ACO 101 Spring 2019
Programming Assignment 2
Due: Start of Class Thursday, 11 April 2019

In this programming assignment, you will combine the various components of the Java programming language that you learned in the first 6 chapters of the textbook with an emphasis on methods and arrays:

- Variables and Types (Ch 2 & Ch 3)
- Input using Scanner (Ch 2)
- Decisions (Ch 3)
- Loops (Ch 4)
- Methods (Ch 5)
- Arrays (Ch 6)

The goal of this PlanetWeight program is to determine the weight of an object on planets in our solar system. You are to prompt the user to input the weight of an object, allowing for fractional digits, entering 0 to exit the program. (You may assume that the user enters a valid weight.) Then prompt the user to enter the name of a planet (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune) or one of the following options: Max, Min, All. Your program must validate this input ignoring case (Hint: String has a method equalsIgnoreCase or convert the user input using toLowerCase() before checking), displaying an error message if input is invalid. For valid input, the program will display the weight of the object on the input choice specified.

Implementation Notes: Your program MUST satisfy the following constraints -

- Use the following array declarations in the PlanetWeight class (not main method), where the gravity array provides the corresponding factor to multiply the weight by for the associated planet. For example, weight * gravity[i] provides the corresponding weight on planets[i].

  public static String[] planets = {"Mercury", "Venus", "Earth", "Mars", "Jupiter", "Saturn", "Uranus", "Neptune"};
  public static double[] gravity = {0.39, 0.91, 1.00, 0.38, 2.87, 1.32, 0.93, 1.23};

- You must implement the following methods, where the find methods are using a *linear search* and returning the *index* of the position in the array when found or -1 when not found:

  public static int findByPlanet(String planet)
  public static int findByGravity(double grvty)
  public static double weightOnPlanet(double weight, int planet)

- Rather than use nested if's to determine the option that the user chose, you must use a switch statement. In the textbook, see Special Topic 3.3 for the syntax and description of the switch statement. Most languages provide a switch/case statement so this is a useful construct to understand.

- You must use formatted output for the All option to display the information in a readable form. See sample output below.

IMPORTANT! You can use only the features of the Java programming language from Chs 1-6.

On the due date, you will turn in the following:

1. A hard copy of your .java files: Make sure that the listing includes your name and class as a comment line in your .java files.
2. A printout of the compilation and execution of your program. (You can copy the contents of the output window of jgrasp OR submit a screenshot.)
3. An electronic copy of your .java files must be turned in through the assignment facility.

NOTE: Only programs that successfully compile and execute will be considered for assessment.
Your program must adhere to the specifications

REMINDER: THIS IS AN INDIVIDUAL ASSIGNMENT!
You can only discuss the assignment with the professor or lab assistant.

Test Cases:

- Planet Options:
  - Valid: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Max, Min, All
  - Valid: but does not match case
  - Invalid: anything else

Sample Input and Output:

```
    ----jGRASP exec: java PlanetWeight
►► Please enter a weight on Earth (0 to quit): 14
►► Please enter a planet name or Max, Min, All: all
    14.0 pounds:
    Mercury              5.46
    Venus               12.74
    Earth               14.00
    Mars                 5.32
    Jupiter             40.18
    Saturn              18.48
    Uranus              13.02
    Neptune             17.22
►► Please enter a weight on Earth (0 to quit): 50
►► Please enter a planet name or Max, Min, All: max
    50.0 pounds is maximum of 143.5 on Jupiter
►► Please enter a weight on Earth (0 to quit): 100
►► Please enter a planet name or Max, Min, All: min
    100.0 pounds is minimum of 38.0 on Mars
►► Please enter a weight on Earth (0 to quit): 150
►► Please enter a planet name or Max, Min, All: jupiter
    150.0 pounds is 430.5 on jupiter
►► Please enter a weight on Earth (0 to quit): 0

    ----jGRASP: operation complete.
►►
```