CSE 8A Programming Assignment 1

Learning goals:

- Write Python functions that take in numerical parameters and return a numerical value
- Print output to the user
- Understand the difference between print and return
- Verify that functions are written correctly by calling them with different inputs

Logistics:

All information for the following can be found on our course syllabus.
- **Pair programming** - This programming assignment can be done individually or with a partner. Make sure to read the guide on pair programming.
- **Academic integrity** - Please adhere to all academic integrity guidelines on the syllabus.

Submission:

- You will submit the following files to Gradescope:
  - **pa1.py** - Contains all your code
  - **Pa1-writeup.pdf** - Contains all written portions of the assignment
  - **Pa1-video.mp4** - Your recorded video
- You can find the template of the write-up here
- You are also required to complete the weekly reflection and degree planning assignment
- Instructions on how to submit can be found below at submission instructions.

Part 1: Implementation (6 Points)

Save all of the following code in a python file named (pa1.py).

In this programming assignment, you will be implementing a function to convert from Fahrenheit to Celsius. You will then ask the user for a temperature to convert and print the result.

Part 1.1: Implementing the function to convert from Fahrenheit to Celsius

First implement the following function. The name of your function should match exactly as shown, including cases (all lowercase). Our autograder on gradescope will not be able to test your function if it is not named properly.

Function Name: fahrenheit_to_celsius
Parameter: temp_in_fahren - A number that represents the temperature in Fahrenheit
Return: A number that represents the converted temperature in Celsius
Description: Given the temperature in Fahrenheit, return the converted temperature in Celsius. *Use the conversion formula: Celsius = (Fahrenheit − 32) × 5/9*
Example: Parameter: temp_in_fahren = 75.5 Returns: 24.166666666666668

Part 1.2: Implement the interaction with the user

1. After implementing your function, you want to be able to test that it works. In order to ask the user to input a temperature to convert and print out the temperature in Celsius, you will need to copy the following lines to the end of your code. It is important that you don't copy this into your function definition (no indents in the front of these lines). Take some time to understand what these four lines are doing before proceeding. The first two lines are empty.

```
temp_in_f_str = #Fill in this line
temp_in_f = #Fill in this line
temp_in_c = fahrenheit_to_celsius(temp_in_f)
print('Temperature in celsius =', temp_in_c)
```

2. Now notice that the first line is empty. Replace "#Fill in this line" with code that will ask the user for an input. The message should say `"Enter temperature in fahrenheit:"`.

3. Since `temp_in_f_str` is a String, passing `temp_in_f_str` straight into the function, `fahrenheit_to_celsius`, will result in an error because the function expects the parameter to be a number. To avoid this error, replace "Fill in this line" in line 2 with code that will convert `temp_in_f_str` to a number.

Once you finish writing the function **fahrenheit_to_celsius** and write the 4 lines of code (and fill in the lines 1 and 2 appropriately) shown in step 1 below the function (without any indentation), then when you run your program using "Run" → "Run Module" in IDLE you should see output similar to below.

```
>>>
============ RESTART: C:\Users\adalb\Google Drive\CSE
8A-Fall2020\PAs\PA1\temp_conversion.py ============
Enter temperature in fahrenheit:98.6
Temperature in celsius = 37.0
>>>
```

Star Points (optional):

*Save all of the following code in **pa1.py***

Read about star points on our course syllabus. To obtain a star point for this PA, you will be writing the following function in pa1.py and checking whether converting the temperature from Fahrenheit to Celsius and back to Fahrenheit will result in the same number.

Part 1.3: Implement the function to convert from Celsius to Fahrenheit (Only for star points; Not required to get full credits on this PA)

Function Name: celsius_to_fahrenheit
Parameter: temp_in_celsius - A number that represents the temperature in Celsius
Return: A number that represents the converted temperature in Fahrenheit
Description: Given the temperature in Celsius, return the converted temperature in Fahrenheit. *Use the conversion formula: Fahrenheit = (Celsius × 9/5) + 32.*
Example: Parameter: temp_in_celsius = 30 Returns: 86.0

The function celsius_to_fahrenheit should be written in between the function fahrenheit_to_celsius and the 4 lines shown in part 1.2. The placement of the two functions is shown below.

```
#definition of fahrenheit_to_celsius

#definition of celsius_to_fahrenheit

temp_in_f_str = #Fill in this line
temp_in_f = #Fill in this line
temp_in_c = fahrenheit_to_celsius(temp_in_f)
print('Temperature in celsius =', temp_in_c)
```

Part 1.4: Converting back to Fahrenheit
(Only for star points; Not required to get full credits on this PA)

1. Similar to part 1.2. Can you figure out how to use temp_in_c and convert it back to Fahrenheit. Do not ask the user to input another temperature. We want to use the temperature that was converted from Fahrenheit to Celsius and check whether converting this number back to Fahrenheit will result in the same value.

2. Add a print statement to print out the temperature converted back to Fahrenheit. Print out "Temperature converted back to Fahrenheit =" followed by the temperature converted back to Fahrenheit from step 1.

3. Are the values the same? Can you find any values that aren't the same? Why or why not. Respond in the writeup portion of the assignment (see Part 2).

When you run your program after finishing part 1.4, you should see output similar to shown below:

```
>>>
= RESTART: C:\Users\adalb\Google Drive\CSE8A-Fall2020
\PAs\PA1\temp_conversion.py
Enter temperature in fahrenheit:100.4
Temperature in celsius = 38.0
Temperature converted back to fahrenheit = 100.4
>>>
```

Part 2: Write up (3 Points)

You must report how you tested your code as well as answer a few short questions in **Pa1-writeup.pdf.** A template has been provided. See submission instructions below on how to make a copy of this template to your own drive. In particular, you must provide:

    A. Report Bugs and Issues
    Include in your report any known bugs or issues with your program.

    B. Questions
    Answer the following questions:
        1. In your own words, what is the difference between **print** and **return**?
        2. Describe **one issue** that you encountered while writing and testing your own code. How did you fix it?

    C. Star point (optional)
    Include in your report whether the temperature converted back to Fahrenheit is the same as the original temperature in Fahrenheit. Explain why or why not.

Part 3: Video (2 points)

For this part, you will create a video recording explaining the code you have written. Your video should answer the questions below. If you are working with a partner, both partners should be in the video and each partner should have some speaking point. One partner will answer question 1 and the other will answer question 2a and 2b. See submission instructions below on how to record a video on zoom.
    1. Show your code for pa1.py and **explain** what each line in part 1.2 is doing.
    2. Code Execution Demos (example of following code execution: https://youtu.be/7uw_Vi_F-dY)
        a. Run your code and input the value **75.5**. Tell us what value your function **returned** and **explain** how you know your function returned that value.
        b. Run your code again and input the value **32** and show the output. Tell us what value your function **returned** and **explain** how you know your function returned that value.

The following things will be checked in your video while grading:
    1. The student(s) **code is clearly visible** in the video. [Hint: Increase your font size to 18
    Windows: "Options" → "Configure Idle" → Size
    Mac: "IDLE"(in top menu bar) → "Preferences" → "Fonts/Tabs" → "Size"]
    2. The student(s) clearly **answer(s) the questions**.
        a. Students submitting individually answer both questions.
        b. Students submitting in pairs each answer one of the questions.

3. Video is within **time limit** (max: **2 mins**)

Part 4: Weekly Reflection Due Friday, Oct 16th (1 Point)

Fill out the reflection form here. This weekly reflection form is not optional, it counts towards 1 point of your assignment. All students have to individually submit their own weekly reflection regardless if you're working with a partner. Weekly reflections are not due when the PA is due. You may submit your weekly reflection for PA 1 anytime before 11:59 pm on Friday, Oct 16th.

Part 5: Degree Planning Assignment Due Friday, Oct 16th (1 Point)

See degree planning assignment for more information.

Submission Instructions

Read all instructions carefully before submitting.
- You will need to submit **pa1.py, Pa1-writeup.pdf, and Pa1-video.mp4** on Gradescope, fill out the weekly reflection, and complete the degree planning assignment.
- To copy the writeup template and export as a pdf:
  - Click here to see a copy of the assignment format.
  - Click on "File" -> "Make a copy", and you will get a local copy of this Google Doc.
  - Fill in the Google Doc, making sure you keep the headings in about the same places.
  - Once you are done, in Google Docs, click on "File"-> "Download" -> "PDF Document", which will export it to a pdf.
- To record a video on zoom:
  - Start a zoom video meeting.
  - Choose "Join with Computer Audio"
  - If you're working with a partner, invite your partner into the meeting.
  - Share your computer's screen using "Share Screen"
  - Show your code on your computer's screen
  - Click "Record" > "Record on your computer".
  - Answer the required questions.
  - Once you are done, click "stop recording" and "End meeting".
  - Save your video file on your computer and name it as Pa1-video.mp4
- Sign into Gradescope and submit all files to PA 1. You should be able to drag and drop multiple files into the upload files window. Ask a teaching staff for help if you are unsure whether you've submitted properly.
- If you are working with a partner, **only one member will need to submit the files** in Gradescope. Do not both submit the files individually to Gradescope. It will be your responsibility to ensure both members are added in Gradescope.

- To add a group member on Gradescope:
  - First submit all files to PA 1.
  - This should take you to your submissions page. Otherwise, you can view your submission by clicking on the assignment.
  - Click on **"Add Group Member"** on the top right under your name.

  GROUP
  Annie Wai
  ✚ Add Group Member
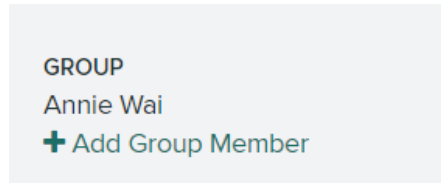
  - Confirm you have added your partner. You should see both you and your partner's name under "Group" in the top right after submitting.
- You may submit multiple times until the deadline. We will be grading only your latest submission. So, please make sure that your latest submission is your best version!