Program 1
CSCI 111 – Fall 2022

Introduction

How cold is it outside? The temperature alone is not enough to provide the answer. Other factors, including wind speed, relative humidity, and sunshine play important roles in determining coldness outside. In 2001, the National Weather Service (NWS) implemented the new wind-chill temperature to measure the coldness using temperature and wind speed.[1]

$$t_{wc} = 35.74 + 0.6215t - 35.75v^{0.16} + 0.4275tv^{0.16}$$

where t_{wc} is the wind chill temperature, t is the outside temperature measured in degree Fahrenheit (**ºF**), and v is the wind speed measured in miles per hour (**mph**). The formula assumes that the temperature is between –58 ºF and 41 ºF, and the wind speed is greater than 2 mph. For program 1, write a program that inputs the outside temperature in degree **Celsius (ºC)**, and the wind speed in **kilometers per hour (km/h)**, and outputs the wind chill and wind chill temperature in ºF.
Notice that in order to use the above formula, you must convert the input temperature from **Celsius to Fahrenheit** and input speed from **km/h to mph** (check page 2 for details).

Input
- outside temperature, t (ºC)
- wind speed, v (km/h)

Output
- wind chill temperature (ºF)

Sample Output

```
Enter the temperature in Celsius: -14.83
Enter the wind speed in kilometers per hour: 9.6

Temperature: 5.306000000000001 degree F but feels like -5.559922876076512 degree F
```

Requirements & Considerations
1. Name your program **WindChillYourLastName.java** Include *header* comments (at the beginning of your Java file) formatted as shown below, using your name and student ID, etc. instead. Be sure to include the Honor Code statement and program description. Your electronic submission of the program file will represent your endorsement of the Honor Code Statement.

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[1] http://www.nws.noaa.gov/om/windchill/

```
/* Course: CSCI 111, Section X
   Student Name: Jane Doe
   Student ID: 12345678
   Program 1
   Due Date:

   In keeping with the Honor Code of UM, I have neither given nor received
   inappropriate assistance from anyone other than the TA or the instructor.

   Program Description:
*/
```

2. Before each significant step, provide a comment explaining the step (do not comment every line of code).

3. You must read the temperature in as ºC and convert it to ºF using the following formula:

$$°F = \frac{9}{5} \, °C + 32$$

Hint: How does Java actually evaluate 9/5? It is not what you necessarily think! Make sure your formula correctly calculates this temperature conversion.

4. You must read in the wind speed in km/h and convert to mph using the following formula:
$$1 \; mile = 1.6 \; kilometers$$

5. You must use Math.pow(a,b) to determine an exponent. In this case a^b is calculated, but you should use different variable names than **a** and **b**.

6. Output the wind chill temperature in ºF (if you can use **System.out.printf** to keep 2 decimal places, that'll be great), in this case, the sample output looks like:

Sample Output

```
Enter the temperature in Celsius: -14.83
Enter the wind speed in kilometers per hour: 9.6

Temperature: 5.31 degree F but feels like -5.56 degree F
```

7. Submit your program on Blackboard using the Program 1 link under Lab Assignments button (either **println** or **printf** is fine for this program).