

# Programming 3

UCN – Computer Science - C#

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## Dealing with errors

### Background

#### *About windchill factor*

"The windchill factor is the temperature that a person feels because of the wind. For example, if a thermometer reads 35 degrees Fahrenheit outside and the wind is blowing at 25 miles per hour (mph), the windchill factor causes it to feel like it is 8 degrees F. In other words, your 98-degree body loses heat as though it is 8 degrees outside."

Source: <https://science.howstuffworks.com/nature/climate-weather/atmospheric/question70.htm>

We will use these resources:

- Online calculation: [https://www.weather.gov/epz/wxcalc\\_windchill](https://www.weather.gov/epz/wxcalc_windchill)
- Formula: <https://www.weather.gov/media/epz/wxcalc/windChill.pdf>

The formula is complicated and you don't really need it for this exercise.

According to the first link the calculation is only valid for certain temperatures and wind speeds!

Try to use the online calculation!

Example:

Enter a temperature and wind speed that you would like calculated:		What the temperature feels like to your body:	
<input type="text" value="5"/>	<input type="radio"/> Fahrenheit <input checked="" type="radio"/> Celsius	<input type="text" value="31.8"/>	° F
<input type="text" value="9"/>	<input type="radio"/> mph <input type="radio"/> knots <input checked="" type="radio"/> m/s <input type="radio"/> k/h	<input type="text" value="-0.1"/>	° C

#### *Getting started*

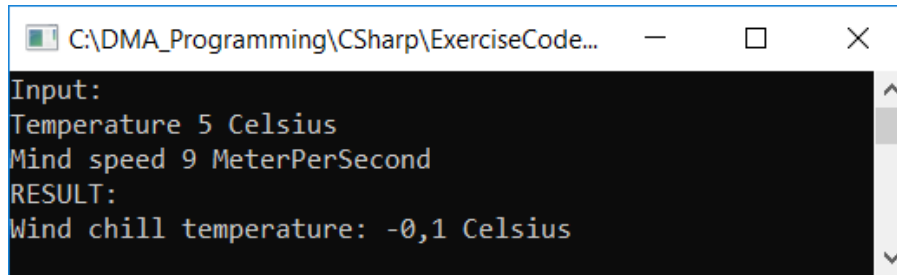
Get hold of the `Exercise_DebugAndTest.zip` file from Canvas.

Unpack the file at your preferred location and open the VS solution.

Build to be sure everything is ok.

# Code and debug

Code the TestChill class – you must use the Meteorology project. \*)  
Output should be similar to this:

A screenshot of a console window titled "C:\DMA\_Programming\CSharp\ExerciseCode...". The window has standard Windows window controls (minimize, maximize, close). The console output is as follows:

```
Input:
Temperature 5 Celsius
Wind speed 9 MeterPerSecond
RESULT:
Wind chill temperature: -0,1 Celsius
```

That is, display the input values and the result in the console.

Use the online calculation to check the result.

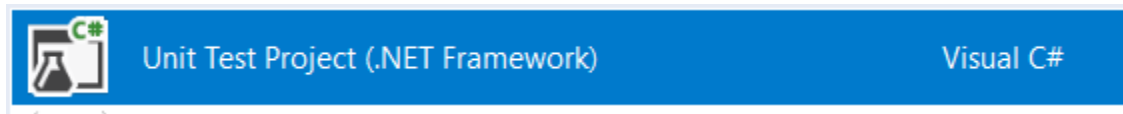
## Debug to find errors!

\*) Start in this way:

```
// Input values (temperature scale, wind speed unit, degrees as integer, wind speed as integer)
TemperatureScale.Scale tempScala = TemperatureScale.Scale.Celsius;
int degreesCelsius = 5;
WindSpeedUnit.Unit windUnit = WindSpeedUnit.Unit.MeterPerSecond;
int windMps = 9;
```

# Code and unit test

Add a test project:



Test methods from the WindChillFactor class:

- ConvertCelsiusToFahrenheit
- ConvertFahrenheitToCelsius
- ConverMilesPerHourToMeterPerSecond
- ConverMeterPerSecondToMilesPerHour
- CalulateChillFactorTemperature

Example:

```
[TestMethod]
0 references
public void TestConvertCelsiusToFahrenheitNormal() {

    // Arrange
    TemperatureScale.Scale tempScale = TemperatureScale.Scale.Celsius;
    int degreesCelsius = 5;
    WindChillFactor wChillFactor = new WindChillFactor(tempScale, WindSpeedUnit.Unit.MeterPerSecc
    double fahrenheitExpected = 41.00;

    // Act
    double fahrenheitResult = wChillFactor.ConvertCelsiusToFahrenheit(degreesCelsius);

    // Assert
    Assert.AreEqual(fahrenheitExpected, fahrenheitResult, 0.001);
}
```

## Handle invalid values (extra)

Enhance the Meteorology project to handle values outside the boundaries incl. return appropriate values to clients of the code.

Create test methods to verify correctness.