

Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

Lab Number:	11
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Roll No :	07

Title:

1. Write a program in java if a number is less than 0 and greater than 10 it generates the user-defined exception "out of range". Else it displays the square of the number.
2. Write a program in java to enter the number. If the first and second number is not entered it will generate the exception. Also, divide the first number with the second number and generate the arithmetic exception.

Learning Objective:

- Students will be able to implement user-defined exceptions

Learning Outcome:

- Understanding the exception handling concept and making the programming interface error-free.

Course Outcome:

- Articulate exception handling methods.

Faculty: Ms. Deepali Kayande

Theory:

1) What is exception handling and how is it achieved in JAVA?

Ans: The Exception Handling in Java is one of the powerful mechanisms to handle the runtime errors so that the normal flow of the application can be maintained.

In Java, an exception is an event that disrupts the normal flow of the program. It is an object which is thrown at runtime.

Exception Handling is a mechanism to handle runtime errors such as `ClassNotFoundException`, `IOException`, `SQLException`, `RemoteException`, etc. The core advantage of exception handling is to maintain the normal flow of the application.

An exception can occur for many different reasons. Following are some scenarios where an exception occurs.

- A user has entered an invalid data.
- A file that needs to be opened cannot be found.
- A network connection has been lost in the middle of communications or the JVM has run out of memory.

Some of these exceptions are caused by user error, others by programmer error, and others by physical resources that have failed in some manner.

Exception Hierarchy:

All exception classes are subtypes of the `java.lang.Exception` class. The exception class is a subclass of the `Throwable` class. Other than the exception class there is another subclass called `Error` which is derived from the `Throwable` class.

Errors are abnormal conditions that happen in case of severe failures, these are not handled by the Java programs. Errors are generated to indicate errors generated by the runtime environment. Example: JVM is out of memory. Normally, programs cannot recover from errors.

The `Exception` class has two main subclasses: `OtherException` class and `RuntimeException` Class.

Catching Exceptions:

A method catches an exception using a combination of the `try` and `catch` keywords. A `try/catch` block is placed around the code that might generate an exception. Code within a `try/catch` block is referred to as protected code, and the syntax for using `try/catch` looks like the following –

Syntax:

```
try {  
    // Protected code  
} catch (ExceptionName e1) {  
    // Catch block  
}
```

2) Explain user defined exceptions in java?

Ans:

User Defined Exception or custom exception is creating your own exception class and throws that exception using 'throw' keyword. This can be done by extending the class Exception.

Using the custom exception, we can have your own exception and message. Here, we have passed a string to the constructor of superclass i.e. Exception class that can be obtained using getMessage() method on the object we have created.

Java exceptions cover almost all the general type of exceptions that may occur in the programming. However, we sometimes need to create custom exceptions.

Following are few of the reasons to use custom exceptions:

- To catch and provide specific treatment to a subset of existing Java exceptions.
- Business logic exceptions: These are the exceptions related to business logic and workflow. It is useful for the application users or the developers to understand the exact problem.

In order to create custom exception, we need to extend Exception class that belongs to java.lang package.

Don Bosco Institute of Technology, Kurla(W)
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Sem III
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Program 1: Write a program in java if a number is less than 0 and greater than 10 it generates the user-defined exception "out of range". Else it displays the square of the number.

Algorithm :

Step 1: Start

Step 2: Make a class outofrange exception which will extend exception class (in-built class)

Step 3: Take input from the user

Step 4: Check conditions is the number between 0-10 , else generates the user-defined exception out of range or displays the square of the number.

Step 5: Stop

Program:

```
package inheritance_java;
import java.util.Scanner;
class outofRangeException extends Exception
{
    public outofRangeException (String str)
    {
        // calling the constructor of parent Exception
        super(str);
    }
}
public class Lab11_1
{
    public static void main(String[] args)
```

Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

```
{
// TODO Auto-generated method stub

try
{
Scanner sc= new Scanner(System.in);
System.out.print("Enter your Number: ");
int a= sc.nextInt();
if(a<0 || a>10)
{
throw(new outofRangeException("valid range is between 1 to 10"));
}
else
{
int s=a*a;
System.out.println("Square of your entered number is:"+s);
}
}
catch(Exception ex)
{
System.out.println(ex);
}
}
}
```

Input given:

Enter your Number: 5

Output Screenshot:

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Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

```
Console ✖
<terminated> Lab11_1 [Java Application] C:\Users\Bhagyesh\
Enter your Number: 5
Square of your entered number is:25
```

```
Console ✖
<terminated> Lab11_1 [Java Application] C:\Users\Bhagyesh\p2\pool\plugins\org.eclipse.justj.c
Enter your Number: 19
inheritence java.outofRangeException: valid range is between 1 to 10
```

Don Bosco Institute of Technology, Kurla(W)
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ECL304 - Skill Lab: C++ and Java Programming
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2021-22

Program 2: Write a program in java to enter the number. If the first and second number is not entered it will generate the exception. Also, divide the first number with the second number and generate the arithmetic exception.

Algorithm:

Step 1: Start

Step 2: Take input from the user, first and second number

Step 3: If the first and second number is not entered it will generate the exception.

Step 4: Divide the first number with the second number, if it is not divisible then generate the arithmetic exception.

Step 5: Stop

Program:

```
package inheritance_java;
import java.util.Scanner;
public class Lab11_2
{
    private static Scanner sc;
    public static void main(String[] args)
    {
        // TODO Auto-generated method stub
        try
        {
            sc = new Scanner(System.in);
            System.out.print("Enter your First Number: ");
            int a= sc.nextInt();
```

Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
2021-22

```
System.out.print("Enter your Second Number: ");  
  
int b= sc.nextInt();  
  
if(b==0)  
{  
    throw(new Exception("second argument should be non zero"));  
}  
  
else  
{  
    double c= a/b;  
    System.out.println("result:"+c);  
}  
}  
  
catch(Exception e)  
{  
    System.out.println(e);  
}  
}  
}
```

Input Given:

Enter your First Number: 15

Enter your Second Number: 0

Don Bosco Institute of Technology, Kurla(W)
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ECL304 - Skill Lab: C++ and Java Programming
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2021-22

Output:

```
Console ✕  
<terminated> Lab11_2 [Java Application] C:\Users\Bhagyesh\.p2\pool\plugi  
Enter your First Number: 15  
Enter your Second Number: 0  
java.lang.Exception: second argument should be non zero
```