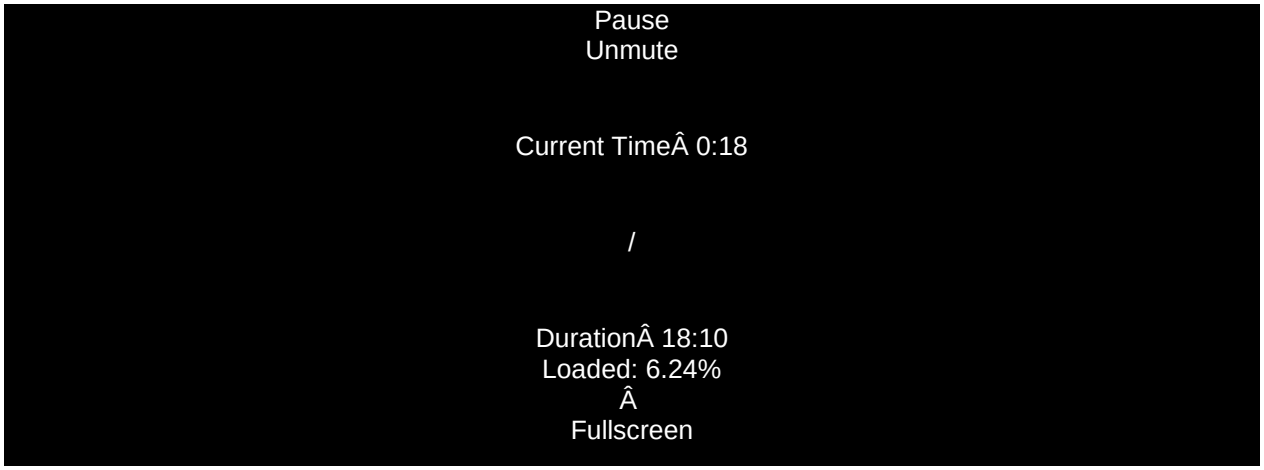
What is Exception in Java?

Dictionary Meaning: Exception is an abnormal condition.

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



What is Exception Handling?

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

Advantage of Exception Handling

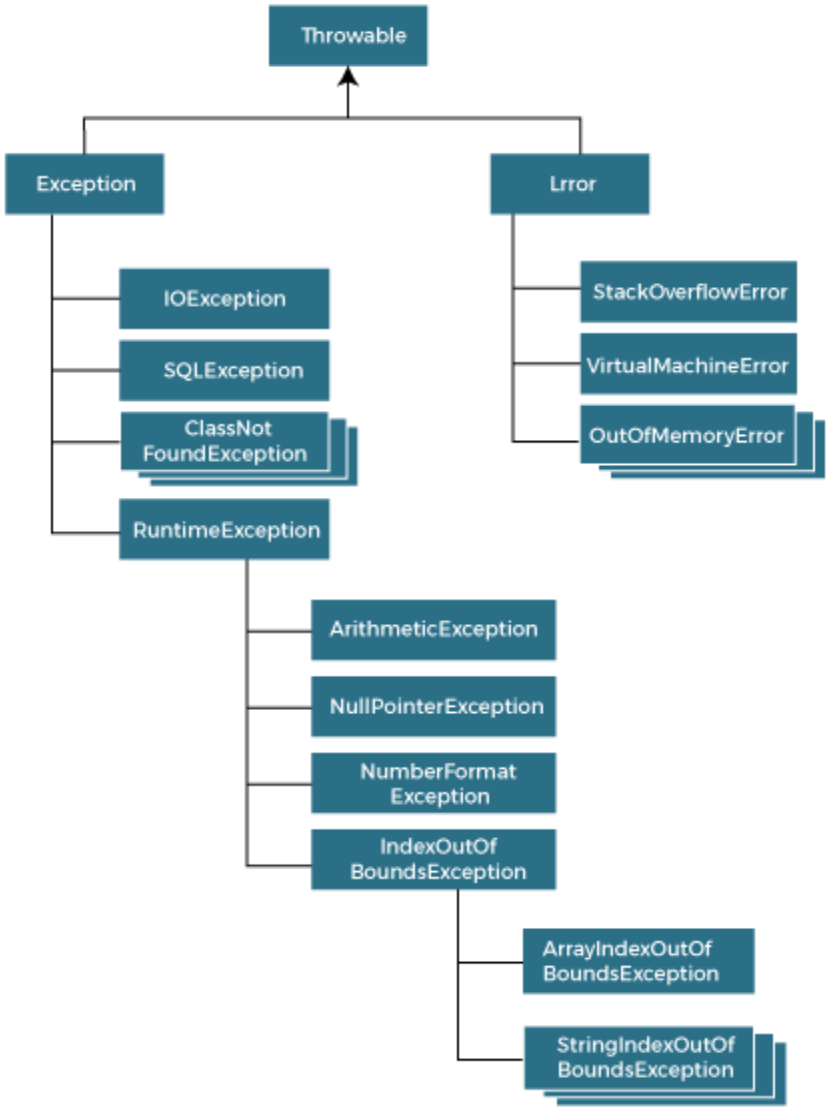
The core advantage of exception handling is **to maintain the normal flow of the application**. An exception normally disrupts the normal flow of the application; that is why we need to handle exceptions. Let's consider a scenario:

1. statement 1;
2. statement 2;
3. statement 3;
4. statement 4;
5. statement 5;//exception occurs
6. statement 6;
7. statement 7;
8. statement 8;
9. statement 9;
10. statement 10;

Suppose there are 10 statements in a Java program and an exception occurs at statement 5; the rest of the code will not be executed, i.e., statements 6 to 10 will not be executed. However, when we perform exception handling, the rest of the statements will be executed. That is why we use exception handling in Java.

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.

Java Exception Handling Example

Let's see an example of Java Exception Handling in which we are using a try-catch statement to handle the exception.

JavaExceptionExample.java

```
1. public class JavaExceptionExample{
2.   public static void main(String args[]){
3.    try{
4.       //code that may raise exception
5.       int data=100/0;
6.    }catch(ArithmeticException e){System.out.println(e);}
7.    //rest code of the program
8.    System.out.println("rest of the code...");
9.   }
10. }
```

Output

```
Exception in thread main java.lang.ArithmeticException:/ by zero
rest of the code...
```

Mcq questions

1. What is an exception in Java?
   A. A syntax error B. A compile-time error C. A runtime error D. A warning

   Answer: C

2. Which of the following is not a type of exception in Java?
   A. Checked exception B. Unchecked exception C. Error D. Warning

   Answer: D

3. What is the purpose of exception handling in Java?
   A. To ignore errors in a program B. To report errors in a program C. To cause errors in a program D. To prevent errors in a program

   Answer: B

4. Which of the following keywords is used to declare a method that may throw an exception?
   A. Try B. Catch C. Finally D. Throws

   Answer: D

5. Which of the following statements is true regarding checked exceptions in Java?
   A. Checked exceptions must be caught or declared. B. Checked exceptions do not have to be caught or declared. C. Checked exceptions cannot be thrown by a method. D. Checked exceptions are subclasses of RuntimeException.

   Answer: A

6. Which of the following statements is true regarding unchecked exceptions in Java?
   A. Unchecked exceptions do not have to be caught or declared.
   B. Unchecked exceptions must be caught or declared.
   C. Unchecked exceptions are subclasses of RuntimeException.
   D. Unchecked exceptions are always caused by syntax errors.

   Answer: A

7. Which of the following is an example of a checked exception in Java?
   A. NullPointerException B. ArrayIndexOutOfBoundsException C. FileNotFoundException D. ClassCastException

   Answer: C

8. Which of the following is an example of an unchecked exception in Java?
   A. SQLException B. ClassNotFoundException C. ArithmeticException D. NoSuchMethodException

   Answer: C

9. Which of the following is the superclass of all Java exceptions?
   A. Object B. Exception C. Throwable D. RuntimeException

   Answer: C

10. Which of the following statements is true regarding the try block in Java exception handling?
    A. The try block is used to enclose code that might throw an exception
    B. The try block is used to catch exceptions that are thrown by a method
    C. The try block is used to declare exceptions that a method may throw.
    D. The try block is used to specify the type of exception that should be thrown.

    Answer: A

11. Which of the following statements is true regarding the catch block in Java exception handling?

A. The catch block is used to handle exceptions that are thrown by the code in the try block.
b. The catch block is used to declare exceptions that a method may throw.
C. The catch block is used to specify the type of exception that should be thrown.
D. The catch block is used to enclose code that should be executed regardless of whether an exception is thrown.

Answer: A

12. Which of the following statements is true regarding the finally block in Java exception handling?

A. The finally block is used to enclose code that should be executed regardless of whether an exception is thrown.
B. The finally block is used to catch exceptions that are thrown by a method.
C. The finally block is used to specify the type of exception that should be thrown.
D. The finally block is used to enclose code that might throw an exception.

Answer: A

13 What is an exception in Java?

a. An error that occurs during compilation
b. A block of code that is executed when an error occurs
c. A runtime error that can occur during the execution of a Java program
d. A statement that is used to handle errors in Java

Answer: c

14 What is the purpose of exception handling in Java?

a. To provide a mechanism for detecting and responding to errors in a Java program
b. To improve the performance of a Java program
c. To make the Java code more readable and maintainable
d. To prevent errors from occurring in a Java program

Answer: a

15 Which keyword is used to declare a method that may throw an exception?

a. Try b. Catch c. Throws d. Finally

Answer: c

16 What is the difference between checked and unchecked exceptions in Java?

a. Checked exceptions are checked at runtime, while unchecked exceptions are not.
b. Checked exceptions must be caught or declared, while unchecked exceptions do not.
c. Checked exceptions can be caught by multiple catch blocks, while unchecked exceptions cannot. d. Checked exceptions are thrown by the Java runtime, while unchecked exceptions are thrown by the programmer.

Answer: b

17 Which of the following is an example of a checked exception in Java?

a. RuntimeException b. NullPointerException c. IOException d. ArrayIndexOutOfBoundsException

Answer: c

18 Which of the following is an example of an unchecked exception in Java?

a. IOException b. ClassNotFoundException c. ArithmeticException d. FileNotFoundException

Answer: c

19 Which of the following is not a part of the Java exception hierarchy?

a. Throwable b. Error c. Exception d. ThrowableException

Answer: d

20 Which of the following is the superclass of all Java exceptions?

a. Error b. Exception c. Throwable d. RuntimeException

Answer: c

21 Which of the following statements is true regarding the try block in Java exception handling?

a. The try block is used to enclose code that might throw an exception.
b. The try block is used to handle exceptions that are thrown by the code in the catch block.
c. The try block is used to enclose code that should be executed regardless of whether an exception is thrown.
d. The try block is used to enclose code that should always be executed.

Answer: a

22 Which of the following statements is true regarding the catch block in Java exception handling?

a. The catch block is used to enclose code that might throw an exception.
b. The catch block is used to handle exceptions that are thrown by the code in the try block
. c. The catch block is used to enclose code that should be executed regardless of whether an exception is thrown.
d. The catch block is used to enclose code that should always be executed.

Answer: b

23 Which of the following statements is true regarding the finally block in Java exception handling?

a. The finally block is used to enclose code that might throw an exception.
b. The finally block is used to handle exceptions that are thrown by the code in the try block
. c. The finally block is used to enclose code that should be executed regardless of whether an exception is thrown.
d. The finally block is used to enclose code that should always be executed.

Answer: c

24 What is the purpose of exception handling in Java?

A. To terminate the program when an exception occurs.
B. To ignore exceptions and continue execution.
C. To catch and handle exceptions.
D. None of the above.

Answer: C

25 Which of the following keywords is used to declare a method that may throw an exception?

A. try B. catch C. finally D. throws

Answer: D

26 Which of the following statements is true regarding checked exceptions in Java? A. They must be caught or declared.

B. They do not need to be caught or declared.
C. They can be caught or declared, but it is not necessary.
D. None of the above.

Answer: A

27 Which of the following statements is true regarding unchecked exceptions in Java?

A. They must be caught or declared.
B. They do not need to be caught or declared.
C. They can be caught or declared, but it is not necessary
. D. None of the above.

Answer: B

28 Which of the following is an example of a checked exception in Java?

A. NullPointerException B. IndexOutOfBoundsException C. IOException
D. ArrayIndexOutOfBoundsException

Answer: C

29 Which of the following is an example of an unchecked exception in Java?

A. IOException B. ClassNotFoundException C. NullPointerException D. SQLException

Answer: C

30 Which of the following is not a part of the Java exception hierarchy?

A. RuntimeException B. Error C. Exception D. Throwable

Answer: A