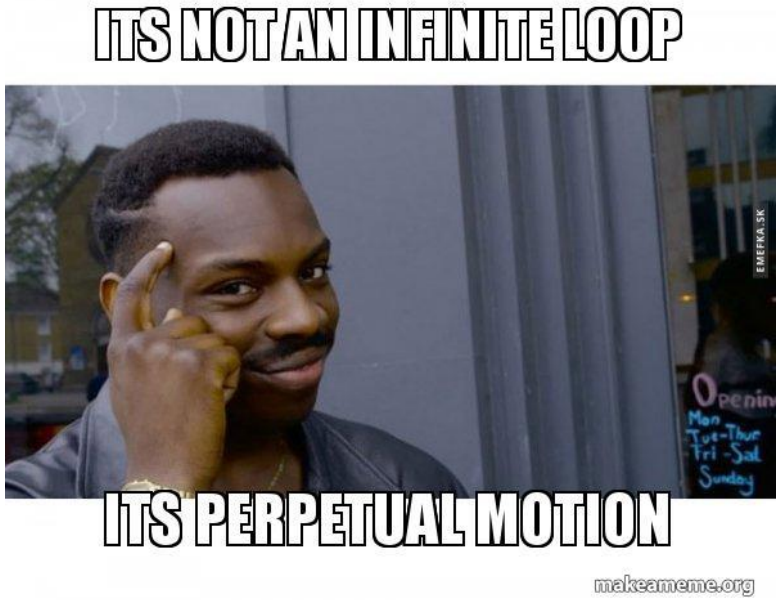

ITS NOT AN INFINITE LOOP
EMEFKA.SK
Openin
Mon
Tue-Thur
Fri-Sat
Sunday
ITS PERPETUAL MOTION
makeameme.org

Module 1-5

Inputs and Outputs

- Methods
- Command Line

Objectives

- Be able to use System.in/System.out to perform console I/O in a program
- Be able to correctly parse input from the input to primitive data types
- Be able to check for string equality
- Be able to split a string apart using known split character
- Be able to explain the process of a command line application (Take input, calculate data, give output)
- Be able to run their command line apps in their IDE

Methods

Methods

- Methods are **related** (hint: {...}) statements that complete a specific task or set of tasks.
- Methods can be called from different places in the code.
- When called, inputs can be provided to a method.
- Methods can also return a value to its caller.

Methods: General Syntax

Here is the general syntax:

<access Modifier> **<return type>** **<name of the method>** (... params…) {

    // method code.

}

- The return type can be one of the data types (boolean, int, float, etc.) we have seen so far.
- If the return type is “void” it means nothing is returned by the method.

Methods: Example

Here is a specific example of a non-void method:

```
public class MyClass {

        public int addTwoNumbers(int a, int b) {
                return a+b;
        }
}
```

The method addTwoNumbers is a method of the MyClass class.

The method accepts 2 parameters as input. More specifically, it expects 2 integers

The method has a return value of int, so there needs to be a return statement that returns an integer.

Methods: Example

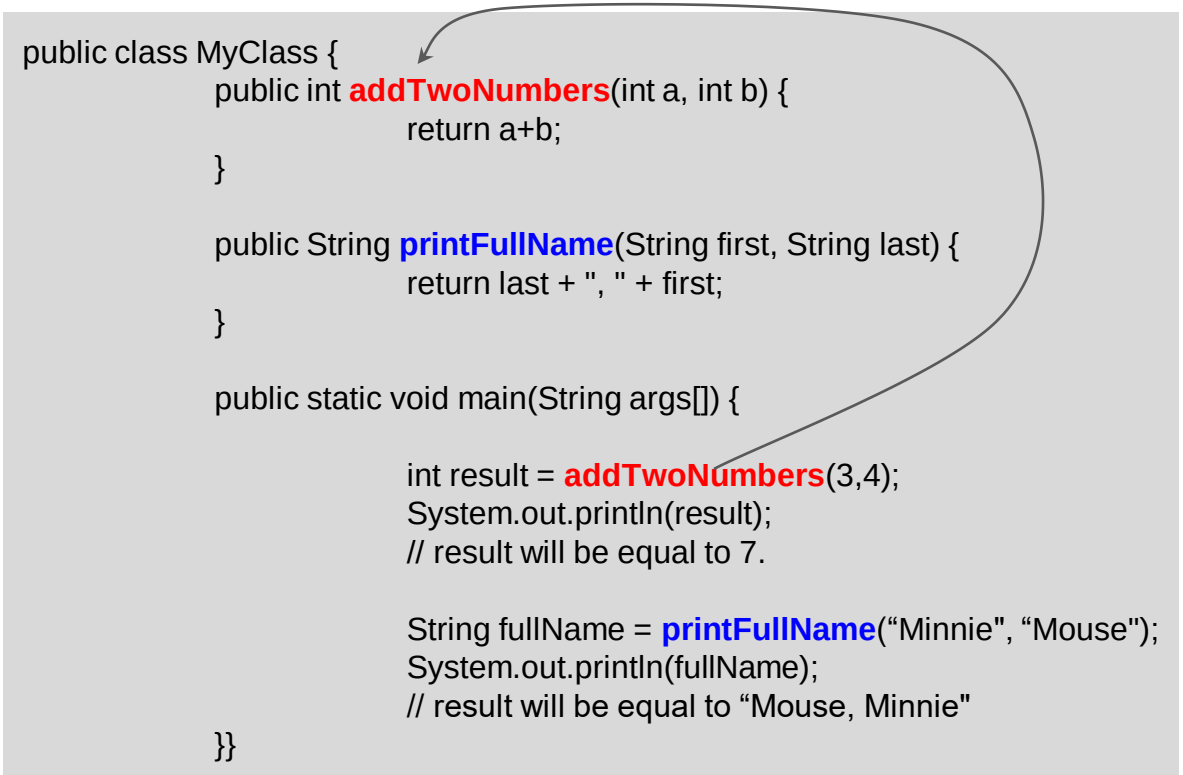
Here is a specific example of a void method:

```
public class MyClass {

        public void addTwoNumbers(int a, int b) {
                System.out.println(a+b);
        }
}
```

This method is void, thus has no return statement.

Methods: Calling A Method

Methods can be called from other methods.



```
public class MyClass {
        public int addTwoNumbers(int a, int b) {
                return a+b;
        }

        public String printFullName(String first, String last) {
                return last + ", " + first;
        }

        public static void main(String args[]) {

                int result = addTwoNumbers(3,4);
                System.out.println(result);
                // result will be equal to 7.

                String fullName = printFullName("Minnie", "Mouse");
                System.out.println(fullName);
                // result will be equal to "Mouse, Minnie"
        }}
```

In here, we call the method **printFullName** from **callingFunction**, providing all needed parameters and saving the result intoresult.

Methods: Calling A Method

Once a method has been defined, it can be called from somewhere else.

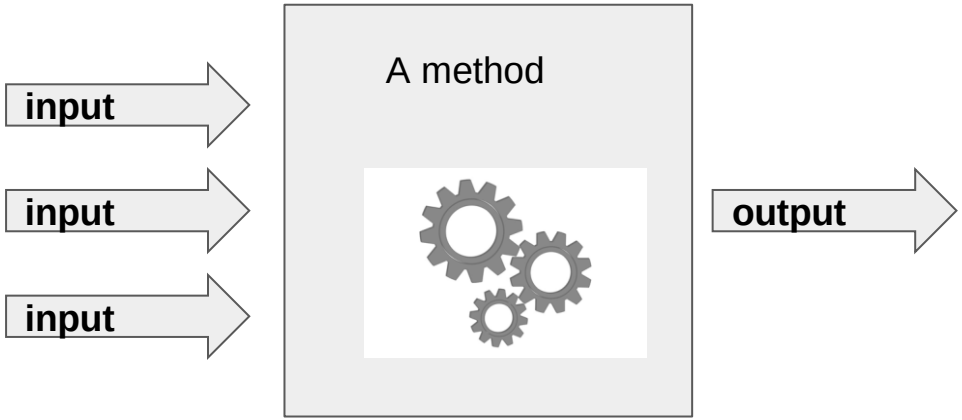
```
public class MyClass {
        public int addTwoNumbers(int a, int b) {
                return a+b;
        }

        public void callingMethod (   ) {

                int result = addTwoNumbers(3,4);
                System.out.println(result);
                // result will be equal to 7.
        }
}
```

addTwoNumbers takes 2 inputs, an integer a and an integer b. These are known as **parameters**.

When we call **addTwoNumbers**, we must provide the exact inputs specified (in this case 2 integers).

Methods: Example

Methods are Java's versions of functions. You can think of this as a process that could potentially take several inputs and use it to generate output.



Command Line Input / Output

Getting Input from the Command Line

- All programming languages must have the ability to read in data (input)
- Examples of input: a file, data being transmitted from a network, or **data typed in by the user**.

System.in and System.out

- Refer to standard input and output streams.
- System.in refers to the keyboard
- System.out refers to the console (monitor/terminal)

- To read from the keyboard, we need to create a Scanner object

```
Scanner input = new Scanner(System.in);
```

Using the Scanner Object

```
import java.util.Scanner;

public class InputReader {

          public static void main(String[] args) {

             Scanner userInput = new Scanner(System.in);

             System.out.print("Please enter your name: ");
             String name = userInput.nextLine();

             System.out.print("Please enter your height: ");
             String heightInput = userInput.nextLine();
             int height = Integer.parseInt(heightInput);

             System.out.println("Your name is: " + name + ".");
             System.out.println("Your height is:  " + height +
                    " inches.");
          }
}
```

To use the scanner object, we must import in the correct class.

Create an object of type scanner

The input is read and stored into a String called name.

The input is read and stored into a String called heightInput.

heightInput is converted into an int using the **Integer Wrapper Class.**

Parsing Strings

- What data type is the input from command line?
  - Always Strings!
- How do we “convert” this to numbers, dates, times, decimals, etc.?
  - Parse the string to convert it to a different data type

Java:

```
Integer.parseInt(String s);
Long.parseLong(String s);
Double.parseDouble(String s);
Boolean.parseBoolean(String s);  // Boolean s is a lower case s
```

Wrapper Classes

- Up until now, we have seen most of the **primitive** data types, to name a few: **int**, **boolean**, **char**, **long**, **float…**
- You have also seen some **non-primitive** types: **Strings** and **Arrays**
- You might have noticed that non-primitive types seem to have extra functionality that can be invoked with the dot operator, for example: (**myArray.length**).
- All the primitive data types have more powerful non-primitive equivalents, these are called **wrapper classes**. You have seen an example of this.

```
int height = Integer.parseInt(heightInput);
```

* albeit this example uses a static method of the wrapper class (more on this at a later date)

Wrapper Classes

Primitive	Wrapper	Example of Use
int	Integer	Integer myNumber = 3;
double	Double	Double myDouble = 3.1;

Declaring a variable using the Wrapper class gives you a little bit more flexibility. For example, you are able to run certain utility methods by using the dot operator.

```
Integer myNumber = 3;
String myStringNumber = myNumber.toString();
```

In the above example we have used a Wrapper class, and then a method of that class (toString()) to convert the value to a String. In general, if you know type conversions will be involved, Wrapper classes might be a good idea.

String equality

- Code example
- Difference between == and .equals() method
  - == can only be used with primitive data types
  - .equals should be used on reference types (Class objects)

```
String s1 = new String("HELLO");
String s2 = new String("HELLO");
System.out.println(s1 == s2);       // false
System.out.println(s1.equals(s2));  // true
```

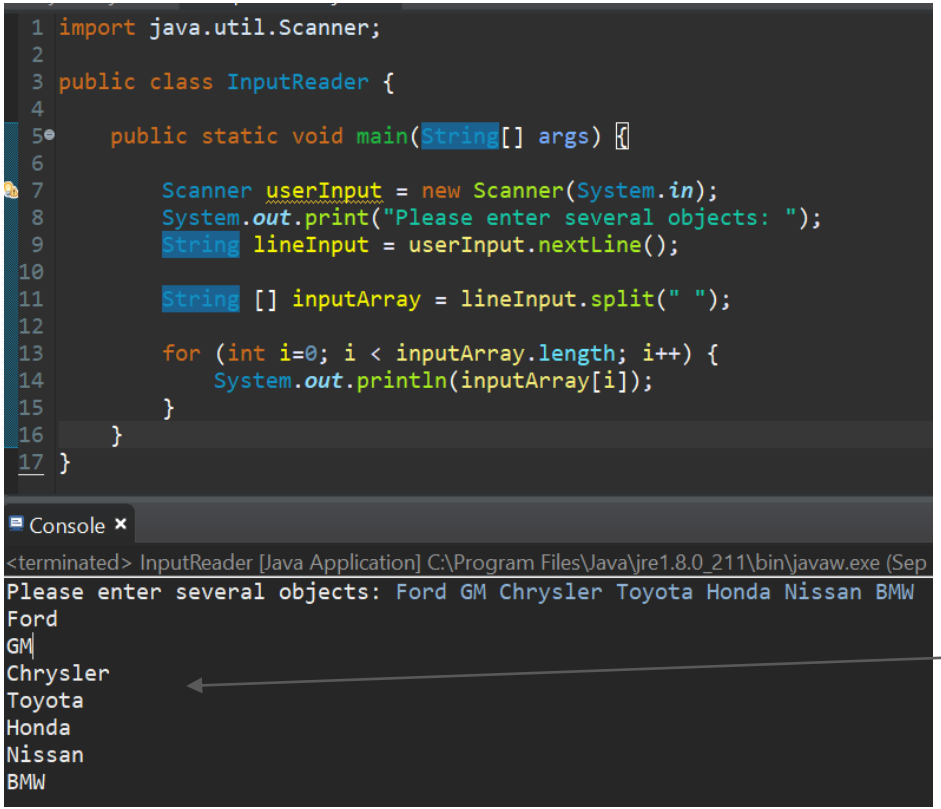
Reading In Multiple Items

```
import java.util.Scanner;

public class InputReader {

          public static void main(String[] args) {

              Scanner userInput = new Scanner(System.in);
              System.out.print("Please enter several names: ");
              String lineInput = userInput.nextLine();

              String [] inputArray = lineInput.split(" ");

              for (int i=0; i < inputArray.length; i++) {

                 System.out.println(inputArray[i]);
              }
          }
}
```

This is one possible way to handle input for more than one item.

- When prompted a user enters each item separated by a space.
- The split method separates out each time using the spaces, and puts all of the items into an array!

Reading In Multiple Items



```java
import java.util.Scanner;

public class InputReader {

    public static void main(String[] args) {

        Scanner userInput = new Scanner(System.in);
        System.out.print("Please enter several objects: ");
        String lineInput = userInput.nextLine();

        String [] inputArray = lineInput.split(" ");

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

```
Console ×
<terminated> InputReader [Java Application] C:\Program Files\Java\jre1.8.0_211\bin\javaw.exe (Sep
Please enter several objects: Ford GM Chrysler Toyota Honda Nissan BMW
Ford
GM
Chrysler
Toyota
Honda
Nissan
BMW
```

The user entered each car brand separated by a space

The whole input is “split” and repackaged as an array

Objectives

- Be able to use System.in/System.out to perform console I/O in a program

```
import java.util.Scanner;

public class InputReader {

            public static void main(String[] args) {

               Scanner userInput = new Scanner(System.in);

               System.out.print("Please enter your name: ");
               String name = userInput.nextLine();

               System.out.println("Your name is: " + name + ".");
            }
}
```

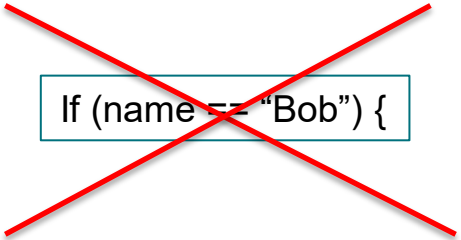
Objectives

- Be able to use System.in/System.out to perform console I/O in a program
- Be able to correctly parse input from the input to primitive data types

```
import java.util.Scanner;

public class InputReader {

           public static void main(String[] args) {

              Scanner userInput = new Scanner(System.in);

              System.out.print("Please enter your height: ");
              String heightInput = userInput.nextLine();
              int height = Integer.parseInt(heightInput);

              System.out.println("Your height is:  " + height +
                      " inches.");
           }
}
```

Objectives

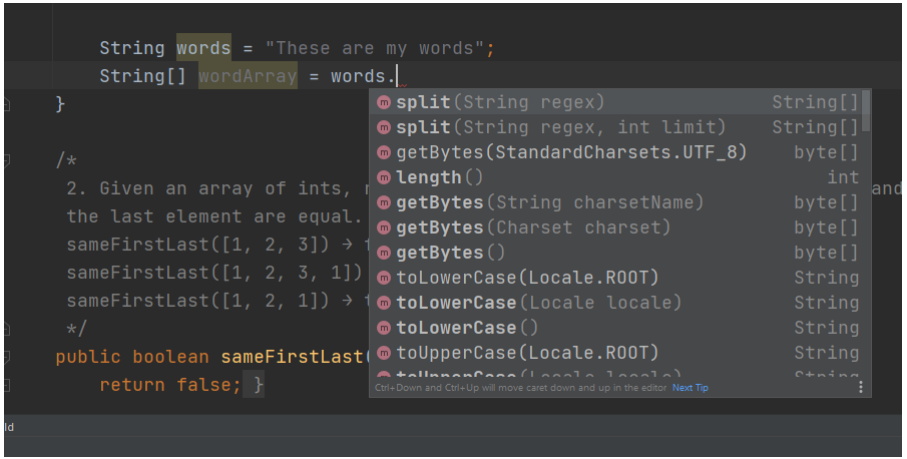
- Be able to use System.in/System.out to perform console I/O in a program
- Be able to correctly parse input from the input to primitive data types
- Be able to check for string equality




```
If (name.equals( “Bob” )) {
```

Objectives

- Be able to use System.in/System.out to perform console I/O in a program
- Be able to correctly parse input from the input to primitive data types
- Be able to check for string equality
- Be able to split a string apart using known split character




```
String words = "These are my words";
String[] wordArray = words.split(" ");
```

```
String words = "These are my words";
String[] wordArray = words.split("\\s");
```

Objectives

- Be able to use System.in/System.out to perform console I/O in a program
- Be able to correctly parse input from the input to primitive data types
- Be able to check for string equality
- Be able to split a string apart using known split character
- Be able to explain the process of a command line application (Take input, calculate data, give output)

Input Process Output

Objectives

- Be able to use System.in/System.out to perform console I/O in a program
- Be able to correctly parse input from the input to primitive data types
- Be able to check for string equality
- Be able to split a string apart using known split character
- Be able to explain the process of a command line application (Take input, calculate data, give output)
- Be able to run their command line apps in their IDE