Exceptions & Error Handling_

Roadmap

- Define exceptions
- When to use exceptions
- How to use exceptions

What are Exceptions?

- A tool to handle errors
- Built-in Exception class - An object with the type **Exception**
- There is usually a message that describes what went wrong
- Exceptions are ***thrown*** when an application can't perform an operation

Throwing Exceptions

```
int[] numbers = {1, 2, 3};

System.out.println(numbers[999]);
```

- When this runs, an `ArrayIndexOutOfBounds` exception is thrown

Try-Catch

- We don’t want to crash our application, we can manage this by **catching** exceptions
- Control flow structure
- Catch blocks go from **more** to **less** specific
  - The most specific catch block will execute
- Block scope
  - Variables declared inside of a try or catch block only exist in that block

Try-Catch

- **Try:** The code here will be tried, but it could cause an exception
- **Catch**: Code that handles any exceptions
- We almost always use **e** as the identifier in the catch block

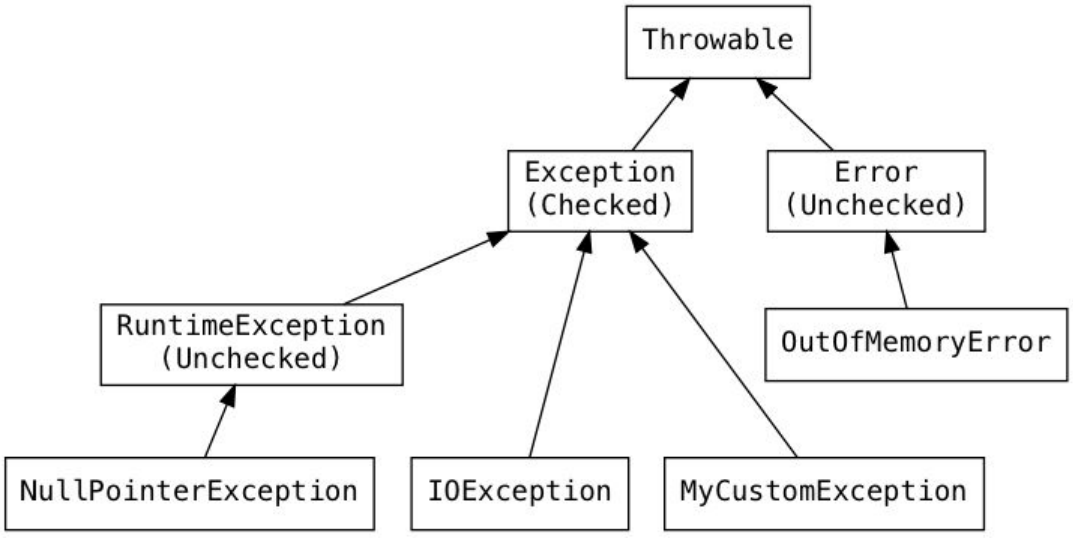
```
try{
    String[] days = {"Monday", "Tuesday"};
    System.out.println(days[4]);
    //ArrayIndexOutOfBoundsException
} catch (ArrayIndexOutOfBoundsException e){
    System.out.println("There is an error!");
    e.printStackTrace(System.out);
} catch (Exception e){
    System.out.println("General Exception");
    e.printStackTrace();
}
```

Exception Methods

- **getMessage**
  - Returns the exception message as a string
- **printStackTrace**
  - Prints full details of the exception to the console

Types of Exceptions

- **Unchecked Exceptions**
  - Mostly exceptions that are built into Java
  - Does not need to be explicitly dealt with
- **Checked Exceptions - Must be dealt with!!!**
- **Error**
  - Out of scope for now
  - Errors represent something is very wrong



Checked Exceptions

- **Checked Exceptions**
  - Must be handled in code
  - Try/Catch
  - Or by declaring them in the method signature with the **throws** keyword
  - Enforced by the compiler
    - If not handled, code will not compile


** Code Examples **