OOP Lab-11 Tasks

Name:	Syed Muhammad Raza Ali
Enrolment:	02-134231-028
Course:	OOP Lab
Faculty:	Miss Hafsa Munawar

Lab11: Exception Handling

In Lab following topics will be covered:

1. Exceptions
2. Types of Exceptions

Exercises

Exercise

Create a program that has class of Mathematical Operations on Matrices and Apply all Exception Handling that can occur e.g. IndexOutOfRange or StackOverflow etc.

Program must perform

1. Addition of two matrices (A+B)
2. Subtraction of two matrices (A-B)
3. Scalar Multiplication with Matrix (x*A)
4. Consider A and B as matrices and x as any scalar value other than 0

Code:

Matrices Class

```
package com.mycompany.exceptionhandling;

import java.util.InputMismatchException;
import java.util.Scanner;

public class Matrices{
    protected int[][] A = new int[3][3];
    protected int[][] B = new int[3][3];
    Scanner sc = new Scanner(System.in);
    //methods
    public void takeInputInA(){
        try{
            System.out.println("===== Input In A =====");
            for(int i = 0;i<A.length;i++){
                for(int j = 0;j<A.length;j++){
                    System.out.println("Enter the value of position "+i+j+" : ");
                    A[i][j] = sc.nextInt();
                }
            }
        }
        catch(IndexOutOfBoundsException | NullPointerException | InputMismatchException e){
            System.out.println(e.getMessage());
        }

    }
    public void takeInputInB(){
           try{
            System.out.println("===== Input In B =====");
            for(int i = 0;i<B.length;i++){
                for(int j = 0;j<B.length;j++){
                    System.out.println("Enter the value of position "+i+j+" : ");
                    B[i][j] = sc.nextInt();
                }
            }
        }
        catch(IndexOutOfBoundsException | NullPointerException | InputMismatchException e){
            System.out.println(e.getMessage());
        }
    }

}
```

Equation1 Class

```
package com.mycompany.exceptionhandling;

import java.util.InputMismatchException;

public class Equation1 extends Matrices{
    private int[][] result = new int[3][3];

    public Equation1() {
    }

    public void calculateSum(){
        try{
            for(int i = 0;i<result.length;i++){
            for(int j = 0;j<result.length;j++){
                result[i][j] = A[i][j] + B[i][j];
            }
        }
                        System.out.println("===== A+B =====");
            for(int i = 0;i<result.length;i++){
            for(int j = 0;j<result.length;j++){
                System.out.print(result[i][j]+"    ");
            }
            System.out.println("\n");
        }
        }
         catch(IndexOutOfBoundsException | NullPointerException | InputMismatchException e){
            System.out.println(e.getMessage());
        }
    }
}
```

Equation2 Class

```
package com.mycompany.exceptionhandling;

import java.util.InputMismatchException;

public class Equation2 extends Matrices{
        private int[][] result = new int[3][3];

    public Equation2() {
    }
 public void calculateDifference(){
        try{
            for(int i = 0;i<result.length;i++){
            for(int j = 0;j<result.length;j++){
                result[i][j] = A[i][j] - B[i][j];
            }
        }
                        System.out.println("===== A-B =====");
            for(int i = 0;i<result.length;i++){
            for(int j = 0;j<result.length;j++){
                System.out.print(result[i][j]+"   ");
            }
            System.out.println("\n");
        }
        }
         catch(IndexOutOfBoundsException | NullPointerException | InputMismatchException e){
            System.out.println(e.getMessage());
        }
    }
}
```

Equation3 Class

```
package com.mycompany.exceptionhandling;

import java.util.InputMismatchException;


public class Equation3 extends Matrices{
    private int scalarValue;

    public Equation3() {
    }
    public void calculateProduct(){

        try{
            System.out.print("Enter a value : ");
        scalarValue = sc.nextInt();
            for(int i = 0;i<A.length;i++){
            for(int j = 0;j<A.length;j++){
                A[i][j] *=scalarValue;
            }
        }
                        System.out.println("===== A*B =====");
            for(int i = 0;i<A.length;i++){
            for(int j = 0;j<A.length;j++){
                System.out.print(A[i][j]+"   ");
            }
            System.out.println("\n");
        }
        }
         catch(IndexOutOfBoundsException | NullPointerException | InputMismatchException e){
            System.out.println(e.getMessage());
        }
    }
}
```

Equation4 Class

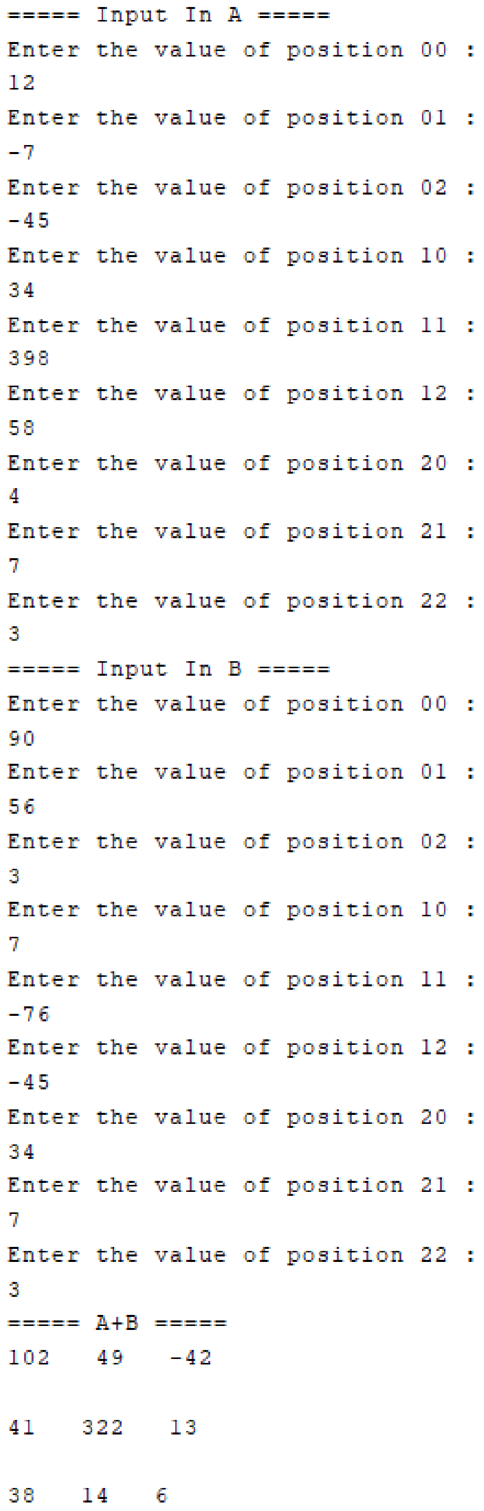
```
package com.mycompany.exceptionhandling;

import java.util.InputMismatchException;

public class Equation4 extends Matrices{
        private int scalarValue;
        private int[][] result = new int[3][3];

    public Equation4() {
    }
 public void calculateProduct(){
        try{

            System.out.println("Enter a value : ");
            scalarValue = sc.nextInt();
            if(scalarValue==0){
                System.out.println("Enter a non zero value....");
            }
            else{
                 for(int i = 0;i<A.length;i++){
            for(int j = 0;j<A.length;j++){
               result[i][j] =A[i][j] * B[i][j]*scalarValue ;
            }
            }


        }
                    System.out.println("===== A*B*scalarValue =====");

            for(int i = 0;i<A.length;i++){
            for(int j = 0;j<A.length;j++){
                System.out.print(result[i][j]+"    ");
            }
            System.out.println("\n");
        }
        }
         catch(IndexOutOfBoundsException | NullPointerException | InputMismatchException e){
           System.out.println(e.getMessage());
        }    }}
```

Application Class

```
package com.mycompany.exceptionhandling;
public class ExceptionHandling {

    public static void main(String[] args) {
        //for equation1
          Equation1 obj = new Equation1();
          obj.takeInputInA();
          obj.takeInputInB();
          obj.calculateSum();
        //for equation2

          Equation2 obj = new Equation2();
          obj.takeInputInA();
          obj.takeInputInB();
          obj.calculateDifference();
                //for equation3

          Equation3 obj = new Equation3();
          obj.takeInputInA();
          obj.takeInputInB();
          obj.calculateProduct();
        //for equation4

          Equation4 obj = new Equation4();
          obj.takeInputInA();
          obj.takeInputInB();
          obj.calculateProduct();
    }
}
```

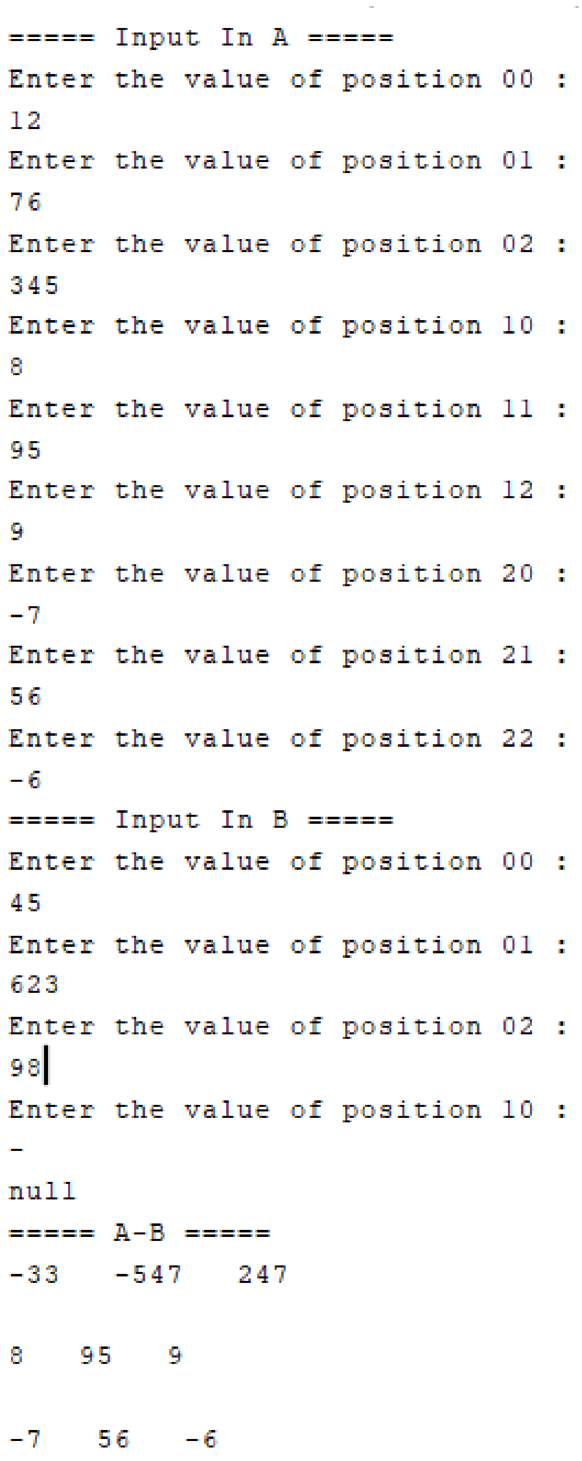
Output:

For Equation1



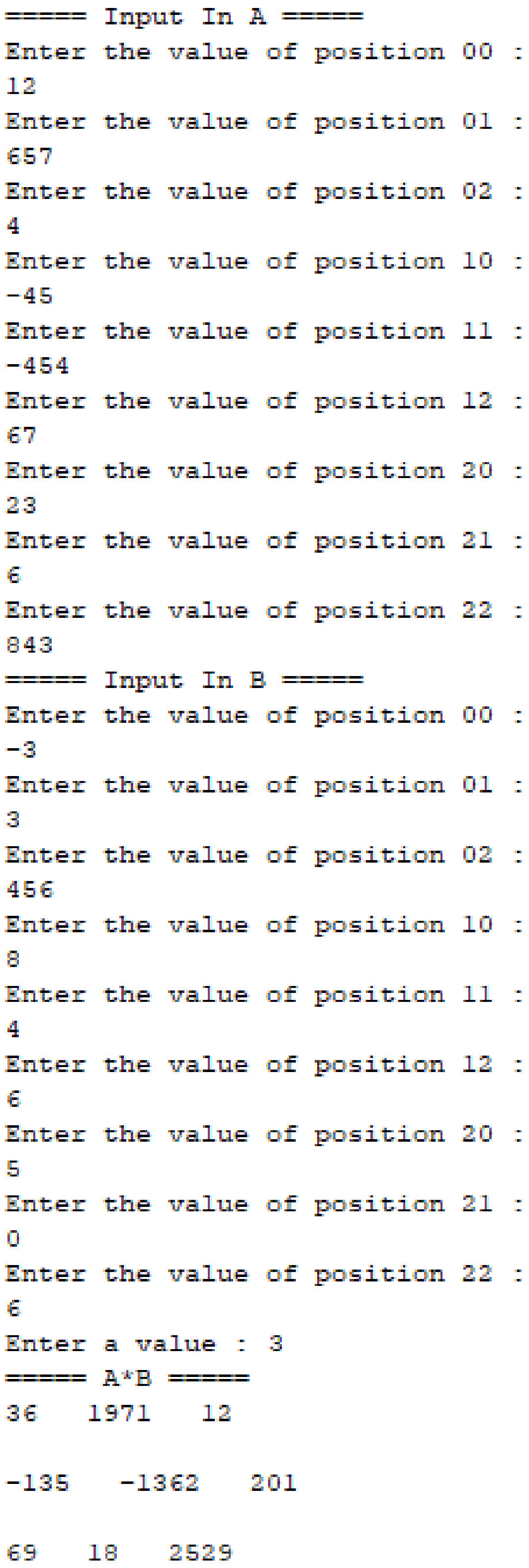
```
===== Input In A =====
Enter the value of position 00 :
12
Enter the value of position 01 :
-7
Enter the value of position 02 :
-45
Enter the value of position 10 :
34
Enter the value of position 11 :
398
Enter the value of position 12 :
58
Enter the value of position 20 :
4
Enter the value of position 21 :
7
Enter the value of position 22 :
3
===== Input In B =====
Enter the value of position 00 :
90
Enter the value of position 01 :
56
Enter the value of position 02 :
3
Enter the value of position 10 :
7
Enter the value of position 11 :
-76
Enter the value of position 12 :
-45
Enter the value of position 20 :
34
Enter the value of position 21 :
7
Enter the value of position 22 :
3
===== A+B =====
102   49   -42

41   322   13

38   14   6
```

For Equation2



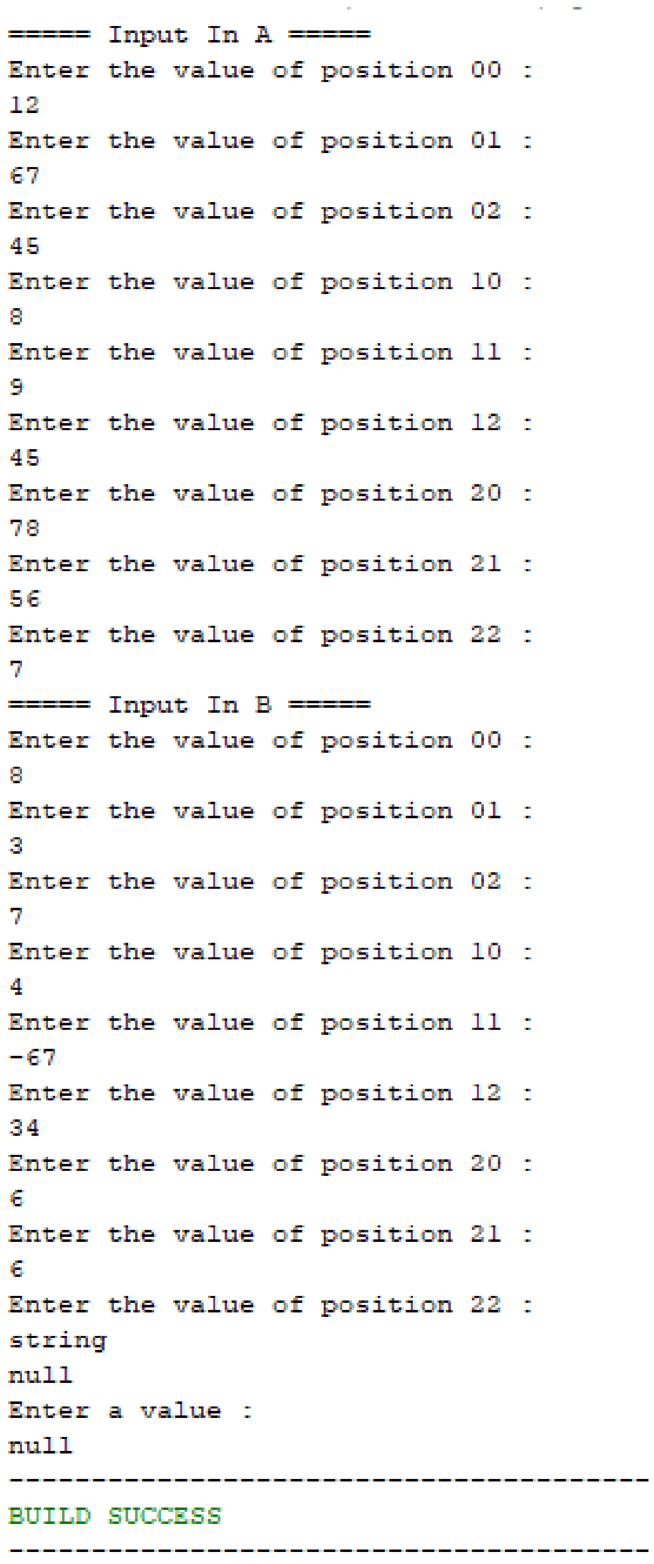
```
===== Input In A =====
Enter the value of position 00 :
12
Enter the value of position 01 :
76
Enter the value of position 02 :
345
Enter the value of position 10 :
8
Enter the value of position 11 :
95
Enter the value of position 12 :
9
Enter the value of position 20 :
-7
Enter the value of position 21 :
56
Enter the value of position 22 :
-6
===== Input In B =====
Enter the value of position 00 :
45
Enter the value of position 01 :
623
Enter the value of position 02 :
98
Enter the value of position 10 :
-
null
===== A-B =====
-33   -547   247

8   95   9

-7   56   -6
```

For Equation3



```
===== Input In A =====
Enter the value of position 00 :
12
Enter the value of position 01 :
657
Enter the value of position 02 :
4
Enter the value of position 10 :
-45
Enter the value of position 11 :
-454
Enter the value of position 12 :
67
Enter the value of position 20 :
23
Enter the value of position 21 :
6
Enter the value of position 22 :
843
===== Input In B =====
Enter the value of position 00 :
-3
Enter the value of position 01 :
3
Enter the value of position 02 :
456
Enter the value of position 10 :
8
Enter the value of position 11 :
4
Enter the value of position 12 :
6
Enter the value of position 20 :
5
Enter the value of position 21 :
0
Enter the value of position 22 :
6
Enter a value : 3
===== A*B =====
36   1971   12

-135   -1362   201

69   18   2529
```

For Equation4



```
===== Input In A =====
Enter the value of position 00 :
12
Enter the value of position 01 :
67
Enter the value of position 02 :
45
Enter the value of position 10 :
8
Enter the value of position 11 :
9
Enter the value of position 12 :
45
Enter the value of position 20 :
78
Enter the value of position 21 :
56
Enter the value of position 22 :
7
===== Input In B =====
Enter the value of position 00 :
8
Enter the value of position 01 :
3
Enter the value of position 02 :
7
Enter the value of position 10 :
4
Enter the value of position 11 :
-67
Enter the value of position 12 :
34
Enter the value of position 20 :
6
Enter the value of position 21 :
6
Enter the value of position 22 :
string
null
Enter a value :
null
----------------------------------------
BUILD SUCCESS
----------------------------------------
```