

Exception Handling

Wednesday, May 17, 2023 2:20 PM

Exception : exception means:- an exception is an unwanted or unexpected event, which occurs during the execution of a program i.e, at run time, that disrupts the normal flow of the program

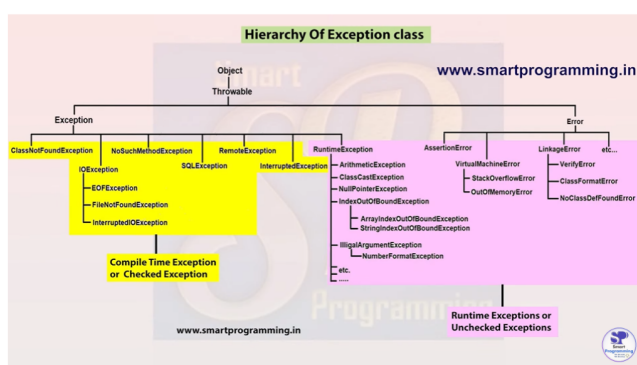
- 1.an exception is an event that disrupts the normal flow of the program. It is an object which is thrown at runtime.

Exception Handling: Exception Handling is a mechanism to handle runtime errors such as ClassNotFoundException, IOException, SQLException, RemoteException, etc.

Difference between Exception & Error	
Exception	Error
1. Exception occurs because of our programs	1. Error occurs because of lack of system resources.
2. Exceptions are recoverable i.e. programmer can handle them using try-catch block	2. Errors are not recoverable i.e. programmer can handle them to their level
3. Exceptions are of two types : <ul style="list-style-type: none">■ Compile Time Exceptions or Checked Exceptions■ Runtime Exceptions or Unchecked Exceptions	3. Errors are only of one type : <ul style="list-style-type: none">■ Runtime Exceptions or Unchecked Exceptions

Hierarchy of Java Exception classes

The java.lang.Throwable class is the root class of Java Exception hierarchy inherited by two subclasses: Exception and Error. The hierarchy of Java Exception classes is given below:



Types of Java Exceptions

There are mainly two types of exceptions: checked and unchecked. An error is considered as the unchecked exception. However, according to Oracle, there are three types of exceptions namely:

1. Checked Exception
2. Unchecked Exception
3. Error

Difference between Checked and Unchecked Exceptions

1) Checked Exception

The classes that directly inherit the Throwable class except RuntimeException and Error are known as checked exceptions. For example, IOException, SQLException, etc. Checked

exceptions are checked at compile-time.

2) Unchecked Exception

The classes that inherit the RuntimeException are known as unchecked exceptions. For example, ArithmeticException, NullPointerException, ArrayIndexOutOfBoundsException, etc. Unchecked exceptions are not checked at compile-time, but they are checked at runtime.

3) Error

Error is irrecoverable. Some example of errors are OutOfMemoryError, VirtualMachineError, AssertionError etc

Java Exception Keywords

Java provides five keywords that are used to handle the exception. The following table describes each.

Keyword	Description
try	The "try" keyword is used to specify a block where we should place an exception code. It means we can't use try block alone. The try block must be followed by either catch or finally.
catch	The "catch" block is used to handle the exception. It must be preceded by try block which means we can't use catch block alone. It can be followed by finally block later.
finally	The "finally" block is used to execute the necessary code of the program. It is executed whether an exception is handled or not.
throw	The "throw" keyword is used to throw an exception.
throws	The "throws" keyword is used to declare exceptions. It specifies that there may occur an exception in the method. It doesn't throw an exception. It is always used with method signature.

Important Points to Note

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1. keywords working :

- try** : In try block we write statements that can throw exception i.e. it contains risky code
- catch** : It contains exception handling code i.e. alternative way for exception
- finally** : It contains clean up code i.e. closing the resources
- throw** : It creates exception object manually (by programmer) and handover to JVM

2. We can throw either checked or unchecked exception but throw is best for customized exception

3. We can only throw class that comes in throwable child class

4. We cannot write any statement after throw, otherwise it will provide unreachable statement error.

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- try** : In try block we write statements that can throw exception i.e. it contains risky code
- catch** : It contains exception handling code i.e. alternative way for exception
- finally** : It contains clean up code i.e. closing the resources
- throw** : It creates exception object manually (by programmer) and handover to JVM
- throws** : It is used to declare the exception. It gives an information to the caller method that there may occur an exception so it is better for the caller method to provide the exception handling code so that normal flow can be maintained.

2. If we call a method that declares an exception, we must either catch the exception using try catch block or declare the exception using throws keyword or say If there is any checked exception, we will get compile time error saying "unreported exception XXX must be caught or declared to be thrown". To prevent this compile time error we can handle the exception in two ways:

- By using try catch
- By using throws keyword

3. throws keyword used to declare the checked exceptions only. If there occurs any unchecked exception such as NullPointerException, it is programmer's fault that is not performing check up before the code being used.

Difference between throw and throws keyword

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throw keyword	throws keyword
1. throw keyword is used to create an exception object manually i.e. by programmer (otherwise by default method is responsible to create exception object)	1. throws keyword is used to declare the exceptions i.e. it indicates the caller method that given type of exception can occur so you have to handle it while calling.
2. throw keyword is mainly used for runtime exceptions or unchecked exceptions	2. throws keyword is mainly used for compile time exceptions or checked exceptions
3. In case of throw keyword we can throw only single exception	3. In case of throws keyword we can declare multiple exceptions i.e. void readFile() throws FileNotFoundException, NullPointerException, etc.
4. throw keyword is used within the method	4. throws keyword is used with method signature
5. throw keyword is followed by new instance	5. throws keyword is followed by class
6. We cannot write any statement after throw keyword and thus it can be used to break the statement	6. throws keyword does not have any such rule

