**CS 1400 Fundamentals of Programming**

**Programming Project #10**

**Wind Chill Calculator**

**Version 1.0**

**Objective:**

At the completion of this project, you will have created an application that

* Reads input from a text file on disk,
* Uses arithmetic expressions, assignment, and control structures,
* Uses a programmer written class, and
* Formats output and sends it to the Console.

**Project:**

Meteorologists report an index called the ***Wind Chill Factor*** to indicate the temperature, taking into account the chill effect of the wind. Wind chill is approximated by the following formula:   
   
     **w = 35.74 + 0.6215t - 35.75 (v0.16) + 0.4275t(v0.16)**

where

    ***v*** = wind speed in mph   
    ***t*** = temperature in degrees Fahrenheit   
    ***w*** = Wind chill index (in degrees Fahrenheit)

The method

     **double Math.Pow(double *x*, double *y*);**

raises the ***value*** in *x* to the ***power*** *y*.

Your program should work as follows:

Design a class ***WindChill***, draw the UML Class Diagram, Pseudo-Code and code for the class. An object of the ***WindChill*** class should do the following:

1. Display a heading introducing your program.
2. Asks the user to give you a file name. Your program should insure that the file is in the user's Documents folder. Gets the file name and verify and stores it.
3. Open the file or throw and exception if it doesn’t open properly.
4. Once the file is open read, a temperature and a wind speed, from the file. Both values should be stored in variables declared as *double*. The file is a text file. Each line of the file contains a temperature and a wind speed value on each line.

* Calculate the wind chill factor using a programmer written method, and display the result in the form:   
     
  For ***t*** = *temperature from file*  
  and ***v*** = *wind speed from file*  
  Wind chill ***index*** = *calculated result* degrees Fahrenheit.

1. Show all numbers with three digits after the decimal point.
2. Repeat these steps until an end of file is encountered.
3. Close the file and ask the user if they want to read another file or exit the program and perform the appropriate action.

Format and document your code in accordance with the Course Style Guidelines.  Watch for magic numbers. Include valid Project and Method Prologs. Submit your project to Canvas.

**File(s) to Submit:**

Place your complete Project folder into a zip file and name the zip file  
Proj\_10\_your-initials\_V1.0.zip. For example, I would name my file Proj\_10\_DAF\_V1.0.zip. Submit this assignment as Project #10 on Canvas.

**Hints**

# If you need some help writing the code for this project, there are some hints below

# Hints for Project Ten

There are two problems you will face in this project. The first is to be sure that you understand the math required to solve the problem. In the program specifications, you are given the equation for wind chill as   
   
     ***W = 35.74 + 0.6215t - 35.75 (v0.16) + 0.4275t(v0.16)***

where   
   
   ***v*** = wind speed in mph   
   
   ***t*** = temperature in degrees Fahrenheit   
   
   ***W*** = Wind chill index (in degrees Fahrenheit)

The expression   
   
     **(v0.16)**

requires that you raise ***v*** (the wind velocity) to the 0.16 power.

The function  
   
     ***double Math.Pow(double x, double y)***

raises the value in ***x*** to the power ***y***.

When you write this code, be sure that you do not use magic numbers and the const’s you declare or the right data-type.

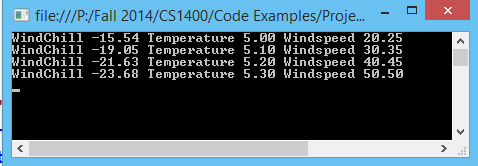
The second big problem, in this project, is reading in the data from the file correctly. In the sample data file provided, you will see three lines of data 

You can get a sample data file below:

      ***5.0 20.25  
     5.1 30.35  
     5.2 40.45***

***5.3 50.50***

The on each line, the first value is the ***temperature*** and the second value is the ***wind speed***.



|  |  |  |
| --- | --- | --- |
|  | **Grading Checklist** |  |
| # | **Program** | C(correct)  X(incorrect) |
| 1 | Meets & works to specifications | 6 points |
| 2 | Error Free, elegant & efficient | 4 points |
| 3 | Pseudo-Code | -3 points |
| 4 | Style Guidelines | -2 points |
| 6 | Source Files(s) & Formatting | -2 points |
| 7 | Project Prolog | -1 points |
| 8 | Function Prologs | -1 points |
| 9 | Zip Filename | -1 points |
| 10 | Lab & Project Names | -1 points |
| 11 | Zip File is invalid or will not unzip | Lab = 0 pts |
|  | Total Points | 10 | 0-9 |

**Sample Output:**

You can get an executable that runs correctly on Canvas.