Types of Exception in Java with Examples

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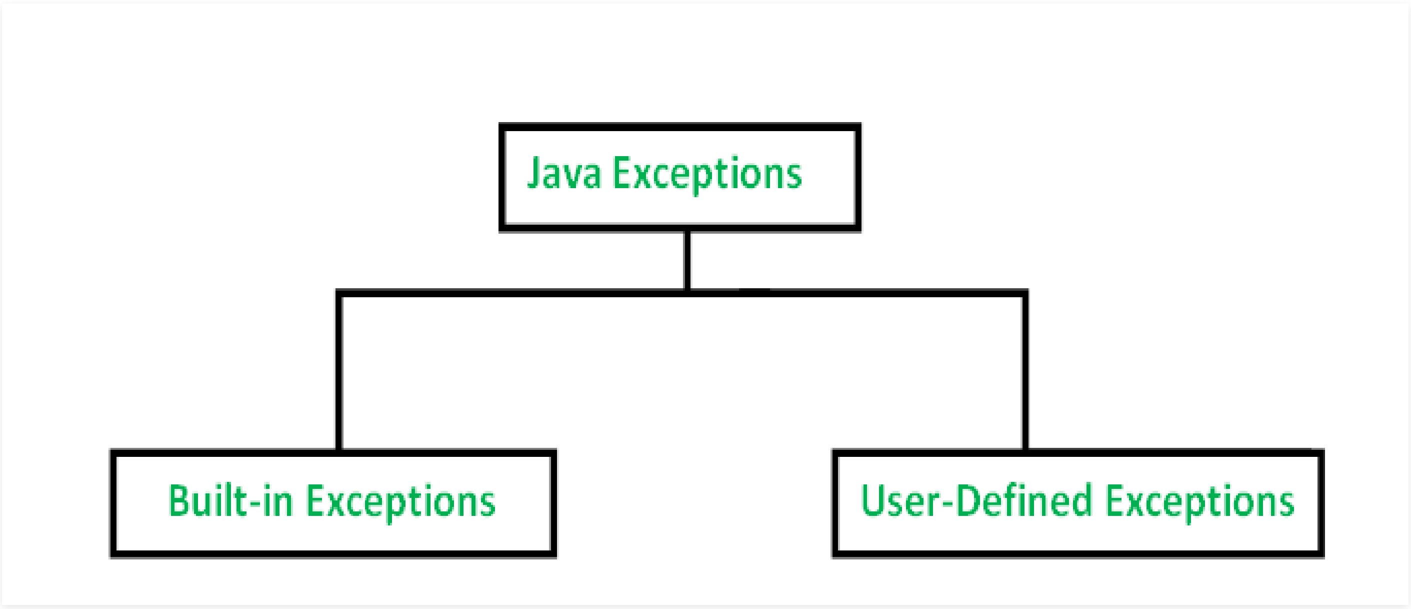
Java defines several types of exceptions that relate to its various class libraries. Java also allows users to define their own exceptions.



Built-in Exceptions

Built-in exceptions are the exceptions which are available in Java libraries. These exceptions are suitable to explain certain error situations. Below is the list of important built-in exceptions in Java.

1. **ArithmeticException**
   It is thrown when an exceptional condition has occurred in an arithmetic operation.
2. **ArrayIndexOutOfBoundsException**
   It is thrown to indicate that an array has been accessed with an illegal index. The index is either negative or greater than or equal to the size of the array.
3. **ClassNotFoundException**
   This Exception is raised when we try to access a class whose definition is not found
4. **FileNotFoundException**
   This Exception is raised when a file is not accessible or does not open.
5. **IOException**
   It is thrown when an input-output operation failed or interrupted
6. **InterruptedException**
   It is thrown when a thread is waiting, sleeping, or doing some processing, and it is interrupted.

7. **NoSuchFieldException**
   It is thrown when a class does not contain the field (or variable) specified
8. **NoSuchMethodException**
   It is thrown when accessing a method which is not found.
9. **NullPointerException**
   This exception is raised when referring to the members of a null object. Null represents nothing
10. **NumberFormatException**
    This exception is raised when a method could not convert a string into a numeric format.
11. **RuntimeException**
    This represents any exception which occurs during runtime.
12. **StringIndexOutOfBoundsException**
    It is thrown by String class methods to indicate that an index is either negative or greater than the size of the string

Examples of Built-in Exception:

- **Arithmetic exception**

```java
// Java program to demonstrate ArithmeticException
class ArithmeticException_Demo
{
    public static void main(String args[])
    {
        try {
            int a = 30, b = 0;
            int c = a/b;  // cannot divide by zero
            System.out.println ("Result = " + c);
        }
        catch(ArithmeticException e) {
            System.out.println ("Can't divide a number by 0");
        }
    }
}
```

Output:

```
Can't divide a number by 0
```

- **NullPointer Exception**

```
//Java program to demonstrate NullPointerException
class NullPointer_Demo
{
    public static void main(String args[])
    {
        try {
            String a = null; //null value
            System.out.println(a.charAt(0));
        } catch(NullPointerException e) {
            System.out.println("NullPointerException..");
        }
    }
}
```

Output:

```
NullPointerException..
```

- **StringIndexOutOfBound Exception**

```
// Java program to demonstrate StringIndexOutOfBoundsException
class StringIndexOutOfBound_Demo
{
    public static void main(String args[])
    {
        try {
            String a = "This is like chipping "; // length is 22
            char c = a.charAt(24); // accessing 25th element
            System.out.println(c);
        }
        catch(StringIndexOutOfBoundsException e) {
            System.out.println("StringIndexOutOfBoundsException");
        }
    }
}
```

Output:

```
StringIndexOutOfBoundsException
```

- **FileNotFound Exception**

```java
//Java program to demonstrate FileNotFoundException
import java.io.File;
import java.io.FileNotFoundException;
import java.io.FileReader;
 class File_notFound_Demo {

    public static void main(String args[])  {
        try {

            // Following file does not exist
            File file = new File("E://file.txt");

            FileReader fr = new FileReader(file);
        } catch (FileNotFoundException e) {
           System.out.println("File does not exist");
        }
    }
}
```

Output:

```
File does not exist
```

- **NumberFormat Exception**

```
// Java program to demonstrate NumberFormatException
class  NumberFormat_Demo
{
    public static void main(String args[])
    {
        try {
            // "akki" is not a number
            int num = Integer.parseInt ("akki") ;

            System.out.println(num);
        } catch(NumberFormatException e) {
            System.out.println("Number format exception");
        }
    }
}
```

Output:

```
Number format exception
```

- **ArrayIndexOutOfBounds Exception**

```
// Java program to demonstrate ArrayIndexOutOfBoundException
class ArrayIndexOutOfBound_Demo
{
    public static void main(String args[])
    {
        try{
            int a[] = new int[5];
            a[6] = 9; // accessing 7th element in an array of
                      // size 5
        }
        catch(ArrayIndexOutOfBoundsException e){
            System.out.println ("Array Index is Out Of Bounds");
        }
    }
}
```

Output:

```
Array Index is Out Of Bounds
```

User-Defined Exceptions

Sometimes, the built-in exceptions in Java are not able to describe a certain situation. In such cases, user can also create exceptions which are called 'user-defined Exceptions'.

Following steps are followed for the creation of user-defined Exception.

- The user should create an exception class as a subclass of Exception class. Since all the exceptions are subclasses of Exception class, the user should also make his class a subclass of it. This is done as:

```
class MyException extends Exception
```

- We can write a default constructor in his own exception class.

```
MyException(){}
```

- We can also create a parameterized constructor with a string as a parameter.
  We can use this to store exception details. We can call super class(Exception) constructor from this and send the string there.

```
MyException(String str)
{
   super(str);
}
```

- To raise exception of user-defined type, we need to create an object to his exception class and throw it using throw clause, as:

```
MyException me = new MyException(“Exception details”);
throw me;
```

- The following program illustrates how to create own exception class MyException.
- Details of account numbers, customer names, and balance amounts are taken in the form of three arrays.
- In main() method, the details are displayed using a for-loop. At this time, check is done if in any account the balance amount is less than the minimum balance amount to be apt in the account.

- If it is so, then MyException is raised and a message is displayed “Balance amount is less”.

```java
// Java program to demonstrate user defined exception

// This program throws an exception whenever balance
// amount is below Rs 1000
class MyException extends Exception
{
    //store account information
    private static int accno[] = {1001, 1002, 1003, 1004};

    private static String name[] =
                {"Nish", "Shubh", "Sush", "Abhi", "Akash"};

    private static double bal[] =
         {10000.00, 12000.00, 5600.0, 999.00, 1100.55};

    // default constructor
    MyException() {    }

    // parameterized constructor
    MyException(String str) { super(str); }

    // write main()
    public static void main(String[] args)
    {
        try  {
            // display the heading for the table
            System.out.println("ACCNO" + "\t" + "CUSTOMER" +
                                               "\t" + "BALANCE");

            // display the actual account information
            for (int i = 0; i < 5 ; i++)
            {
                System.out.println(accno[i] + "\t" + name[i] +
                                               "\t" + bal[i]);

                // display own exception if balance < 1000
                if (bal[i] < 1000)
                {
                    MyException me =
                       new MyException("Balance is less than 1000");
                    throw me;
                }
            }
        } //end of try

        catch (MyException e) {
            e.printStackTrace();
        }
    }
}
```

RunTime Error

```
MyException: Balance is less than 1000
   at MyException.main(fileProperty.java:36)
```

Output:

```
ACCNO    CUSTOMER    BALANCE
1001    Nish    10000.0
1002    Shubh     12000.0
1003    Sush    5600.0
1004    Abhi    999.0
```

Related Articles:

- Checked vs Unchecked Exceptions in Java
- Catching base and derived classes as exceptions
- Quiz on Exception Handling

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