

CSE101 – Fall 2019

Programming Assignment #1

Due September 18, 2019 by 11:59pm, KST. The assignment is worth 25 points.

Instructions

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

- 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 PyCharm using the setup we created in lab.
- At the top of every file add your name and Stony Brook email address in a comment.
- Provide a few test cases (test inputs) with each program.

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:

(2 points)

Write a Python program with a function that will take as input from the user the temperature in Celsius and will convert and display temperature values in both Fahrenheit and Celsius, using the equation:

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

Note: below is what a sample input line to your program should look like and the resulting output. User input lines always start with `>>>`. This convention will be used for all of the problem sets.

```
>>>Enter temperature in Celsius: 20
```

```
20 Celsius = 68 Fahrenheit
```

Problem 2:

(3 points)

Create and call a function that prints out a favorite quotation of yours and cites the original source. Be sure to use quotes (") around the quotation and make sure the quotes are also printed out, along with the name of the source on the next line, tab indented.

```
"You must be the change you wish to see in the world."
```

```
    - Gandhi
```

Problem 3:

(3 points)

The distance between Seoul and New York is 11050 *kilometers*. Write a Python program that first takes in as user input a flying speed in miles per hour, then calls a function that does the following:

Given a parameter of a flying speed in *miles per hour*, return from the function the number of *minutes* required to fly between Seoul and New York and then print out this value (with a precision of two decimal points).

Note: 1 mile = 1.609 kilometers

```
>>>Enter the flying speed in miles per hour: 500
```

```
Time required to travel from Seoul to New York: 824.11 minutes
```

Problem 4:

(4 points)

The volume of a cone is calculated using the formula: $Volume = \frac{1}{3} \pi * height * radius^2$ and the surface area of the base is calculated as: $Base\ Surface\ Area = \pi * radius^2$

Write a Python function that takes as input two parameters, the radius and height of the cone, and prints out the radius, height, base surface area, and volume with 1 decimal precision. Write at least three test cases, where you call the function with different values for the inputs (the radius and height) and check the output to ensure it is working correctly. This is a good practice to do with your assignments. The results of one example test case is below:

```
A cone with a 2.5 cm radius and 10 cm height has a base surface area  
of 19.6 cm and a volume of 65.4 cm.
```

Problem 5:

(5 points)

Write a Python program that will calculate how much money you will have when you invest a given amount of money over a set number of years with a given interest rate. The program takes as user input **how much money to invest** and the **yearly interest rate** and calls a `calculateEarnings` function using those two inputs as the parameters `initialMoney` and `interestRate`. Both of the user inputs should be able to be entered in decimal numbers. The `calculateEarnings` function should print out the amount of money you will have after 1 year, 10 years, 20 years, and 30 years, each value on a new line. The output should be precise to two decimal places.

Calculate the total amount of money using compound interest, calculated yearly. The formula for this is below – note that 6% interest would be entered as 0.06 for `interestRate` in the formula but the user enters it as a percentage in the input:

$$totalMoney = initialAmount * (1 + interestRate)^{numberOfYears}$$

```
>>>How much money are you investing? 10000
>>>What is the yearly interest rate (%)? 6.0
```

```
After 1 year: 10600.00
After 10 years: 17908.48
After 20 years: 32071.35
After 30 years: 57434.91
```

Problem 6:

(3 points)

Write a Python program that will take an integer as user input and print whether the number is even or odd. Use a function that takes a number as a parameter and if the number is even it prints “Is even” and if the number is odd it prints “Is odd”.

```
>>>Enter an integer: 4

Is even
```

Problem 7:

(5 points)

Write a Python program that has a function that takes three numbers as parameters. The function should return the largest number. Write at least three test cases to ensure the function is returning the largest number.

The result of one example test case is below:

The largest number in (7, 15, -3) is 15