL H. SUANA
USN: 1BM19CS020

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.

```
class NewThread implements Runnable
{ String name, print;
  int delay, loop;
  Thread t;
  NewThread(String threadname, String
                    toprint, int d, int n)
  {  name = threadname;
     print = toprint;
     delay = d;
     loop = n;
  t = new Thread(this, name);
  System.out.println("New thread:"+t);
    t.start();
  }
public void run()
{ try
  { for(int i = loop; i>0; i--)
    { System.out.println(print);
      Thread.sleep(delay);
    }
  }
catch(InterruptedException e)
{ System.out.println(name+" Interrupted"); }
  System.out.println(name+" exiting");
}
}
```


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```
class multiThread
{ public static void main (String args[])
  { new NewThread("Thread_1", BMS
                College of Engineering", 10000,2);
  new NewThread("Thread_2", CSE, 2000,5);
  }
}
```


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Command Prompt

```
Microsoft Windows [Version 10.0.10586]
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C:\Users\AKSHAT SURANA>cd C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>set path="C:\Program Files\Java\jdk1.8.0_261\bin"

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>javac program_9th.java

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>java multiThread
New thread: Thread[Thread_1,5,main]
New thread: Thread[Thread_2,5,main]
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
Thread_2 exiting.
BMS College of Engineering
BMS College of Engineering
Thread_1 exiting.

C:\Program Files\Java\jdk1.8.0_261\bin\OOJPROGRAMS>
```

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LAB-10

LAB-10 NAME: ANSHUL H. SURANA
USN: 1BM19CS020

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
{ IntDivUp Idu;
  SampleDialog (Frame parent, String title)

{ super (parent, title, false);
  idu = (IntDivUp) parent;
  setLayout (new FlowLayout ());
  setSize (500,200);
  add (new Label (idu.errmsg));
  Button b;
  add (b= new Button ("OK"));
  b.addActionListener (this);
```


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```
}
public void actionPerformed(ActionEvent ae)
  { dispose();}
}
public class IntBinUp extends Frame
        implements ActionListener
  { TextField Num1, Num2, Result;

    Button divide;
    String errmsg = " ";

    public IntBinUp()
  { setLayout (new FlowLayout());
    Divide = new Button ("Divide");

  Label Num1p = new Label ("Num1:", Label.RIGHT);
  Label Num2p = new Label ("Num2", Label.RIGHT);

  Num1 = newTextfield(10);
  Num2 = newTextfield (10);
  Result = new TextField (10);
  add (Num1p);
  add (Num1p);
  add (Num1);
  add (Num2p);
  add (Num2);
  add (Divide);
  add (Result);

  Divide. addActionListener (this);
  addWindowListener (new WindowAdapter()
```

Arshad H. Surana

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```
{ public void windowClosing (WindowEvent
                                we)
  { System.exit(0); }
});
}

public void actionPerformed(ActionEvent ae)
{   int a=0, b=1, r=0;
    try
{ a= Integer.parseInt(Num1.getText());
  b= Integer.parseInt(Num2.getText()); }
  catch (NumberFormatException e)
  { errmsg= "Caught:" + e;
  SampleDialog d = new SampleDialog(this,
                                "Dialog");
    d.setVisibile(true); }
  try
  { r= a/b; }
  catch (ArithmeticException e)

  { errmsg= "Caught:" + e + " Num2=" + b;
  SampleDialog d= new SampleDialog (this, "Dialog")
    d.setVisible (true); }
    Result.setText("" + r);
  }

  public static void main (String args[])
  { IntDivUp appwin= new IntDivUp();
  appwin.setSize (new Dimension (700,700));
  appwin.setTitle ("Integer Division");
  appwin.setVisible (true);
  }
}
```


Anshul H. Swamy

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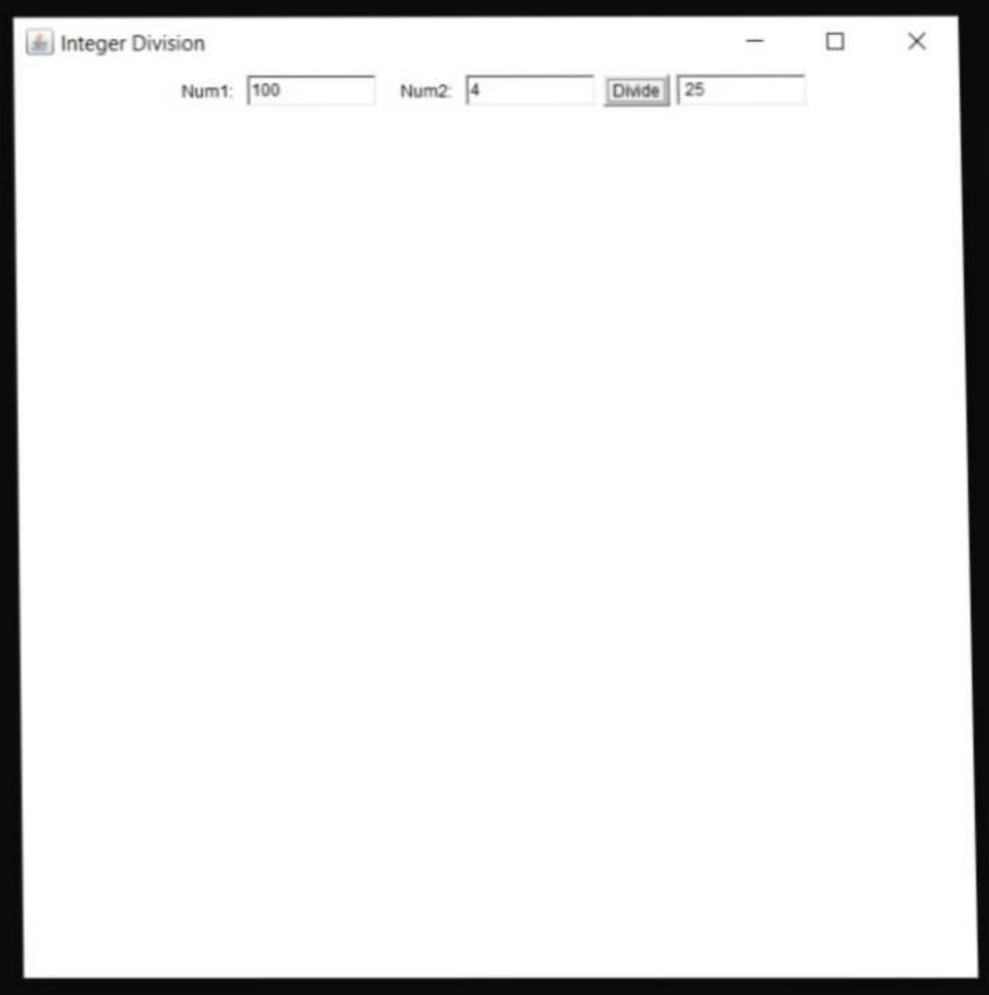
```
:\Java\jdk1.8.0_261\bin\prog>javac IntDivUp.java

:\Java\jdk1.8.0_261\bin\prog>java IntDivUp

:\Java\jdk1.8.0_261\bin\prog>javac IntDivUp.java

:\Java\jdk1.8.0_261\bin\prog>java IntDivUp
```



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```
\Java\jdk1.8.0_261\bin\prog>javac IntDivUp.java

\Java\jdk1.8.0_261\bin\prog>java IntDivUp

\Java\jdk1.8.0_261\bin\prog>javac IntDivUp.java

\Java\jdk1.8.0_261\bin\prog>java IntDivUp
```

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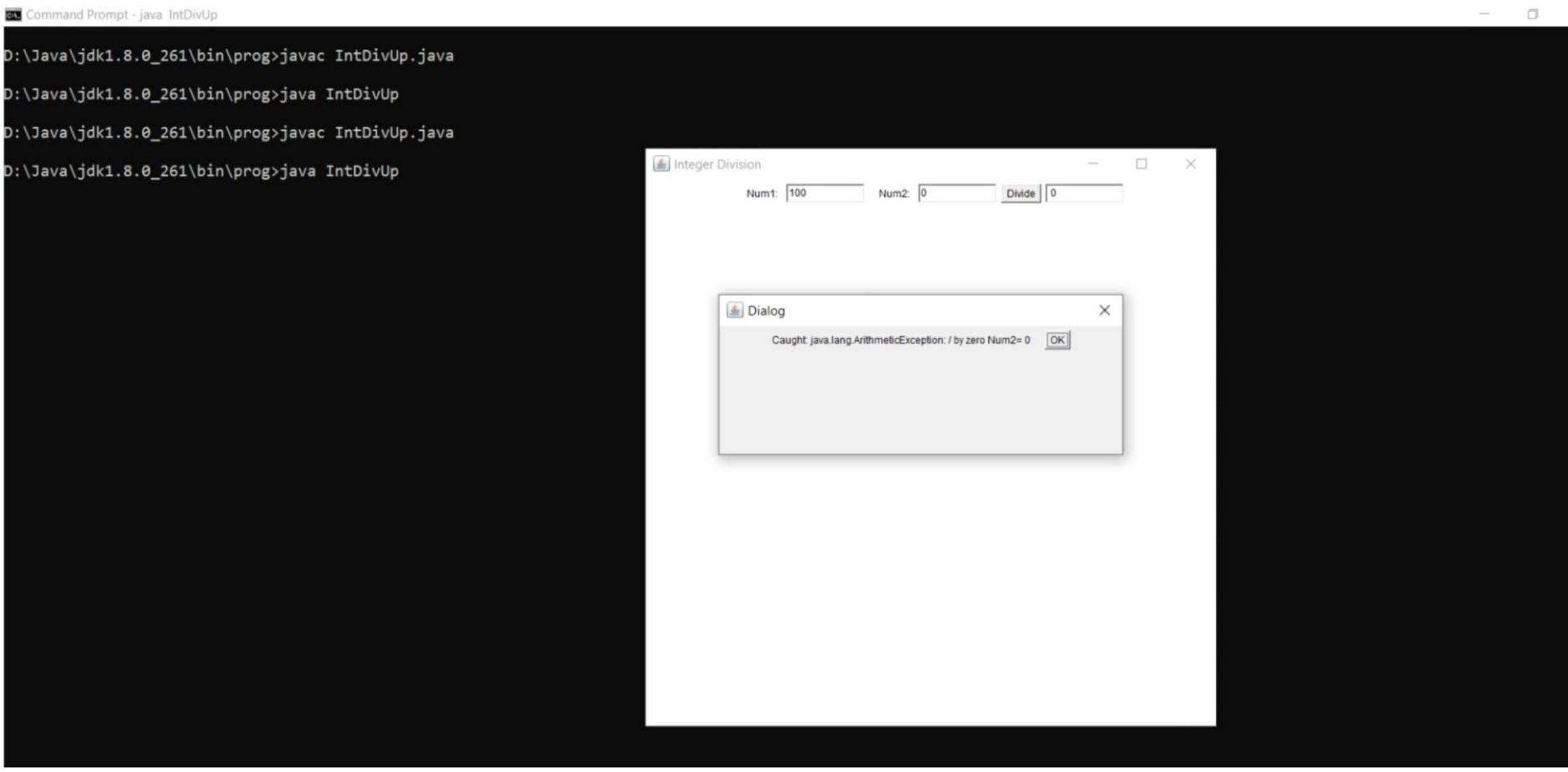

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