Input

Reading Resource

✓ Read chapter 4 (Variables and Constants) in the textbook A Guide to Programming in Java, pages 77 to 82.

Key Concepts

- A ***stream*** is a data channel to or from the operating system.
- The standard input stream in Java is **`System.in`**
- Use the **Scanner** class has methods for inputting data from the console window

```
     import java.util.*;

public class InputExample1 {
  public static void main(String[] args) {

    Scanner keyboard = new Scanner(System.in);
    String name;

        // prompt the user for their name
    System.out.println("What is your name? ");
        // input a word from the keyboard
    name = keyboard.nextLine();
        // output a greeting
    System.out.println("Hello " + name);
  }  // end main method
} // end class Example4
```

Notes about importing packages

- The `import` statement makes the classes of a package accessible to an application.
- The following statement imports the one class (`Scanner`) to your application

```
     import java.util.Scanner;
```

- Use an asterisk (*) so all members of the `util` package are accessible
- Import statements are placed before the class definition

The Scanner class

To input what you type on the keyboard, your program needs to connect to the hardware through the operating system. This is done with a **class** (a blueprint for a program) that is included with the Java, the Scanner class. Add this line to your programs to enable keyboard input.

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

This statement instructs the computer to create an ***object*** (keyboard in this example) and initialize it with the ***input stream*** called System.in Remember that in previous examples output was displayed on the monitor, which is the output stream called System.out, with the println ***method***.

Terminology

Input stream: a sequence of characters received from an input device.

Class: a blueprint for an abject

Object: a named entity that is made of related data and instructions for performing actions on that data.

Method: a named set of statements that performs a simple, well-defined task.

Methods in the Scanner class

A method is like a subprogram inside the class with a special purpose. The Scanner class has many methods for obtaining a value from the user. Look in your textbook, A Guide to Programming in Java, on page 81 and copy the list of methods into the chart below.

Method name	Description

Here is another example program:

```
//**********************************************************
// * Program Title:   Input Example 2
// * Programmer:      Mr. Young
// * Course:          ICS 4U1
// * Date:            09/08/2014
// * Filename:        InputExample2.java
// * Description:     demonstrates different methods of
// *                  the Scanner class
// ************************************************************
import java.util.*;
public class InputExample2 {
  public static void main(String[] args) {

    Scanner keyboard = new Scanner(System.in);
    String name;
    int age;
         // prompt the user for their name
    System.out.println("What is your name? ");
        // input a line of text from the keyboard
    name = keyboard.nextLine();
        // prompt the user for their age
    System.out.println("How old are you? ");
        // input an integer number from the keyboard
    age = keyboard.nextInt();
        // output an extended greeting
    System.out.println("\n\tHello " + name + ".");
    System.out.println("\tI see that you are "
                              + age + " years old.\n");
   }  // end main method
} // end class ProgramExample5
```

Notes on Example # 5

- You must reserve a location in memory for the data in your program. There are a few fundamental types of data that you will see in your programs. Here are some standard ***data types***:

  - **`int`** An ***integer*** data type is a whole number (no decimals; ex: 6, 127, or 9358)
  - **`double`** If your program will use decimal numbers such as 3.1415 or 0.002, then you must tell the computer that the variable needs this kind of storage. **Note:** in some textbooks and program examples **`float`** is used instead of double. This is OK since **`double`** is just twice the memory capacity of a float variable
  - **`char`** This designates one byte of memory for a single Unicode character.
  - **`String`** For a whole word or a whole sentence to be stored in a single variable, use the type **`String`**. Notice that this data type begins with a capital.

- The **Scanner** class: there are many methods (commands) that you can use with an object created from the Scanner class. This statement creates an object called **get** built with the Scanner "blueprint":

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

  - Use the `next()` method to input one word (***delimited*** by spaces), for example:

    ```
    String first_name;
    first_name = get.next();
    ```

  - Use the `nextLine()` method to input an entire line of text (delimited by the Enter key), for example:

    ```
    String sentence;
    sentence = get.next();
    ```

  - Use the `nextInt()` method to input one integer, for example:

    ```
    int number;
    number = get.nextInt();
    ```

  - Use the `nextDouble()` method to input one "floating point" number, which is a number with a fractional part (a decimal), for example:

    ```
    double price;
    price = get.nextDouble();
    ```

Rules for Naming Variables in Java

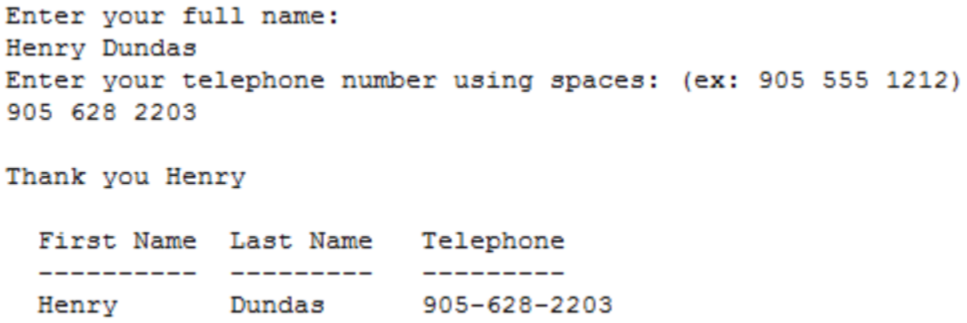
- A variable name may be very long (up to 256 characters) but it is more practical to keep them short (example: `name` rather than `TheLastNameOfMyClient`)
- A variable name must begin with a letter
- A variable name may contain the digits 0-9. (ex: `letter1`, `letter2`, `letter3`)
- DO NOT use spaces (bad example: `size in sq meters`)
- Separate words in a variable name with the underscore '_' character (example: `size_in_sq_meters`)
- Java is **case sensitive** so `Size_In_SqMeters` is different than `size_in_sqmeters`
- Do Not use **key-words** as variables (such as `int`, `float`, `char`, and so on)

Examples

Legal variable names		**Illegal variable names**	
total	Price	4names	$letter
Sentence	My_Name	File-name	Total Price
aLongVariableName	sales_tax	char	account#1
COUNT	number	A long variable name.	

Activity # 7

Modify the example code so that the program asks for the user’s full name (first name and last name) and their telephone number (Area Code, Exchange, and Number) and then displays the output similar to this sample:



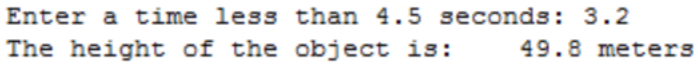
```
Enter your full name:
Henry Dundas
Enter your telephone number using spaces: (ex: 905 555 1212)
905 628 2203

Thank you Henry

  First Name  Last Name   Telephone
  ----------  ---------   ---------
  Henry       Dundas      905-628-2203
```

Activity # 8

The height of an object at any given time dropped from a starting height of 100 meters is given by the equation $h=100-4.9*t^2$ where **t** is the time in seconds. Create an ObjectHeight application that prompts the user for a time less than 4,5 seconds and then displays the height of the object at that time. The application output should look similar to:



```
Enter a time less than 4.5 seconds: 3.2
The height of the object is:    49.8 meters
```

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