

CSE101 – Spring 2021

Programming Assignment #1

Due March 11, 2021 by 11:59pm, KST. The assignment is worth 7 points.

Instructions

For each of the following problems, create an error-free Python program.

- At the top of every file add your name and Stony Brook email address in a comment.
- Each program should be submitted in a separate Python file that follows a particular naming convention: Submit the answer for problem 1 as “Assign1Answer1.py” and for problem 2 as “Assign1Answer2.py” and so on.
- These programs should execute properly in VS Code using the setup we created in lab.

Regarding working in pairs:

- You are welcome to work with a partner on the homework assignment, but you **MUST write both your names and email addresses in each file** in a comment. Only one person needs to submit the homework on Blackboard.
- You are only allowed to work together with one other person – larger group submissions or collaborations (beyond high-level discussions of problems, as stated on the syllabus) are not allowed.

Programming conventions to use

Developers use different standards for programming conventions for whitespace and variable names vary based on the language and their personal taste or organization. Consistency is important. As you program more you’ll develop your own conventions, but for this class use the conventions below:

Naming:

- Choose concise but informative variable names that would be clear to someone reading it. Avoid uncommon abbreviations. For example, `hourly_rate` is better than `hr`. An alternative style is to write `hourlyRate`. You can use whichever option you prefer, just be consistent.
- Variables and functions should always start with a lower-case letter. For example `hourlyRate` and not `HourlyRate`.

Whitespace:

- Use blank lines (whitespace) in your program consistently to make your program more readable.

The descriptions of conventions will not be repeated in future assignments, but be sure to continue following them for the rest of the course.

Problem 1 (1 point)

1. Download the provided [Assign1Answer1.py](#) file and bring it into VS Code.
2. Fill in your info at the top of the file.
3. Follow the instructions below and complete the program:

The [basal metabolic rate](#) (BMR) is the amount of energy (in kcal/day) expended by a person at rest in a temperate climate. The BMR is given by the following formula:

$$BMR=10m+6.25h-5a+s$$

where m is the person's mass in kilograms, h is the person's height in centimeters, a is the person's age in years, and s is 5 for a man and -161 for a woman.

Your program will take a person's weight in *pounds*, height in total *inches*, and age in years. Convert these values as needed (1 lb is 0.453592 kg, 1 inch is 2.54 cm) and then print the BMR for both a man and a woman with those physical characteristics. Assume that the weight is given in a variable named `weight`, the height in a variable named `height`, and the age in a variable named `age` as shown in the provided code. Do not write any `input` statements!

You will write the code that calculates and stores the BMR for a man in the variable `bmrMan` and for a woman in `bmrWoman` so that the print statements output the results properly. You can see if your calculation is correct by trying the sample inputs given in the table below – just change the values of `weight`, `height` and `age` in the starting code provided.

Inputs (age, height, weight)	BMR for Man (output)	BMR for Woman (output)
130, 66, 55	1367.4196	1201.4196
165, 68, 23	1717.9268	1551.9268
135, 60, 16	1489.8492	1323.8492

Problem 2 (1 point)

Download the provided [Assign1Answer2.py](#) file and bring it into VS Code.

Write the implementation in the provided `celsiusToFahrenheit` function that will take the `celsius` input parameter and convert the value into Fahrenheit. Use the following formula to make the conversion:

$$F = \left(C * \frac{9}{5} \right) + 32$$

Problem 3 (1 point)

Go through the following steps:

1. Download the provided [Assign1Answer3.py](#) file and bring it into VS Code.
2. Fill in your info at the top of the file.
3. Run it in VS Code to make sure it works. Try to understand how all the code works.

4. Add a new function below `printSum`. This new function should print the information described below while satisfying the following requirements:
 - a. Print your name with quotation marks around it (e.g. "Alice Park")
 - b. On the next line, indent the line with a tab character and then print your major and what year you started at SUNY Korea.

So when printed it will look like:

```
"Alice Park"  
    Computer Science 2021
```

5. Add code that calls your new function and test to make sure it works without any errors.

Problem 4 (2 points)

Download the provided [Assign1Answer4.py](#) file and bring it into VS Code.

Complete the function `fillPool`, which computes and returns how many minutes it will take to completely fill a swimming pool of given dimensions. Suppose we have a rectangular pool with a length of `length` meters, width of `width` meters, and uniform depth of `depth` meters. Water is flowing into the pool at a rate of `gpm` gallons per minute. The function returns the time in minutes to fill the pool. Note that you will need to look up some conversion factors to figure out the solution!

Expected Results. Note that your answers might be a little different in the digits to the right of the decimal point. That is OK.

Function Call	Return Value
<code>fillPool(10, 10, 10, 1000)</code>	264.172
<code>fillPool(12, 13, 20, 3000)</code>	274.739
<code>fillPool(10, 40, 8, 250)</code>	3381.402

Problem 5 (2 points)

For the questions below, copy the questions into a text file and write your answers below each question.

Use a text editor like Notepad (Windows) or TextEdit (Mac) and save the file with a `.txt` or `.rtf` file extension.

- A. What is the result of this expression: `"z" * 8`
- B. What is a variable?
- C. Assuming you have run the Python code: `name = "Alice Park"`
 1. What does `name[1]` return?

2. What does `name[-2]` return?
 3. What does `name[1:-2]` return?
 4. What would you type to get the length of the `name` variable?
- D. What are escape sequences in Python?
 - E. What is the difference between an integer and floating-point number?
 - F. What is the result when you run the code `10 / 4` and `10 // 4` in Python? Why are they different?
 - G. What is the result of `6 ** 3`?
 - H. Given (`x = 1`), what will be the value of `x` after we run (`x += 3`)?
 - I. How can we round a number in Python?
 - J. What is the result of `float(1)`?
 - K. What is the result of `10 == "10"`?
 - L. What is the result of `"carrot" > "banana"`?