CIS 125 Principles of Programming Logic
Final Exam
Weather System

Due by Tuesday May 12, 2020 at 1 PM
Submit (Upload) File/Program To Final Exam Link in our Moodle Web Site

Academic Honestly Policy

Students are expected to uphold the school's standard of conduct relating to academic honesty. It is imperative that standards of academic integrity be upheld for the best interest of the student, college, community, and industry. Therefore, first instances of academic dishonesty (cheating) will result in a two-letter grade reduction in final overall course grade. Second instances of academic dishonesty (cheating) will result immediate submission of a failing course grade to the college records system. Violations resulting in a failing grade for the course will be forwarded to the Office of the Registrar.

Directions

Complete the following one Python program worth a total of 200 points. Name and submit the file as **weather.py**

Program Specifications/Requirements.

- Create a Python program that allows the user to perform several **weather-related calculations**.
- The program should be able to run and allow of the user input, processes, and output shown in the **sample run** shown further in this handout.
- **Display the main menu**, which will look like this.
    - The menu should be inside a loop and keep running to ask the user for another menu choice until the user enters 3 to exit.
    - If the user enters invalid user input (for example, dog or bbb or 33) the program should: a) not crash, and b) indicate the user input was invalid, and c) re-prompt the user for valid input. See and have the program work as the sample run shows.
    - You can place the menu in its own user-defined function or not. I recommend doing so.

```
  Weather Menu
----------------------------------------------
1. Convert Celsius to Fahrenheit
2. Calculate Temperature with Wind Chill
3. Exit

Enter menu choice (1-3):
```

- If the user **choses menu option 1**, a user-defined function will be called to provide this functionality. In this function, the program should:
    - Display the output as shown in the sample run below.
    - Prompt the for a Celsius temperature to convert.
        - Validate this input to ensure it is a float and the program does not crash if a string is entered.
    - Convert the Celsius temperature to Fahrenheit
        - The formula is: `f = c * 9/5 + 32`
    - Display the output of the converted temperature as shown in the sample run, i.e. display both the C and F temperature and round the F temperature to two (2) digits to right of decimal place.

- If the user **choses menu option 2**, a user-defined function will be called to provide this functionality. In this function, the program should:
    - Display the output as shown in the sample run below.
    - Prompt the for a Fahrenheit temperature.
        - Validate this input to ensure it is a float, 50 or lower and the program does not crash if a string is entered.
    - Prompt the for a wind speed in miles per hour (mph).
        - Validate this input to ensure it is a float, greater than 3 and the program does not crash if a string is entered.

      (i.e. wind chill is only calculated for temperatures of 50 F or lower and wind speeds greater than 3 mph)
    - Calculate the Wind Chill Fahrenheit temperature
        - The formula is:

```
f2 = 35.74 + (0.6215 * f) - (35.75 * (wind ** 0.16)) +
     ((0.4275 * f) * (f ** 0.16))
```

      where f is the user inputted Fahrenheit temperature
      wind is the user inputted wind speed
      f2 is the calculated Fahrenheit temperature with wind chill

    - Display the output of the converted temperature as shown in the sample run, i.e. display both the user inputted values and the calculated Fahrenheit temperature with wind chill to two (2) digits to right of decimal place.

- If the user **choses menu option 3**, the program will end.

- If the user **enters any other input for the main menu (e.g. 4, dog, etc.)**, a message will display that this is invalid input, the menu will re-display, the user input asked for again.
    - The program should not crash if a string is entered.

Sample Program Run #41

```
        Weather Menu
-----------------------------------------
1. Convert Celsius to Fahrenheit
2. Calculate Temperature with Wind Chill
3. Exit

Enter menu choice (1-3): cat

Invalid menu choice.  Try again.


        Weather Menu
-----------------------------------------
1. Convert Celsius to Fahrenheit
2. Calculate Temperature with Wind Chill
3. Exit

Enter menu choice (1-3): 4

Invalid menu choice.  Try again.


        Weather Menu
-----------------------------------------
1. Convert Celsius to Fahrenheit
2. Calculate Temperature with Wind Chill
3. Exit

Enter menu choice (1-3): 1

Celsius to Fahrenheit Converter
-----------------------------------------
Please enter Celsius temperature: dog

Invalid number. Try again.

Please enter Celsius temperature: 100

 100.0 Celsius = 212.00 Fahrenheit


        Weather Menu
-----------------------------------------
1. Convert Celsius to Fahrenheit
2. Calculate Temperature with Wind Chill
3. Exit

Enter menu choice (1-3): 2
```

Temperature with Wind Chill Converter

Please enter Fahrenheit temperature (50 F or below): dddd

Invalid number. Try again.

Please enter Fahrenheit temperature (50 F or below): 100
Temperature must be 50 F or below. Try again.
Please enter Fahrenheit temperature (50 F or below): 23
Please enter wind speed (mph; greater than 3): 1
Wind speed must be greater than 3. Try again.
Please enter wind speed (mph): 10

23.0 F with a wind speed of 10.0 = 14.60 F with wind chill

Weather Menu
---
1. Convert Celsius to Fahrenheit
2. Calculate Temperature with Wind Chill
3. Exit

Enter menu choice (1-3): 3

Grading Rubric

Exam Component	Not Present	Developing	Competent
Comments/Remarks	0 points Program contains no comments/remarks	1-19 points Program contains some comments/remarks, but not highly informative and/or sufficient	20 points Program contains highly informative and sufficient comments/remarks throughout program.
Main Menu	0 points Main menu does not display, function or validate properly.	1-39 points Main menu partially displays, functions and validates properly.	40 points Main menu fully displays, functions and validates properly.
Celsius to Fahrenheit converter functionality	0 points Celsius to Fahrenheit converter functionality does work properly.	1-39 points Celsius to Fahrenheit converter functionality partially works properly.	40 points Celsius to Fahrenheit converter functionality works as specified/required.
Temperature with Wind Chill calculator functionality	0 points Temperature with Wind Chill calculator functionality does work properly.	1-99 points Temperature with Wind Chill calculator functionality partially works properly.	100 points Temperature with Wind Chill calculator functionality works as specified/required.
		Total Final Exam Point:	**200**