

# Understanding Exception Types

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# Overview



**Explore the exceptions hierarchy**

**Identify two broad categories of exceptions**

- Checked and unchecked
- Enumerate the most frequent ones
- Review their relationships

**Revisit chained and multi-catch blocks**

**Errors: Do's and Don'ts**



In Java, (almost) everything is  
an object.  
This includes exceptions.



```
class SomeException {  
    public SomeException() {  
    }  
}
```



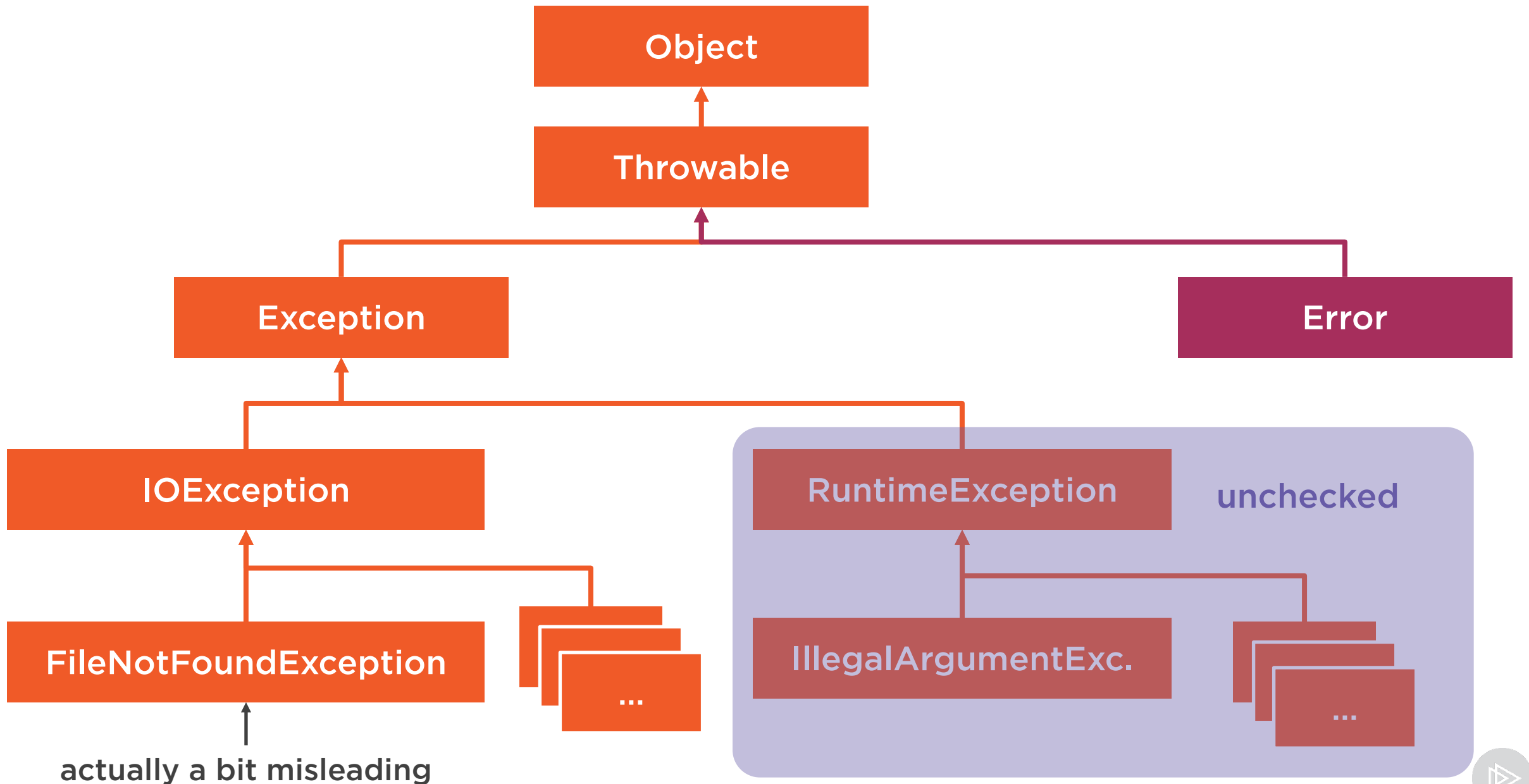
```
new SomeException();
```

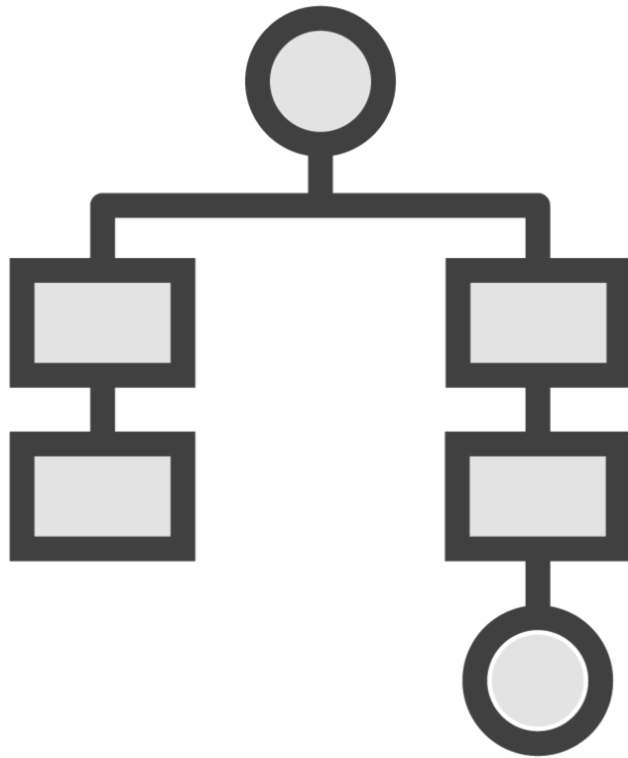


```
throw RuntimeException();
```



```
throw new RuntimeException();
```





## Purpose of Throwable:

- Bring Exceptions and Errors into a single hierarchy
- Provide useful methods e.g. `printStackTrace()`;

# Exception Types



**Checked**  
(by the compiler)



**Unchecked**  
a.k.a. Runtime Exceptions





Both checked and unchecked exceptions will crash the program if left unhandled.



## Common RuntimeException Classes

ArithmeticException

ArrayIndexOutOfBoundsException

ClassCastException

IllegalArgumentException

IllegalStateException

NullPointerException

NumberFormatException



# ArithmeticException

```
int result = 5 / 0;
```

Exception in thread "main" java.lang.ArithmeticException: / by zero

# ArrayIndexOutOfBoundsException

```
int[] arr = new int[1];  
System.out.println(arr[1]); // off by one
```

Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Index 1 out of bounds for length 1

# ArrayIndexOutOfBoundsException 2

```
int total = 0;
int[] nums = {1, 2 ,3};
for (int i = 0; i <= nums.length; i++)
    total += nums[i];
```

Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Index 3 out of bounds for length 3

# ClassCastException

```
String s = "1";
```

```
Integer n = (Integer) s;
```

N/A – won't compile

# ClassCastException 2

```
String s = "1";  
Object obj = s;  
Integer n = (Integer) obj;
```

Exception in thread "main" java.lang.ClassCastException: class java.lang.String cannot be cast to class java.lang.Integer

# IllegalArgumentException

```
int age = 15;  
if (age < 21) {  
    throw new IllegalArgumentException("message");  
}
```

Exception in thread "main" java.lang.IllegalArgumentException: message



# IllegalStateException

```
if(!isSwitchedOn){  
    throw new IllegalStateException("XYZ must be switched on");  
}
```

Exception in thread "main" java.lang.IllegalStateException: XYZ must be switched on

# NullPointerException

```
String s1 = null;  
s1.toUpperCase();
```

Exception in thread "main" java.lang.NullPointerException

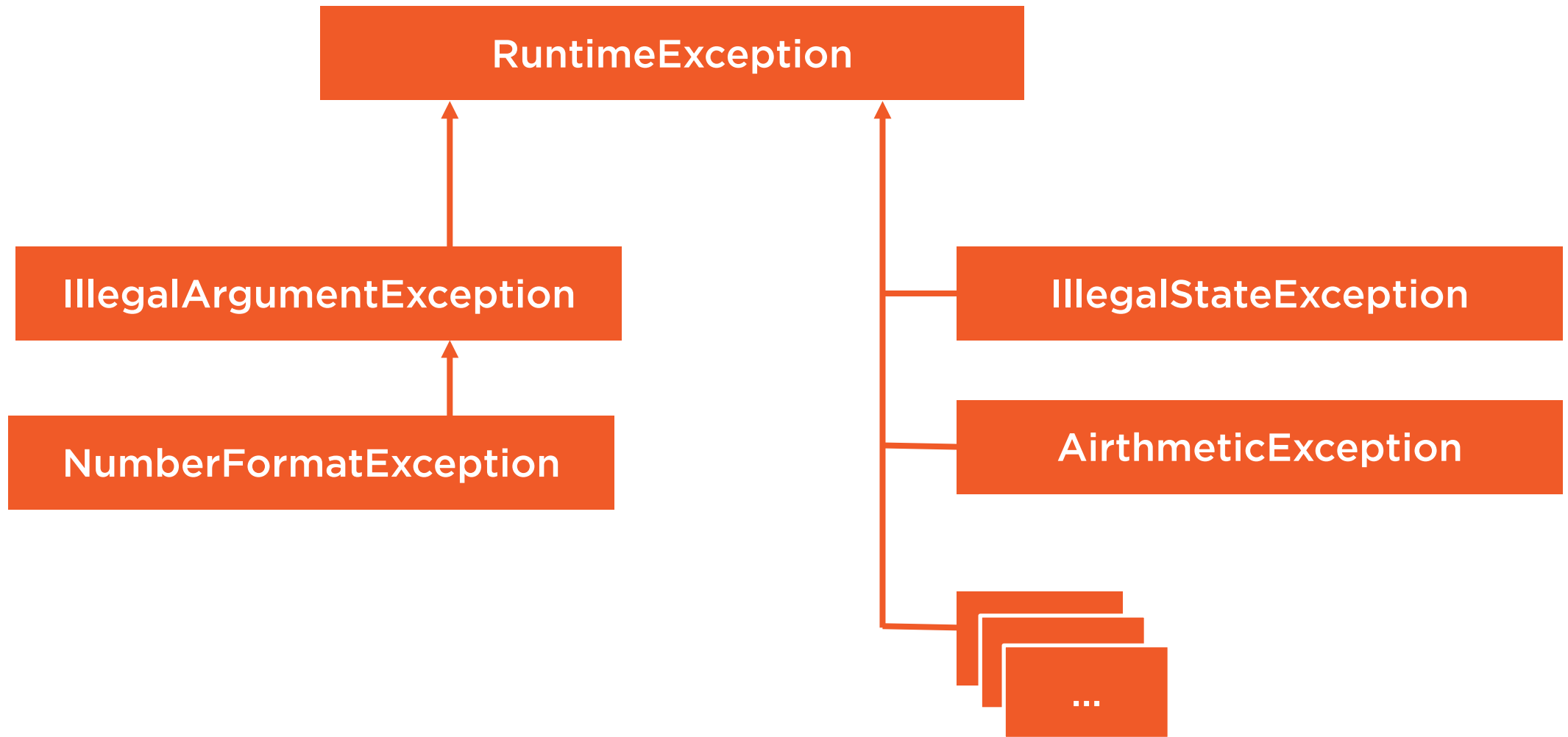
# NumberFormatException

```
Integer.parseInt("a");
```

```
Double.parseDouble("b");
```

```
Exception in thread "main" java.lang.NumberFormatException: For input  
string: "a"
```

```
Exception in thread "main" java.lang.NumberFormatException: For input  
string: "b"
```



## Common Checked Exception Classes

**IOException**

**FileNotFoundException**



# FileNotFoundException

```
try {  
    var br = new BufferedReader(new FileReader("file.txt"));  
} catch (FileNotFoundException e) {  
    e.printStackTrace();  
}
```

```
java.io.FileNotFoundException: file.txt (The system cannot find the file  
specified)
```



### **java.io:**

- FileNotFoundException
- IOException

### **java.nio:**

- FileSystemException
- NoSuchFileException
- AccessDeniedException



### **Java cert path:**

- Working with the Java I/O API

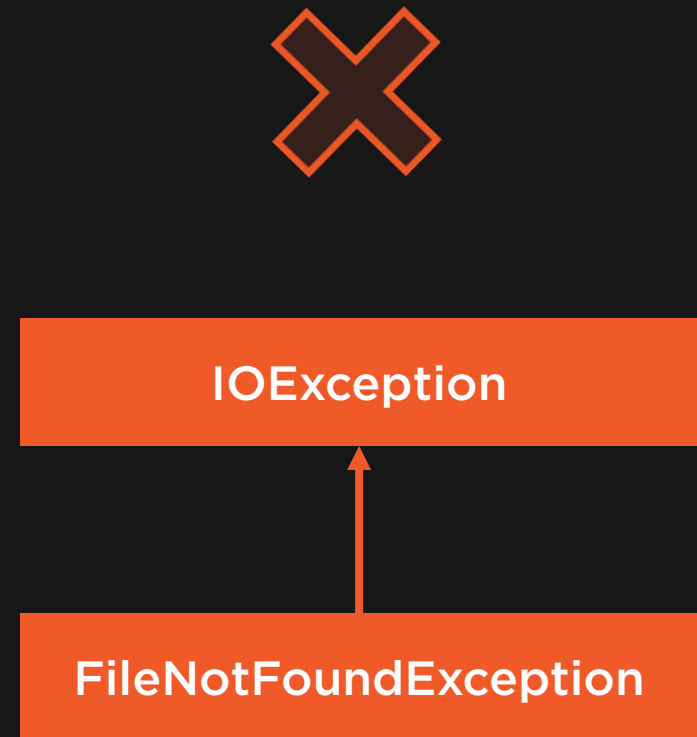
### **Other Pluralsight courses (more thorough):**

- Java Fundamentals: Input/Output
- Java Fundamentals: NIO and NIO2

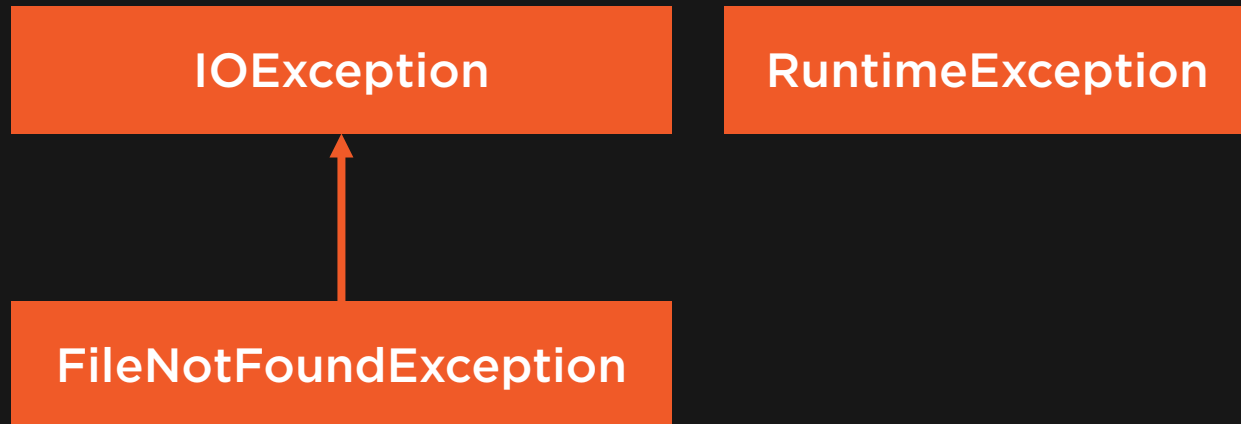




```
try {  
    throw new IOException();  
}  
catch (IOException e) { }  
catch (FileNotFoundException e) { }
```



```
try {  
    throw new IOException();  
}  
catch (FileNotFoundException e) { }  
catch (RuntimeException e)      { }  
catch (IOException e)           { }
```



```
try {
```

```
}
```

```
catch (NumberFormatException e) { }
```

```
catch (IllegalArgumentException e) { }
```

```
catch (IllegalStateException e) { }
```



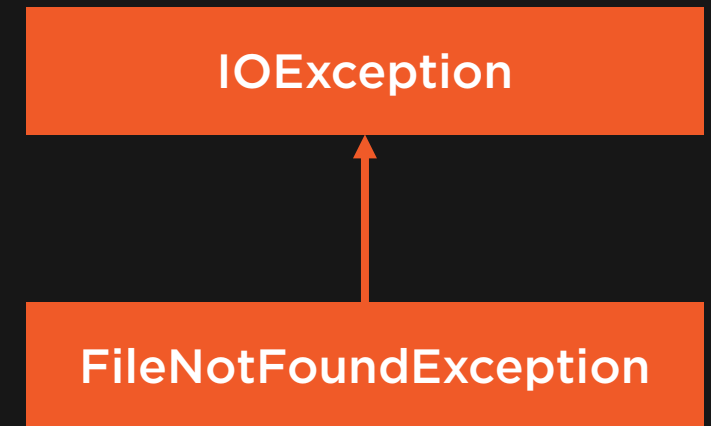
IllegalArgumentException.

IllegalStateException.

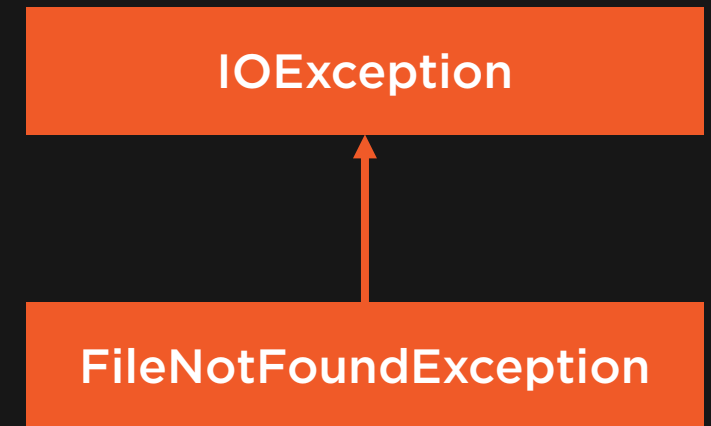
NumberFormatException



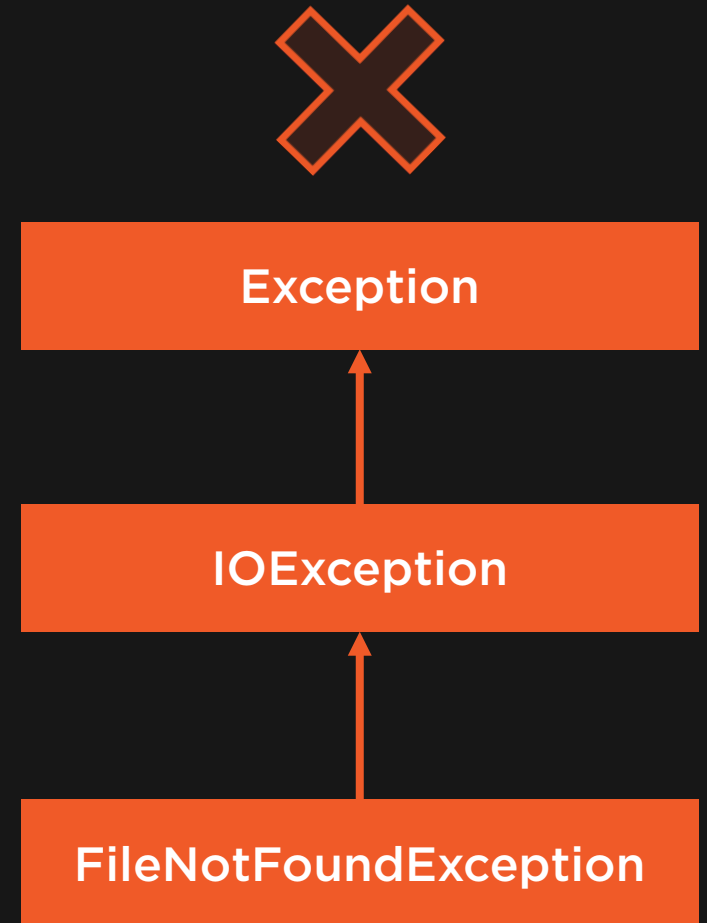
```
try {  
    throw new IOException();  
}  
catch (IOException | FileNotFoundException e) {  
  
}
```



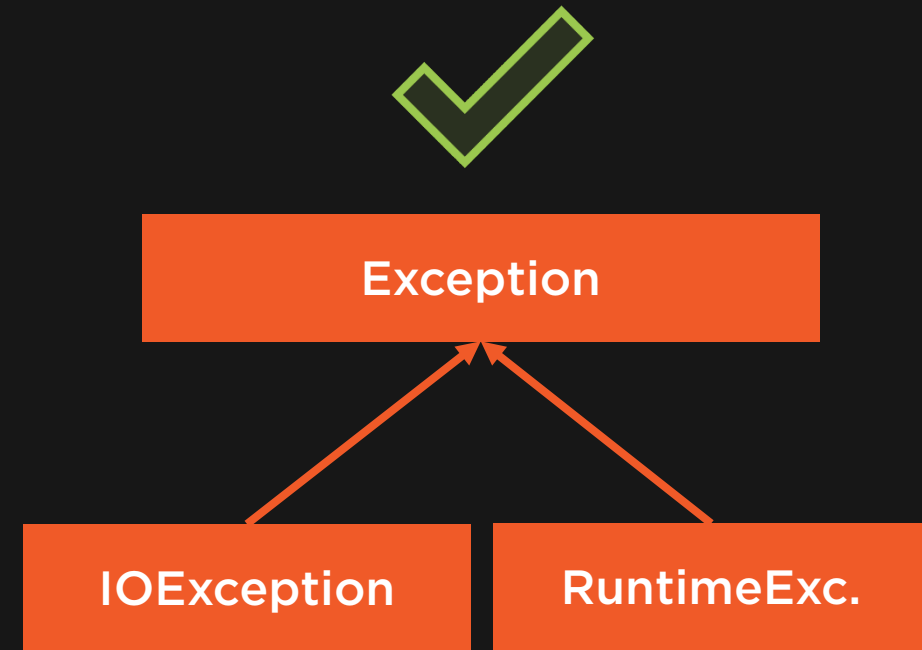
```
try {  
    throw new IOException();  
}  
catch (FileNotFoundException | IOException e) {  
  
}
```



```
try {  
    throw new IOException();  
}  
catch (IOException | Exception e) {  
  
}
```



```
try {  
    throw new IOException();  
}  
catch (IOException | RuntimeException e) {  
  
}
```



## Common Errors

**ExceptionInInitializerError**

**StackOverflowError**

**NoClassDefFoundError**

**OutOfMemoryError**

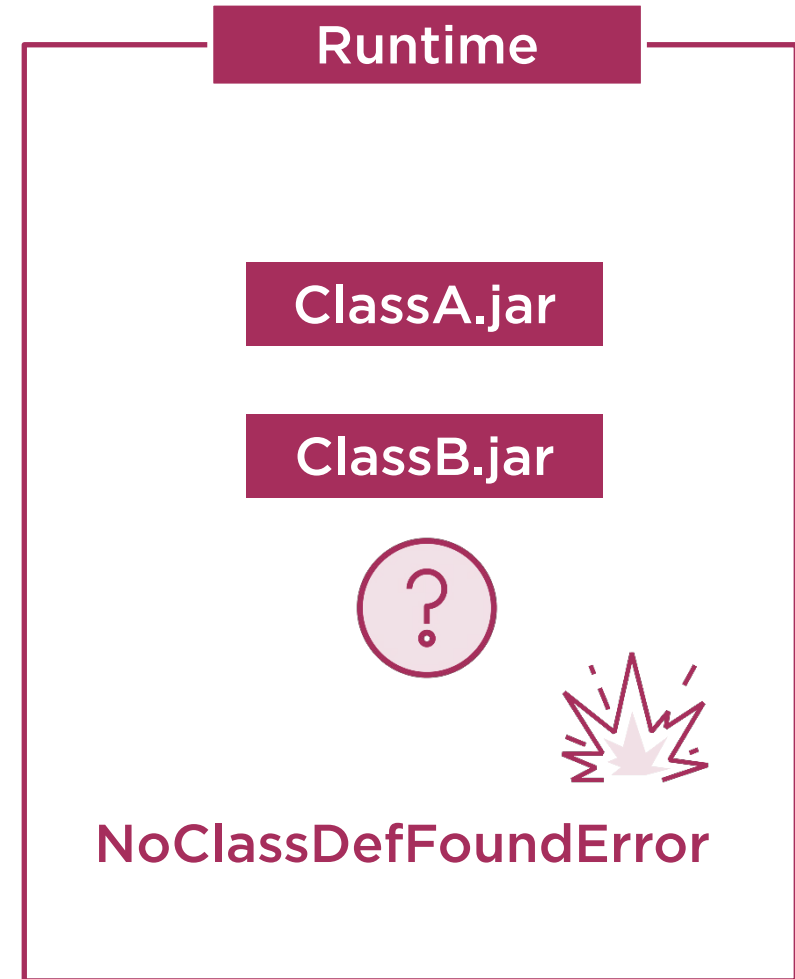
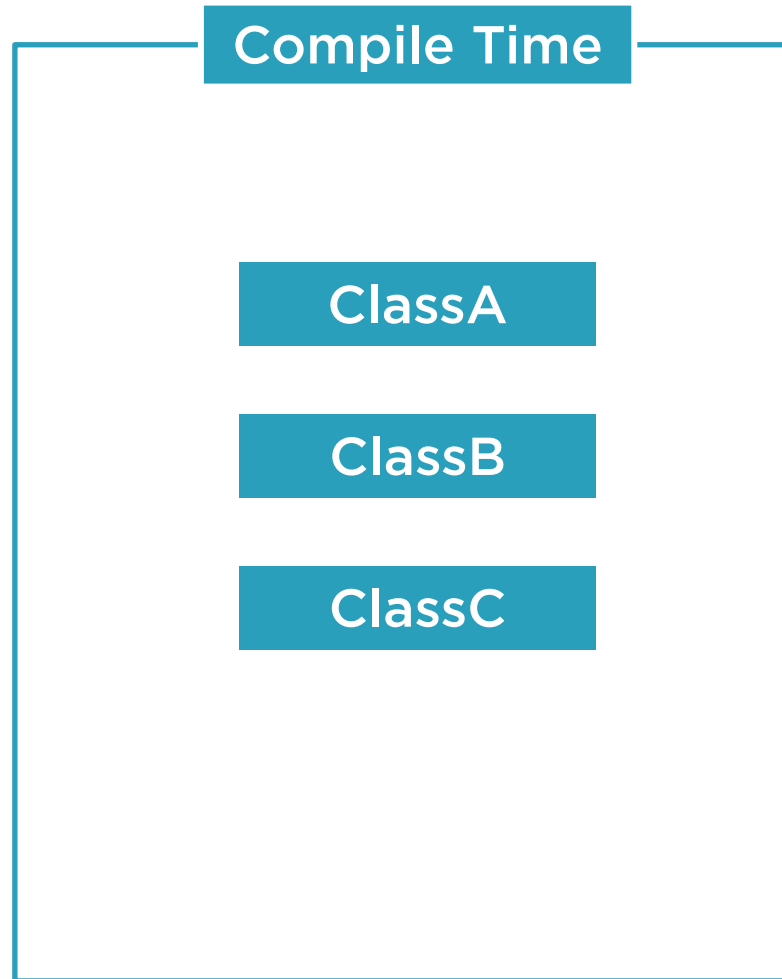






**Don't catch, handle or try  
to recover from errors**





# Summary



## **All exceptions extend Throwable**

- Exceptions vs. Errors

## **Exception types:**

- Checked vs. Unchecked

**Review of specific exceptions and errors**

**Practice!**



# Throwing Exceptions

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