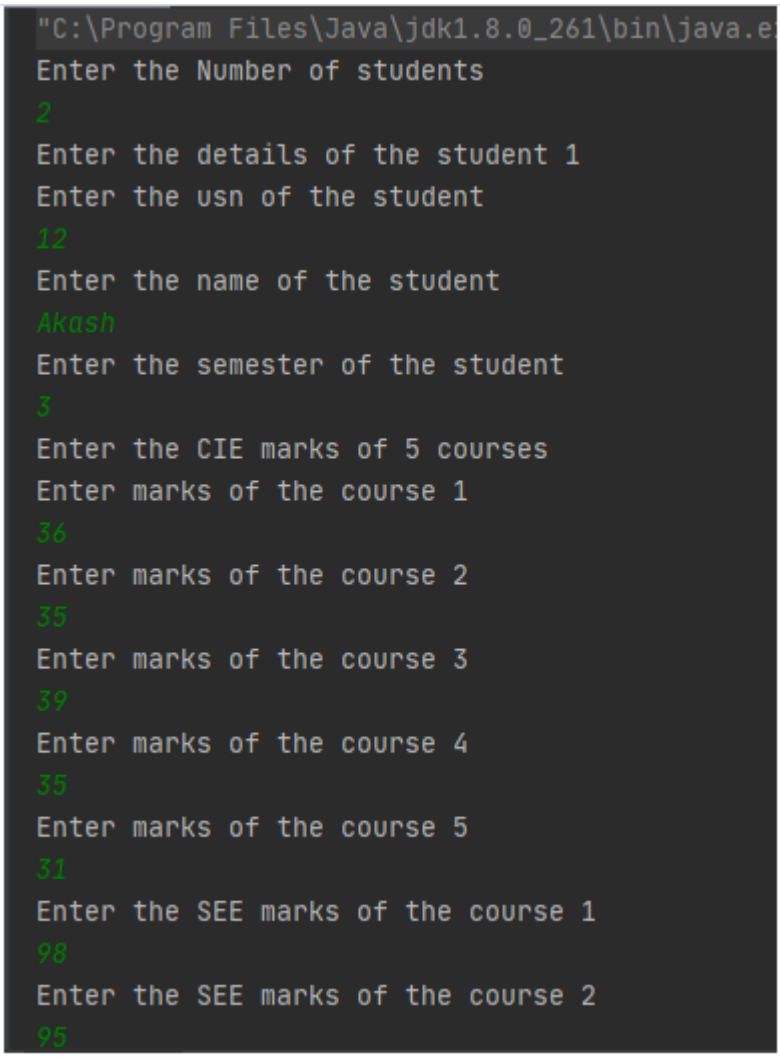
```
package
cie;
          import java.util.*;
          public class internals extends student
          {
              public int[] a=new int[5];
              public void read()
              {
                  super.read();
                  Scanner sc=new Scanner(System.in);
                  System.out.println("Enter the CIE marks of 5 courses ");
                  for(int i=0;i<5;i++)
                  {
                      System.out.println("Enter marks of the course " + (i+1));
                      a[i]=sc.nextInt();
                  }
              }
              public void display()
              {
                  System.out.println("USN of the student is " + usn);
                  System.out.println("Name of the stuednt is " + name);
                  System.out.println("Semester of the student is " + sem);
              }
          }


package
cie;
          import java.util.*;
          public class student
          {
              public String usn;
              public String name;
              public int sem;
              public void read()
              {
                  Scanner sc=new Scanner(System.in);
                  System.out.println("Enter the usn of the student ");
                  usn=sc.next();
                  System.out.println("Enter the name of the student ");
                  name=sc.next();
                  System.out.println("Enter the semester of the student ");
                  sem=sc.nextInt();
              }
          }


package
see;
```

```
import java.util.*;
import java.io.*;
import java.lang.*;
public class external extends cie.student
{
    public int[] b=new int[5];
    public int[] mar;
    public void read()
    {
        Scanner sc=new Scanner(System.in);
        for(int i=0;i<5;i++)
        {
            System.out.println("Enter the SEE marks of the course " + (i+1));
            b[i]=sc.nextInt();
        }
    }
}
```

```
package
com.company;
import java.util.*;
import java.io.*;
import java.lang.*;
import cie.*;
import see.*;
public class Main
{
    public static void main(String[] args)
    {
        int n;
        Scanner sc=new Scanner(System.in);
        int final_mark;
        System.out.println("Enter the Number of students ");
        n=sc.nextInt();
        internals[] in=new internals[n];
        external[] ex=new external[n];
        internals ob1=new internals();
        external ob2=new external();
        ob2.mar=new int[n];
        for(int i=0;i<n;i++)
        {
            System.out.println("Enter the details of the student " + (i+1));
            in[i]=new internals();
            in[i].read();
            ex[i]=new external();
            ex[i].read();
        }
        System.out.println();
```

```
            for(int i=0;i<n;i++)
            {
                System.out.println("*Details Of The Student* " + (i+1));
                System.out.println("USN: " + in[i].usn);
                System.out.println("Name: " + in[i].name);
                System.out.println("Semester: " + in[i].sem);
                for(int j=0;j<5;j++)
                {
                    final_mark=in[i].a[j]+((ex[i].b[j])/2);
                    System.out.println("Final Mark of the student " + (i+1) + " " + " in
course " + (j+1) + " " + final_mark);
                }
                System.out.println();
            }
        }
    }
```

OUTPUT:



```
95
Enter the SEE marks of the course 3
91
Enter the SEE marks of the course 4
87
Enter the SEE marks of the course 5
96
Enter the details of the student 2
Enter the usn of the student
125
Enter the name of the student
Abhi
Enter the semester of the student
3
Enter the CIE marks of 5 courses
Enter marks of the course 1
25
Enter marks of the course 2
32
Enter marks of the course 3
36
Enter marks of the course 4
25
Enter marks of the course 5
```

```
Enter the SEE marks of the course 1
65
Enter the SEE marks of the course 2
68
Enter the SEE marks of the course 3
69
Enter the SEE marks of the course 4
95
Enter the SEE marks of the course 5
97

*Details Of The Student* 1
USN: 12
Name: Akash
Semester: 3
Final Mark of the student 1  in course 1 85
Final Mark of the student 1  in course 2 82
Final Mark of the student 1  in course 3 84
Final Mark of the student 1  in course 4 78
Final Mark of the student 1  in course 5 79

*Details Of The Student* 2
USN: 125
Name: Abhi
```

```
Final Mark of the student 1  in course 1 85
Final Mark of the student 1  in course 2 82
Final Mark of the student 1  in course 3 84
Final Mark of the student 1  in course 4 78
Final Mark of the student 1  in course 5 79

*Details Of The Student* 2
USN: 125
Name: Abhi
Semester: 3
Final Mark of the student 2  in course 1 57
Final Mark of the student 2  in course 2 66
Final Mark of the student 2  in course 3 70
Final Mark of the student 2  in course 4 72
Final Mark of the student 2  in course 5 75


Process finished with exit code 0
```

1BI19IET004

lab-6

(6) create a package CIE which has two classes - student and Internals. The class Personal has members like usn, name, sem. The class Internal 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 package in a file that declares the final marks of n students of all five courses.

Sol:

```
package cie;
import java.util.*;

public class internals extends student
{
  public int[] = a new int[5];
  public void read()

{
  super.read();
  Scanner sc = new Scanner (System.in);
System.out.println("Enter CIE marks");
for( int i= 0; i<5; i++)
{
System.out.println("Enter marks" + (i+1));
```

```
        a[i] = sc.nextInt();
        }
    }
    Public void display()
    {
        System.out.println(" USN:" +usn);
        System.out.println(" Name:" + name);
        System.out.println(" Semester:" +sem);
    }
}
```

Student.java

```
package cie;
    import java.util.*;
public class student
{
    public String usn;
    public String name;
    Public int sem;
public void read()
{
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter USN:");
    usn = sc.next();
    System.out.println("Enter the name:");
    name = sc.next();
    System.out.println("Enter sem:");
    sem = sc.nextInt();
}
}
```

```
package see;
import java.util.*;
import java.io.*;
import java.lang.*;

public class external cie, student
{
    public int[] b = new int[5];
    public int mark;
    public void read()
    {
        Scanner sc = new Scanner(System.in);
        for(int i = 0; i<5; i++)
        {
            System.out.println("Enter the SEE "+(i+1));
            b[i] = sc.nextInt();
        }
    }
}
```

Main

```
package com;
import java.util.*;
import java.io.*;
import java.lang.*;
import cie.*;
import see.*;

public class Main
```

```
public static void main (String [] args)
{
  int n;
Scanner sc = new Scanner(System.in);
int final mark;
System.out.println(" Enter number of student");
   n = sc.next Int();
internals [] in = new internals [n];
external [] ex = new externals[n];
internals obj = new internals();
external obj2 = new externals();
obj2.mar = new int[n];

for(int i=0; i<n; i++)
{
  System.out.print(" Enter the details " +(i+1));
  in[i] = new internals();
  in[i].read();
  ex[i] = new external();
  ex[i].read();
}

System.out.println();

for(int i=0; i<n; i++)
{
  System.out.println("Details of the student" +(i+1));
  System.out.println("USN" + in[i].usn);
  System.out.println("Name:" + in[i].name);

for(int j=0; j<5; j++)
```

```
{
    final_marks = in[i].a[j] + ((ex[i] - b[j]) / e);
System.out.println("Final mark of studen" + (i + 1) + " "+
"in course" + (j + 1) + " " + final_marks);
}
System.out.println();
}
}
}
```

LAB-7(GENERICS)

```
class Test<T>
{
    T obj;
    Test(T obj) { this.obj = obj; } // constructor
    public T getObject() { return this.obj; }
}


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

        Test <Integer> iObj = new Test<Integer>(15);
        System.out.println(iObj.getObject());


        Test <String> sObj =
                new Test<String>("Test");
        System.out.println(sObj.getObject());
    }
}
```

OUTPUT:

```
"C:\Program Files\Java\jdk1.8.0_261\bin\java.exe" ...
15
Test

Process finished with exit code 0
```

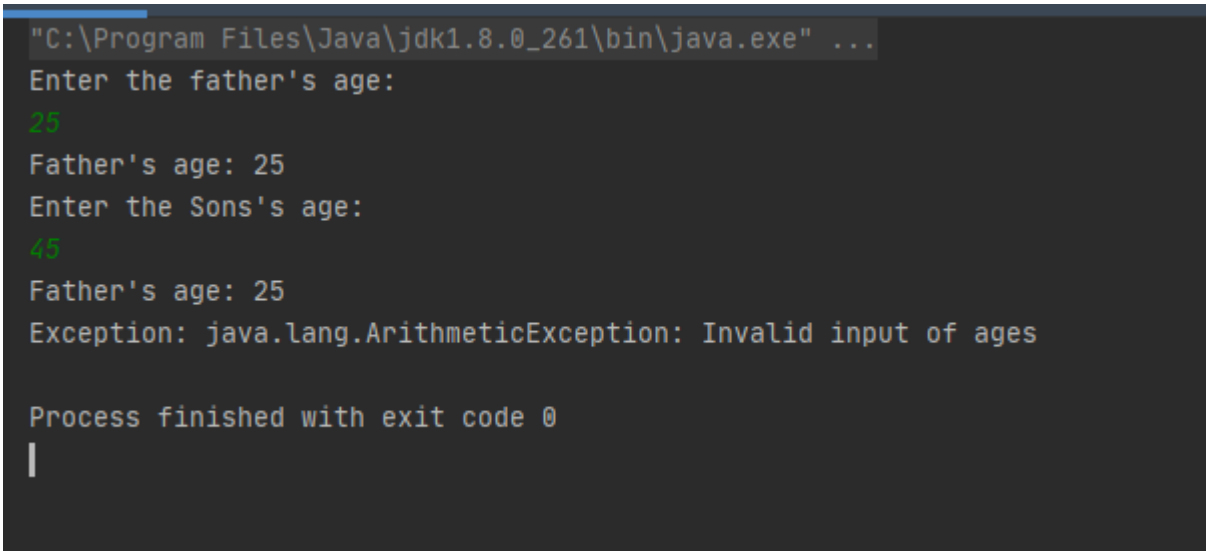
LAB-7(WRITEUP)

```
class Test<T>
{
  T obj;
  Test(T obj)
{
  this.obj=obj;
}
public T getobject()
{
return this.obj;
}
class generic
{
public static void main(String args[])
  {
   Test<Integer> iobj = new Test<Integer>(88);
  System.out.println(iobj.getobject());

  Test<String> sobj;
  new Test<String>("Test");
System.out.println(sobj.getObject());

}

}
```

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 WrongAge( ) when the input age<0. In Son class, implement a constructor that cases both father and son’s age and throws an exception if son’s age

LAB-8(EXCEPTION HANDLING)

```
import java.util.*;
class Father
{
    Father(int age)
    {
        try
        {
            if(age<0)
            {
                throw new ArithmeticException("Invalid age");
            }
            else
            {
                System.out.println("Father's age: "+age);
            }
        }
        catch (ArithmeticException e)
        {
            System.out.println("Error"+e);
        }

    }
}
class Son extends Father
{
    Son(int agef,int ages)
    {
        super(agef);
        try
        {
            if(agef<ages)
            {
                throw new ArithmeticException("Invalid input of ages");
            }
            else
                System.out.println("Age of the son is: "+ages);
        }
        catch(ArithmeticException o)
        {
            System.out.println("Exception: "+o);
        }
    }
}
class trial
{
    public static void main(String args[])
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the father's age: ");
        int i=sc.nextInt();
        Father objf=new Father(i);
        System.out.println("Enter the Sons's age:");
        int j=sc.nextInt();
        Son objs=new Son(i,j);
    }
}
```


"C:\Program Files\Java\jdk1.8.0_261\bin\java.exe" ...
Enter the father's age:
25
Father's age: 25
Enter the Sons's age:
45
Father's age: 25
Exception: java.lang.ArithmeticException: Invalid input of ages
Process finished with exit code 0

LAB-8(WRITEUP)

```
import java.util.*;
class Father
{
  Father (int age)
  {
    try
      {
        if (age<0)
          throw new ArithmeticException ("Invalid age");
        System.out.println (" Father's age" + age);

      }
catch (Arithmetic.Exception e)
  System.out.println (" Error" +e);

class Son extends Father
 {
   Son (int agef, int ages)
    {
     super (agef);
     try {
          if (agef<ages)
            throw new ArithmeticException ("Invalid input");
          else
        System.out.println (" Son's age" + ages);
    }
  catch (ArithMetic Exception 0)
    {
      System.Out.println (" Exception:" +0);
    }
}
```

```
class trial
{
  public static void main (String [] args)
  {
    Scanner sc = new Scanner(System.in);
    System.out.println ("Enter father's age");
    int i = sc.nextInt();
    Father obj = new father(i);
    System.out.println ("Enter son's age");
    int j = sc.nextInt();
    Son objs = Son(i,j);
  }
```

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-9(THREADS)

```
//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.

package com.company;
import java.util.*;
class newthread implements Runnable {
    String name;
    Thread t;

    newthread(String threadname) {
        name = threadname;
        t = new Thread(this, name);
        t.start();
    }

    public void run() {
        try {
            while(true) {

                System.out.println("CSE");

                Thread.sleep(2000);
            }


        } catch (InterruptedException e) {

            System.out.println(name + "Interrupted");
        }

    }
}
public class Main
{
    public static void main(String[] args) {
        new newthread("child"); //
        try {
            for(int i=0;i<5;i++) {
                System.out.println("B.M.S College of Engineering");
                Thread.sleep(10000);
            }
        } catch (InterruptedException e) {

            System.out.println("Main thread Interrupted");

        }
    }

}
```

```
"C:\Program Files\Java\jdk1.8.0_261\bin\java.exe" ...
B.M.S College of Engineering
CSE
CSE
CSE
CSE
CSE
B.M.S College of Engineering
CSE
CSE
CSE
CSE
CSE

Process finished with exit code -1
```

LAB-9(WRITEUP)

```
packa

import java.util.*;
class newthread implements runnable {
  String name;
  Thread t;
newthread( String threadname) {
    name = threadname;
    t = new Thread (this, name);
    t.start();
  }

public void run() {
    try {
        while (true) {
        System.out.println("CSE");
        Thread.sleep (2000);
        }
  } catch(InterruptException e) {
    System.out.println(name + "Interrupted");
  }
}

public class main
{
  public static void main (String[]args) {
  new newthread ("child");
```

11011
1
11100

```
try {
    for (int i=0; i<5; i++) {
System.out.println("B.M.S College of Engineering");
    Thread.sleep(10000);
}
catch (InterruptException e){

System.out.println("Main Thread Interrupted");
}
}
}
```

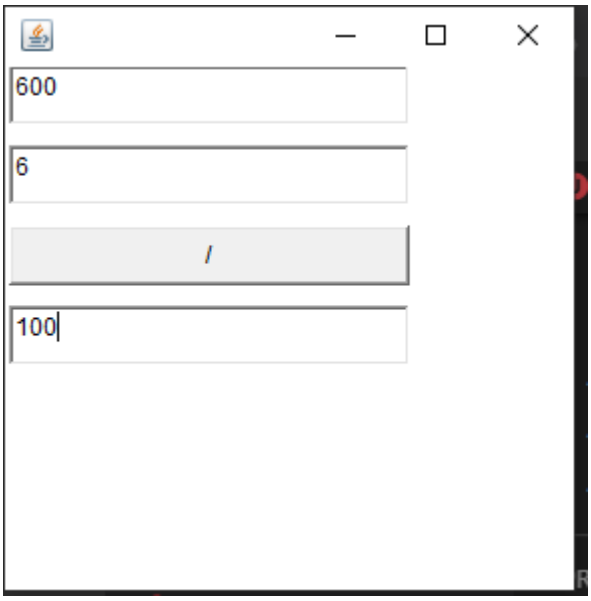
LAB-10

Code:

```
import java.awt.*;
import java.awt.event.*;

class division1 extends Frame implements ActionListener
{
    Frame f;
    TextField tf1;
    TextField tf2;
    TextField tf3;
    Button b;
    Dialog d1;

    division1()
    {
        setSize(300,300);
        setVisible(true);
        setLayout(null);
        addWindowListener(new WindowAdapter(){
            public void windowClosing(WindowEvent aew)
            {
                dispose();
            }
        }
        );
    tf1=new TextField("Number 1");
    tf1.setBounds(10,30,200,30);
    add(tf1);
    Button b=new Button("/");
    b.setBounds(10,110,200,30);
    b.addActionListener(this);
    add(b);
    tf2=new TextField("Number 2");
    tf2.setBounds(10, 70, 200, 30);
    add(tf2);

    tf3=new TextField("Output");
    tf3.setBounds(10,150,200,30);
    add(tf3);
    }
public void actionPerformed(ActionEvent e)
```

```
{
    try{
        String num1=tf1.getText();
        int nu1=Integer.parseInt(num1);
        String num2=tf1.getText();
        int nu2=Integer.parseInt(num2);
        int result = nu1/nu2;
        tf3.setText(Integer.toString(result));
    }
    catch(NumberFormatException e2){
    d1=new Dialog(f,"error",true);
    Label l=new Label(" "+e2);
    d1.add(l);
    d1.setSize(300,50);
    d1.setVisible(true);
}
catch(ArithmeticException e1){
    d1=new Dialog(f,"error",true);
    Label l=new Label(" "+e1);
    d1.add(l);
    d1.setSize(300,50);
    d1.setVisible(true);
}
}

}
 public class Lab10awt
 {
     public static void main(String args[])
     {
         division1 d=new division1();
     }
 }
```

Output:


600
6
/
100

(8) Write a program that creates a user interface to perform integer division. The user enter two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the result if button is clicked. If Num1 and Num2 were not an integer program will throw a NumberFormatException. If Num2 is 0, program will throw an Arithematic Exception.

```
import java.awt.*;
import java.awt.event.*;
    :
class Division1 extends Frame implements ActionListener{
Frame f;
Textfield tf1;
TextField tf2;
TextField tf3;
Button b;
Dialog d1;

Division1(){
SetSize(300,300);
SetVisible(true);
SetLayout(null);

addWindowListener(new WindowAdapter()){
public void windowClosing(WindowEvent arg0)
{
dispose();
}
```

```
};

tf1 = new TextField("Number 1");
tf1.setBounds(10,70,200,30);
add(tf1);
b = new Button("/");
b.setBounds(10,110,200,30);
b.addActionListen(this);
add(b);
tf2 = new TextField("Number 2");
tf2.setBounds(10,70,200,30)
add(tf2);
tf3 = new TextField("Output");
tf3.setBounds(10,150,200,30);
add(tf3);
}

Public void actionPerformed(ActionEvent e) {
  try {
      String num1 = tf1.getText();
      int nu1 = Integer.parseInt(num1);
      String num2 = tf2.getText();
      int nu2 = Integer.parseInt(num2);
      int result = nu1/nu2;
      tf3.setText(Integer.toString(result));

  }
catch (NumberFormatException e2) {
    d1 = new Dialog(f," error", true);
```

```
Label l = new Label(" " + e2);
d1.add(l);
d1.setSize(300, 50);
d1.setVisible(true);

}
catch (ArithmeticException e1) {
  d1 = new Diag(f, "error", true);
Label l = new Label(" " + e1);
  d1.add(l);
  d1.setSize(300, 50);
  d1.setVisible(true);

}

}
}

public class App {
public static void main(String[] args) {
    Division1d = new Division1();
  }

}
```