





You Made It! Happy Friday!

Weekly Calendar

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				

COMMAND LINE PROGRAMS

MORE CONTEXT - ARRAY DECLARATION WITH INITIALIZATION

You can declare and initialize an array with values using two different syntax variations:

```
String [] names = {"yoav", "Jim", "Andrea"}  
  
// above is shorthand for this  
String [] namesUsingNew = new String[] {"yoav", "Jim", "Andrea"};  
  
printStrings(names);  
printStrings(namesUsingNew);  
  
printStrings({"yoav", "Jim", "Andrea"}); // DOES NOT WORK  
printStrings(new String [] {"yoav", "Jim", "Andrea"});  
  
// method being used  
  
public void printStrings(String [] strings) {  
    for (int index = 0; index < strings.length; index++) {  
        System.out.println(strings[index]);  
    }  
}
```

Either of these are valid when declaring an array variable.

When you create an array on the fly without assigning it to a variable, you **MUST** use the version that includes the **new** keyword.

This is because the compiler does not have enough information to infer that you are trying to create an array of a certain type.

TODAY'S OBJECTIVES

- Using `System.in/System.out/Console.ReadLine()` to perform console I/O in a program.
- Parsing input from the input stream to primitive data types.
- Check for string equality.
- Convert a String list with a known separator character into an array.
- Command line application process: Take input, calculate data, give output.
- Running command line apps in your 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> (... arguments...) {  
    // 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: EXAMPLES

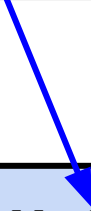
Methods can accept input parameters but are not required to.

```
public void printHello() {  
    System.out.println("Hello, World!")  
}
```


METHODS: EXAMPLES

No input parameters

Methods can accept input parameters but are not required to.



```
public void printHello() {  
    System.out.println("Hello, World!")  
}
```

METHODS: EXAMPLES

Methods can accept input parameters but are not required to.

No input parameters

```
public void printHello() {  
    System.out.println("Hello, World!")  
}
```

```
public int addNums(int num1, int num2) {  
    return num1 + num2;  
}
```

Two input parameters of type int.

METHODS: EXAMPLES

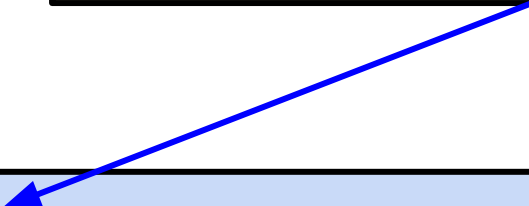
Methods can return a value but are not required to.

```
public void printHello() {  
    System.out.println("Hello, World!")  
}
```

METHODS: EXAMPLES

No return value (`void` return type specified). MUST NOT return a value.

Methods can return a value but are not required to.



```
public void printHello() {  
    System.out.println("Hello, World!")  
}
```

METHODS: EXAMPLES

No return value (void return type specified). MUST NOT return a value.

Methods can return a value but are not required to.

```
public void printHello() {  
    System.out.println("Hello, World!")  
}
```

```
public int addNums(int num1, int num2) {  
    return num1 + num2;  
}
```

Returns an int value. If the return type is not void, the method MUST return a value of the specified type.

METHOD SIGNATURE

Methods have a signature, which is made up of:

- Name (should be descriptive)

Method name

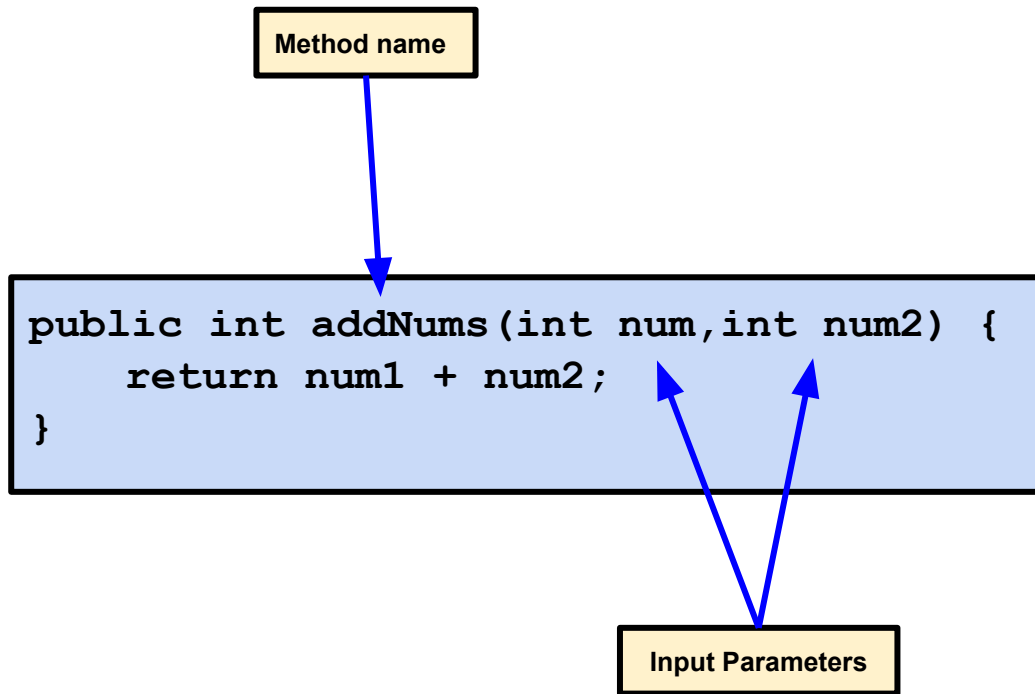


```
public int addNums(int num,int num2) {  
    return num1 + num2;  
}
```

METHOD SIGNATURE

Methods have a signature, which is made up of:

- Name (should be descriptive)
- Input Parameters (number, types, order)



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 void callingFunction (String args[]) {  
  
        int result = addTwoNumbers(3,4);  
        System.out.println(result);  
        // result will be equal to 7.  
  
        String fullName = printFullName("Andy", "Chong");  
        System.out.println(fullName);  
        // result will be equal to "Chong, Andy"  
  
    }  
}
```


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) {  
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    }  
  
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        int result = addTwoNumbers(3,4);  
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        // result will be equal to 7.  
  
        String fullName = printFullName("Andy", "Chong");  
        System.out.println(fullName);  
        // result will be equal to "Chong, Andy"  
  
    }  
}
```

callingFunction makes a call to `printFullName` providing all needed parameters and saving the returned value into `result`

CALLING A METHOD

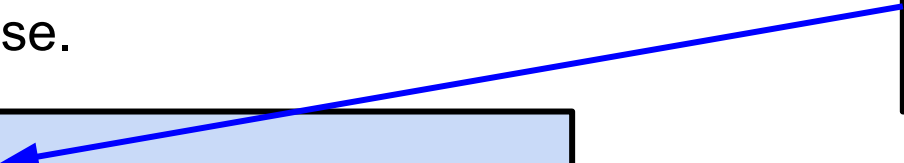
Once a method has been defined, it can be called from somewhere else.

```
public class MyClass {  
    public int addTwoNumbers(int a, int b) {  
        return a+b;  
    }  
  
    public String printFullName(String first, String last) {  
        return last + ", " + first;  
    }  
  
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        int result = addTwoNumbers(3,4);  
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        System.out.println(fullName);  
        // result will be equal to "Chong, Andy"  
  
    }  
}
```

CALLING A METHOD

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

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



```
public class MyClass {  
    public int addTwoNumbers(int a, int b) {  
        return a+b;  
    }  
  
    public String printFullName(String first, String last) {  
        return last + ", " + first;  
    }  
  
    public void callingFunction (String args[]) {  
  
        int result = addTwoNumbers(3,4);  
        System.out.println(result);  
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        String fullName = printFullName("Andy", "Chong");  
        System.out.println(fullName);  
        // result will be equal to "Chong, Andy"  
  
    }  
}
```

CALLING A METHOD

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

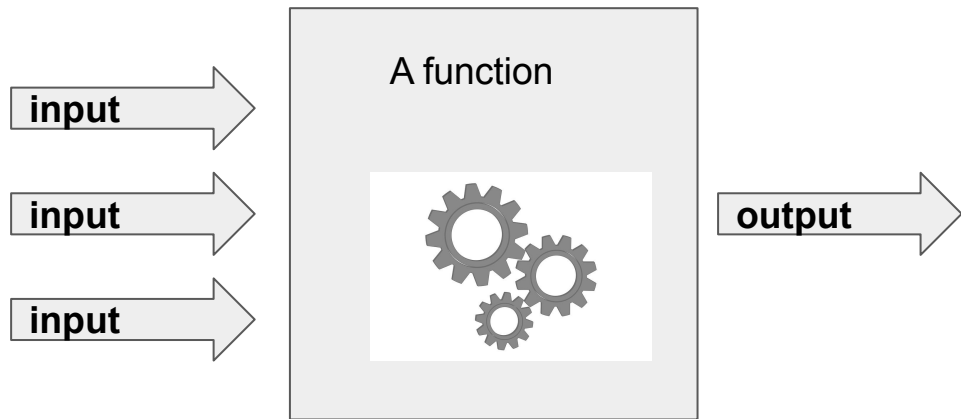
addTwoNumbers takes 2 inputs, an integer **a** and an integer **b**. These are known as parameters.

```
public class MyClass {  
    public int addTwoNumbers(int a, int b) {  
        return a+b;  
    }  
  
    public String printFullName(String first, String last) {  
        return last + ", " + first;  
    }  
  
    public void callingFunction (String args[]) {  
  
        int result = addTwoNumbers(3,4);  
        System.out.println(result);  
        // result will be equal to 7.  
  
        String fullName = printFullName("Andy", "Chong");  
        System.out.println(fullName);  
        // result will be equal to "Chong, Andy"  
  
    }  
}
```

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.**

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 + " cm's.");

    }
}
```


USING THE SCANNER OBJECT

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

```
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 + " cm's.");

    }
}
```

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 + " cm's.");

    }
}
```

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

Create an object of type **Scanner**

USING THE SCANNER OBJECT

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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 + " cm's.");

    }
}
```

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**.

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 + " cm's.");

    }
}
```

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**.

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 + " cm's.");

    }
}
```

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**.

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 objects: ");
        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

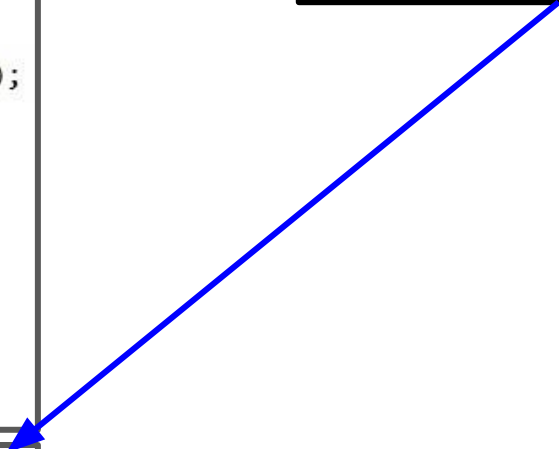
```
public class InputReader {  
  
    public static void main(String[] args) {  
  
        Scanner userInput = new Scanner(System.in);  
        System.out.print("Please enter several objects: ");  
        String lineInput = userInput.nextLine();  
  
        String [] inputArray = lineInput.split(" ");  
  
        for (int i=0; i < inputArray.length; i++) {  
            System.out.println(inputArray[i]);  
        }  
    }  
}
```

```
Please enter several objects: Ford GM Chrysler Toyota Honda  
Ford  
GM  
Chrysler  
Toyota  
Honda
```

READING IN MULTIPLE ITEMS

```
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]);  
        }  
    }  
}
```

The user entered each car brand separated by a space



```
Please enter several objects: Ford GM Chrysler Toyota Honda  
Ford  
GM  
Chrysler  
Toyota  
Honda
```


READING IN MULTIPLE ITEMS

```
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]);  
        }  
    }  
}
```

```
Please enter several objects: Ford GM Chrysler Toyota Honda  
Ford  
GM  
Chrysler  
Toyota  
Honda
```

The user entered each car brand separated by a space

The whole input is **split** and repackaged as an array

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.