

Lecture 07: Exceptions

CS 0445: Data Structures

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<http://db.cs.pitt.edu/courses/cs0445/current.term/>

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The Basics

- Method creates an exception object
 - We say “throws an exception”
- Signal to program
 - Unexpected has happened
- Handle the exception
 - Detect and react



The Basics

- Checked exceptions in the Java Class Library
 - `ClassNotFoundException`
 - `FileNotFoundException`
 - `IOException`
 - `NoSuchMethodException`
 - `WriteAbortedException`



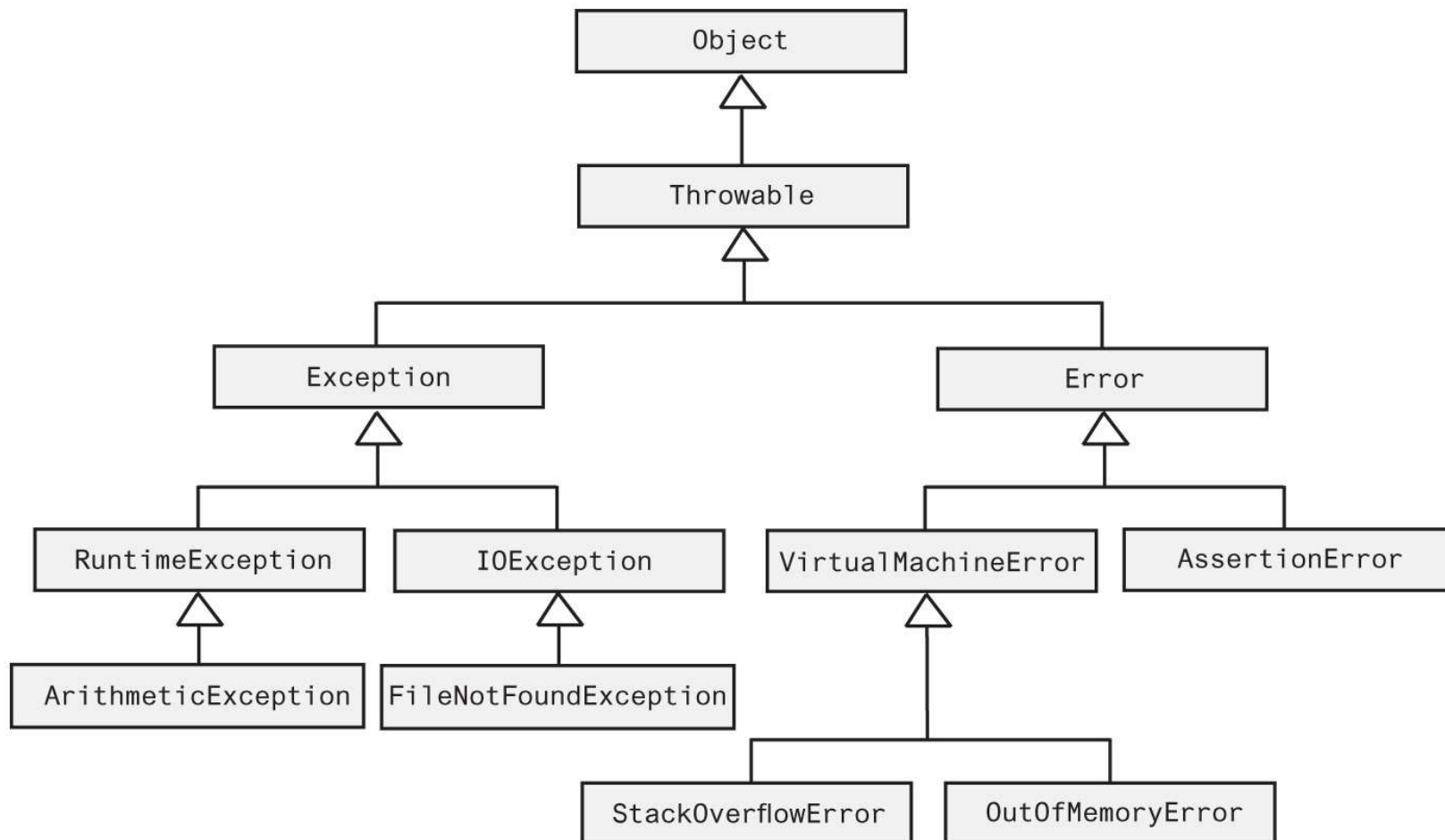
The Basics

- Runtime exceptions in the Java Class Library (Unchecked)
 - `ArithmeticException`
 - `ArrayIndexOutOfBoundsException`
 - `ClassCastException`
 - `IllegalArgumentException`
 - `IllegalStateException`
 - `IndexOutOfBoundsException`
 - `NoSuchElementException`
 - `NullPointerException`
 - `StringIndexOutOfBoundsException`
 - `UnsupportedOperationException`



Java Class Exception and Error Hierarchy

- The hierarchy of some standard exception and error classes



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Handling an Exception

- Postpone handling: The throws clause
 - If programmer not sure what action is best for a client when an exception occurs
 - Leave the handling of the exception to the method's client
- Method that can cause but does not handle checked exception must declare in its header

```
public String readString(. . .) throws IOException
```



Handle It Now: The try-catch Blocks

- Code to handle an `IOException` as a result of invoking the method `readString`

```
try
{
    < Possibly some code >
    anObject.readString(. . .); // Might throw an IOException
    < Possibly some more code >
}
catch (IOException e)
{
    < Code to react to the exception, probably including the following statement: >
    System.out.println(e.getMessage());
}
```



Multiple catch Blocks

- Good order for catch blocks

```
catch (FileNotFoundException e)
{
    . . .
}
catch (IOException e) // Handle all other IOExceptions
{
    . . .
}
```



Throwing an Exception

- A method intentionally throws an exception by executing a throw statement.
- Programmers usually create the object within the throw statement

```
throw new IOException();
```



Throwing an Exception

- If you can resolve unusual situation in a reasonable manner
 - likely can use a decision statement
- If several resolutions to abnormal occurrence possible, and you want client to choose
 - Throw a checked exception
- If a programmer makes a coding mistake by using your method incorrectly
 - Throw a runtime exception

