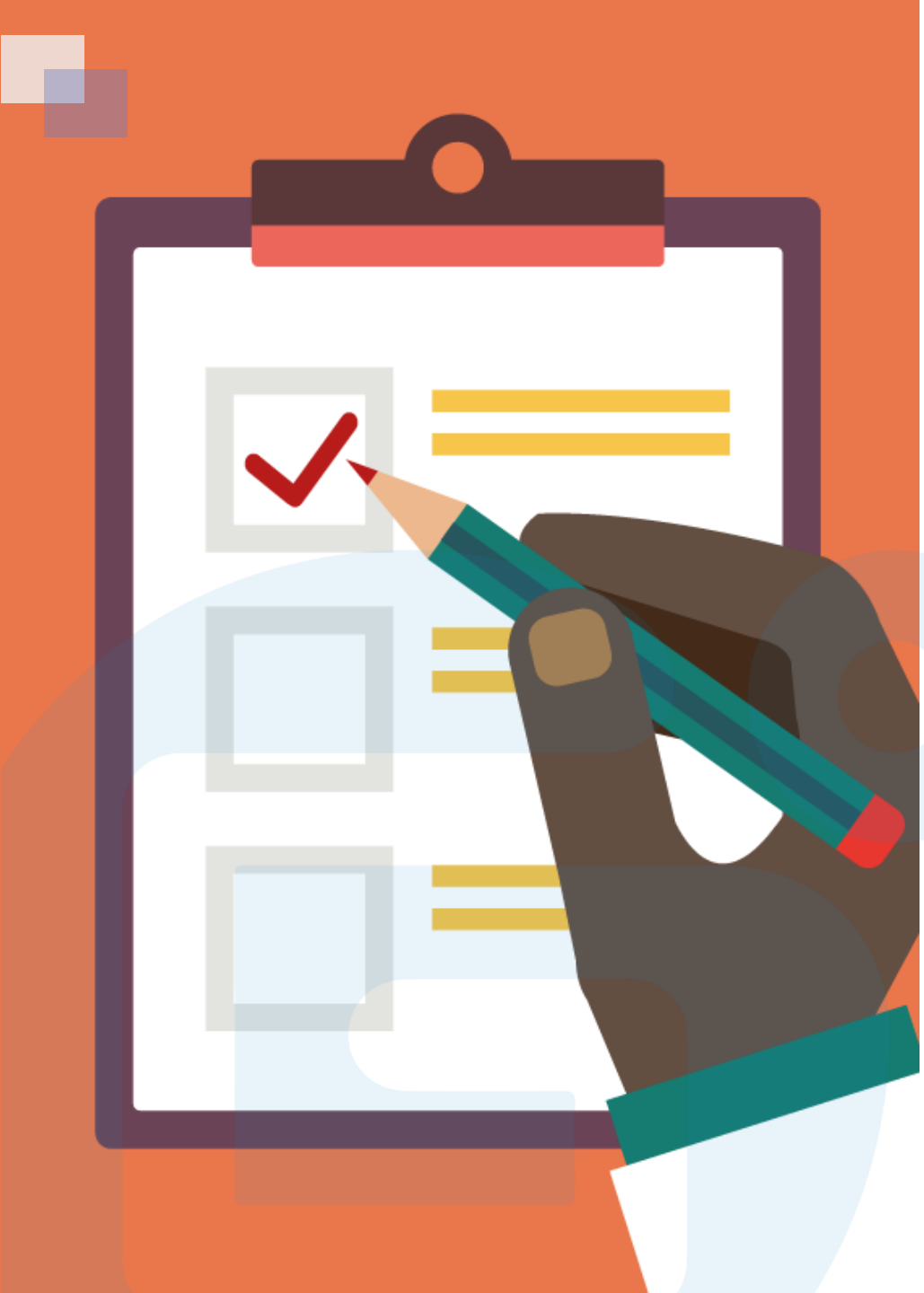
Lecture 4: Java Methods and Files



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Method Parameters

- Information can be passed to methods as parameter.
- Parameters act as variables inside the method.
- Parameters are specified after the method name, inside the parentheses. You can add as many parameters as you want.

```
public class Main {
  static void myMethod(String fname) {
    System.out.println(fname + " Refsnes");
  }
  public static void main(String[] args) {
    myMethod("Liam");
    myMethod("Jenny");
    myMethod("Anja");
  }
}
// Liam Refsnes
// Jenny Refsnes
// Anja Refsnes
```

Multiple parameters – The method call must have the same number of arguments as there are parameters, and the arguments must be passed in the same order.

```
public class Main {
  static void myMethod(String fname, int age) {
    System.out.println(fname + " is " + age);
  }
  public static void main(String[] args) {
    myMethod("Liam", 5);
    myMethod("Jenny", 8);
    myMethod("Anja", 31);
  }
}

// Liam is 5
// Jenny is 8
// Anja is 31
```

Return Value

Return value - If you want the method to return a value, you can use a primitive data type (such as int, char, etc.) instead of void, and use the return keyword inside the method.

```
public class Main {
  static int myMethod(int x, int y) {
    return x + y;
  }
  public static void main(String[] args) {
    System.out.println(myMethod(5, 3));
  }
}
// Outputs 8 (5 + 3)
```

```
public class Main {
  static int myMethod(int x, int y) {
    return x + y;
  }
  public static void main(String[] args) {
    int z = myMethod(5, 3);
    System.out.println(z);
  }
}
// Outputs 8 (5 + 3)
```

Method with If ... Else...

```
public class Main {
  // Create a checkAge() method with an integer variable called age
  static void checkAge(int age) {
    // If age is less than 18, print "access denied“
    if (age < 18) {
      System.out.println("Access denied - You are not old enough!");
    // If age is greater than, or equal to, 18, print "access granted“
    } else {
      System.out.println("Access granted - You are old enough!");
    }
  }
  public static void main(String[] args) {
    checkAge(20); // Call the checkAge method and pass along an age of 20
  }
}

// Outputs "Access granted - You are old enough!"
```

Method Overloading

With method overloading, multiple methods can have the same name with different parameters.
For example:

```
int myMethod(int x)
float myMethod(float x)
double myMethod(double x, double y)
```

We can overload the plusMethod method to work for both int and double.

```
static int plusMethodInt(int x, int y) {
  return x + y;
}
static double plusMethodDouble(double x, double y) {
  return x + y;
}
public static void main(String[] args) {
  int myNum1 = plusMethodInt(8, 5);
  double myNum2 = plusMethodDouble(4.3, 6.26);
  System.out.println("int: " + myNum1);
  System.out.println("double: " + myNum2);
}
```

```
int: 13
double: 10.559999999999999
```

Java Recursion

- Recursion is the technique of making a function call itself.
- Recursion can break complicated problems down into simple problems which are easier to solve.
- For example, recursion can be used to add a range of numbers together by breaking it down into the simple task of adding two numbers.

Eg. Add all of the numbers up to 10 using recursion.

```
public class Main {
  public static void main(String[] args) {
    int result = sum(10);
    System.out.println(result);
  }
  public static int sum(int k) {
    if (k > 0) {
      return k + sum(k - 1);
    } else {
      return 0;
    }
  }
}
```

Calculation steps:

10 + sum(9)
10 + (9 + sum(8))
10 + (9 + (8 + sum(7)))
...
10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 + sum(0)
10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 + 0

- Recursive functions can also run into the problem of infinite recursion.
- Infinite recursion is when the function never stops calling itself.
- Every recursive function should have a halting condition, which is the condition where the function stops calling itself.

Eg. Add all of the numbers between 5 to 10.

```
public class Main {
  public static void main(String[] args) {
    int result = sum(5, 10);
    System.out.println(result);
  }
  public static int sum(int start, int end) {
    if (end > start) {
      return end + sum(start, end - 1);
    } else {
      return end;
    }
  }
}
```

The halting condition for this recursive function is when end is not greater than start.

Write Files

• To create a file in Java, createNewFile( ) method needs to be used.
• createNewFile( ) method returns a boolean value. If the file was successfully created, it will return true. If the file already exists, it will return false.

```
import java.io.File;  // Import the File class
import java.io.IOException;  // Import the IOException class to handle errors
public class CreateFile {
  public static void main(String[] args) {
    try {
      File myObj = new File("filename.txt");
      if (myObj.createNewFile()) {
        System.out.println("File created: " + myObj.getName());
      } else {
        System.out.println("File already exists.");
      }
    } catch (IOException e) {
      System.out.println("An error occurred.");
      e.printStackTrace();
    }
  }
}
```

- FileWriter class can be used with its write ( ) method to write some text to the file.
- When you finish writing to the file, close ( ) method should be used to close the file.

```
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();
    }
  }
}
```

Load Files

- Scanner class can be used to read the contents of the text file.

```
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 Files

- delete ( ) method can be used to delete a file in 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.");
    }
   }
}
```

Thank you!
Any questions?