Exception handling and file handling

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Arrays

Arrays are used to store multiple values in a single variable, instead of declaring separate variables for each value.

To declare an array, define the variable type with square brackets:

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};

int[] myNum = {10, 20, 30, 40};
```

Accessing and updating elements

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};

System.out.println(cars[0]);
```

Update :

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};

cars[0] = "Opel";

System.out.println(cars[0]);
```

Array length and loop

```
String[] cars = {"Volvo", "BMW", "Ford", "Mazda"};
  System.out.println(cars.length);
```

To loop through array

```
for (int i = 0; i < cars.length; i++) {
  System.out.println(cars[i]);
  }
```

ArrayList

The ArrayList class is a resizable array, which can be found in the java.util package.

The difference between a built-in array and an ArrayList in Java, is that the size of an array cannot be modified (if you want to add or remove elements to/from an array, you have to create a new one). While elements can be added and removed from an ArrayList whenever you want.

Creating ArrayList and Adding element

```
import java.util.ArrayList; // import the ArrayList class


  ArrayList<String> cars = new ArrayList<String>();
   cars.add("Volvo");
   cars.add("BMW");
   cars.add("Ford");
   cars.add("Mazda");
   System.out.println(cars);
```

Access and update element

To access an element in the ArrayList, use the get() method and refer to the index number

```
cars.get(0);
```

To modify an element, use the set() method and refer to the index number:

```
cars.set(0, "Opel");
```

Remove and clear elements

To remove an element, use the remove() method and refer to the index number:

```
cars.remove(0);
```

To remove all the elements in the ArrayList, use the clear() method:

```
cars.clear();
```

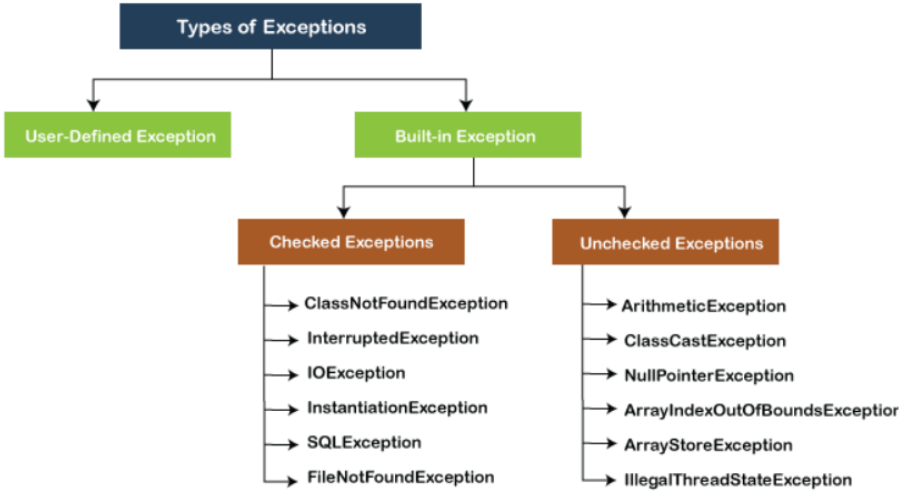
Exception Handling

When executing Java code, different errors can occur: coding errors made by the programmer, errors due to wrong input, or other unforeseeable things.

When an error occurs, Java will normally stop and generate an error message. The technical term for this is: Java will throw an exception (throw an error).

Types of Exception

1. Built-in Exceptions
    - Checked Exception
    - Unchecked Exception
2. User-Defined Exceptions



Try and catch

The try statement allows you to define a block of code to be tested for errors while it is being executed.

The catch statement allows you to define a block of code to be executed, if an error occurs in the try block.

The try and catch keywords come in pairs:

```
try {
  //  Block of code to try
}
catch(Exception e) {
  //  Block of code to handle errors
}
```

Finally

The finally statement lets you execute code, after try...catch, regardless of the result:

```
public class Main {
  public static void main(String[] args) {
    try {
      int[] myNumbers = {1, 2, 3};
      System.out.println(myNumbers[10]);
    } catch (Exception e) {
      System.out.println("Something went wrong.");
    } finally {
      System.out.println("The 'try catch' is finished.");
    }
  }
}
```

Throw keyword

The throw statement allows you to create a custom error.

The throw statement is used together with an exception type. There are many exception types available in Java: ArithmeticException, FileNotFoundException, ArrayIndexOutOfBoundsException, SecurityException, etc:

Example

```
public class Main {
  static void checkAge(int age) {
    if (age < 18) {
      throw new ArithmeticException("Access denied - You must be at least 18 years old.");
    }
    else {
      System.out.println("Access granted - You are old enough!");
    }
  }

  public static void main(String[] args) {
    checkAge(15); // Set age to 15 (which is below 18...)
  }
}
```

File Handling

In Java, with the help of File Class, we can work with files. This File Class is inside the java.io package. The File class can be used by creating an object of the class and then specifying the name of the file.

File Handling is an integral part of any programming language as file handling enables us to store the output of any particular program in a file and allows us to perform certain operations on it.

Creating a new file

```
import java.io.File;  // Import the File class


  File myObj = new File("filename.txt");
```

File methods

Method	Type	Description
`canRead()`	Boolean	Tests whether the file is readable or not
`canWrite()`	Boolean	Tests whether the file is writable or not
`createNewFile()`	Boolean	Creates an empty file
`delete()`	Boolean	Deletes a file
`exists()`	Boolean	Tests whether the file exists
`getName()`	String	Returns the name of the file
`getAbsolutePath()`	String	Returns the absolute pathname of the file
`length()`	Long	Returns the size of the file in bytes
`list()`	String[]	Returns an array of the files in the directory
`mkdir()`	Boolean	Creates a directory

Write to a file

```java
import java.io.FileWriter;   // Import the FileWriter class
import java.io.IOException;  // Import the IOException class to handle errors

public class WriteToFile {
  public static void main(String[] args) {
    try {
      FileWriter myWriter = new FileWriter("filename.txt");
      myWriter.write("Files in Java might be tricky, but it is fun enough!");
      myWriter.close();
      System.out.println("Successfully wrote to the file.");
    } catch (IOException e) {
      System.out.println("An error occurred.");
      e.printStackTrace();
    }
  }
}
```

Read a File

```java
import java.io.File;  // Import the File class
import java.io.FileNotFoundException;  // Import this class to handle errors
import java.util.Scanner; // Import the Scanner class to read text files

public class ReadFile {
  public static void main(String[] args) {
    try {
      File myObj = new File("filename.txt");
      Scanner myReader = new Scanner(myObj);
      while (myReader.hasNextLine()) {
        String data = myReader.nextLine();
        System.out.println(data);
      }
      myReader.close();
    } catch (FileNotFoundException e) {
      System.out.println("An error occurred.");
      e.printStackTrace();
    }
  }
}
```

Delete a File

```java
import java.io.File;  // Import the File class

public class DeleteFile {
  public static void main(String[] args) {
    File myObj = new File("filename.txt");
    if (myObj.delete()) {
      System.out.println("Deleted the file: " + myObj.getName());
    } else {
      System.out.println("Failed to delete the file.");
    }
  }
}
```