Programming Assignment 6

A `Weather` Class

Overview

WeatherBits is a company that develops weather-related software of various kinds. They have asked you to develop a class (named `Weather`) that can be used to calculate wind chill values (for locations in North America). Your work will ultimately be part of a larger product called *WeatherBitmaps*.

Wind chill values are calculated differently in different parts of the world (and have been calculated differently in the past). For the purposes of this project, you must use the following formula that was developed for North American air temperatures at or below 50°F and wind speeds above 3mph:

$$w = 35.74 + 0.6215 \cdot t - 35.75 \cdot v^{0.16} + 0.4275 \cdot t \cdot v^{0.16}$$

where w denotes the wind chill value in degrees Fahrenheit, t denotes the air temperature in degrees Fahrenheit, and v denotes the velocity in miles per hour. For other temperatures and wind speeds, the wind chill value must be the air temperature.

Specifications

You must write a `Weather` class that complies with the following specifications:

1. It must have a method with the the following signature:

   ```
   public static double windChillNA(double t, double v)
   ```

   that calculates the wind chill using the method described in the overview.

In addition, you must write a `WeatherTest` class that complies with the following specifications:

2. It must have the following method that tests the `windChillNA()` method in the `Weather` class:

   ```
   public static void windChillNATest()
   ```

   This method can have parameters or not, as you see fit. However, this method must, at a minimum, include the following tests:

Temperature	Wind Speed	Wind Chill
20.2	17.4	5.47
40.0	10.0	33.64
-15.0	15.0	-38.61
50.0	10.0	46.04
49.9	4.0	48.75
50.0	3.1	49.59
5.0	13.0	-11.82
51.0	20.0	51.00
59.0	3.1	59.00
95.0	10.0	95.00
20.0	3.0	20.00
-10.0	3.0	-10.00
49.9	2.9	49.90
53.0	3.0	53.00
93.0	2.0	93.00

3. It must use the `Test` class that you have used in the past.

4. It must have the following method:

   `public static void main(String[] args)`

5. The `main()` method must open and close the `JMUConsole` at appropriate times.

6. The `main()` method must invoke the `windChillNATest()` method appropriately.

Recommended Process

You should be able to create an appropriate process for this assignment. As part of that process, you should make sure you understand why each of the tests that you must use is important.

The last step of the process must be to submit both `Weather.java` and `WeatherTest.java` in a file named `pa6.zip` using Autolab. Do not include any other files in the `.zip` file.Recommended

Process

The `Math` class has a method with the signature `pow(double value, double exponent)` that you can use to calculate `value` raised to the `exponent` power.

Grading

Your grade on this assignment will depend both on the quality of the tests and the quality of the corrected `Weather` class.

Your code will first be graded by Autolab and then by the Professor. The grade you receive from Autolab is the maximum grade that you can receive on the assignment.

Autolab Grading

Your code must compile (in Autolab, this will be indicated in the section on "Does your code compile?"), all class names and method signatures comply with the specifications (in Autolab, this will be indicated in the section on "Do your class names, method signatures, etc. comply with the specifications?"), and **your code must conform to the course style guide** for you to receive any points on this assignment.

Autolab will then grade your submission as follows:

Coverage/Quality of Your Tests:	**20 points** (Partial Credit Possible)
Correctness:	**80 points** (Partial Credit Possible)

Autolab will only provide limited hints because, at this point in the semester, you should not be using Autolab to test and debug your code, you should be testing and debugging your code yourself. For the coverage/quality of your tests it will indicate which methods are not being adequately tested, but will not provide any details. For the correctness of the code, it will provide very little information.

Autolab will not provide any hints about the coverage/quality of your tests or the correctness of your code, if your submission does not conform to the course style guide.

Manual Grading

After the due date, the Professor may manually review your code. At this time, points may be deducted for inelegant code, inappropriate variable names, bad comments, etc.