

CSCE 110: Programming I Spring 2020

Lab 1

General Instructions:

- The lab is due online by 11:59 pm of the due date. The assignment must be typed, not handwritten or scanned.
- Label your Python programs q<num>.py, where num is the question number. For example, your solution to the first question will be stored in the file q1.py.
- Make sure you understand everything in this lab before getting started. Also, make sure that your programs match the output exactly as given for each question. This is important as one of the keys to being a good programmer is attention to detail.
- If you forgot to bring a computer, you can check out a temporary laptop from ZACH 383 for a few hours (depending on availability).
- Before you leave the lab room make sure to checkout with the TA by showing your student ID. The TA will mark your attendance at checkout. Attendance is required on the lab release day.
- Grading is based on correctness and clarity. Copying work from another source and submitting it as your own is plagiarism. The minimum penalty for plagiarism is a zero on this lab.

Lab Questions

1. Write a Python program stored in a file `q1.py` that:

- gets two numbers from the user and prints the type of the numbers (numbers are positive and integer).
- Add the first number to 1 and print the result. You should get an error.

What is the error?

Why did you get that error? (Add your answer as a comment block in the code)

Comment out the erroneous line of code and continue to the next section (This section is not printed in the output).

- Add the first number to the second number and print the result.
Did you get any error? Why?
- Change the type of both variables to integer and add the two numbers together. Then, print the numbers along with the type of the variable.
- Add the first number to 2.45 and store it to a variable named *result1*.
Calculate the square of the second number and store it to a variable named *result2*.
Print the result variables along with the type of each variable.
- Divide the *result1* by *result2* (from section “d”) and print the result of the division and the remainder.
- Find the average of *result1* and *result2* (from section “d”) and print the result.

Note: To print an empty line, use `print()`.

Sample output

Look at the following example with the numbers 10 and 12.

```
1 ***** Section a *****
2 Enter the first number: 10
3 Enter the second number: 12
4 The type of the first variable is <class 'str'>
5 The type of the second variable is <class 'str'>
6
7 ***** Section c *****
8 The result of adding a string to another string is: 1012
9
10 ***** Section d *****
11 The result of adding 10 and 12 is: 22.
12 The type of the result is: <class 'int'>
13
14 ***** Section e *****
15 The result of adding 10 to 2.45 is: 12.45
16 The type of the result is: <class 'float'>
17 The square of 12 is: 144
18 The type of the result is: <class 'int'>.
```

```

19
20 ***** Section f *****
21 12.45 over 144 is: 0.0864583333333333 and the remainder is 12.45.
22
23 ***** Section g *****
24 The average over 12.45 and 144 is 84.45.

```

2. Write a Python program stored in a file q2.py that gets the information of two students such as name, age, and UIN. Then the program greets them and will update their information for next year.

Below is an example of the output when the program is executed.

Note: To print an empty line, use print().

Sample output

Print one full line of stars on line 1, line 2 is empty.

At the prompt “Enter the first student’s name:”, the user enters John (line 3). The user then enters 20 at the age prompt (line 4), the user enters the UIN on line 5, line 6 is empty.

Repeat the same process for the second student.

Print the word Howdy on lines 11 to 16.

Line 17 is empty.

Line 18 prints the students’ information for the following year and the last line is a full line of stars.

```

1  *****
2
3  Enter first student's name: John
4  Enter first student's age: 20
5  Enter first student's UIN: 342898545
6
7  Enter second student's name: Mary
8  Enter second student's age: 22
9  Enter second student's UIN: 855748211
10
11
12  | | | | / _ \ \ \ / \ / | | \ \ \ / /
13  | | | | | | | \ \ \ \ / | .--. | \ \ \ / /
14  | | | | | | | \ \ \ \ / | | | | \ \ \ / /
15  | | | | | | | \ \ \ \ / | | | | \ \ \ / /
16  | | | | | | | \ \ \ \ / | | | | \ \ \ / /
17
18  Next year, John with UIN number 342898545 will be 21 and Mary with UIN
    number 855748211 will be 23 years old.
19  *****

```

3. Write a Python program stored in a file q3.py that calculates and outputs the results of each of the following operations.

Note: You should not add any extra parenthesis to the equations.

- You will get an error on section b, what is the error type and why you got this error? Fix it and continue.
- Explain briefly in your code with comments the priority of the following operations in python +, -, /, *, **, (). Note: use a new line to show the priority.

Use comments in your code to explain your answers.

- `-3 + 8 * 12 / 3 - 2`
- `6 % 2 + 4 * (-4 + 2) 8 - 3 / 2`
- `27 % 4 % 2 * 3 + 2 * 2 / 2 + (7 * 3 + 2)`
- `13.5 // 2`
- `13.5 / 2`
- `13 // 2`
- `13 / 2`
- `2.1 + 3 ** 7 / 3 - 16 % 2 * 3 ** 4.2`

Sample output

Your output for each section will be as follows:

```
a. : "your answer"
b. : "your answer"
c. : "your answer"
d. : "your answer"
e. : "your answer"
f. : "your answer"
g. : "your answer"
h. : "your answer"
```

4. Write a Python program stored in a file q4.py that take the radius and height of a cone and calculate the volume and surface area of it. The volume of the cone can be calculated as:

$$V = \pi r^2 \frac{h}{3}$$

where V is the volume, r is the radius and h is the height.

The surface area can be calculated as:

$$A = \pi r (r + \sqrt{h^2 + r^2})$$

where A is the surface area, r is the radius and h is the height.

Note: Use the approximate value of π 3.14.

Sample output

At the prompt “Enter radius of a cone”, the user enters 5 (line 1) and at the prompt

“Enter the height of a cone” the user enters 3 (line 2).

Then the volume and surface area is printed on lines 4 and 5, respectively.

```
1 Enter the radius of a cone: 5
2 Enter the height of a cone: 3
3
4 The volume of a cone with radius 5 and height 3 is 78.5.
5 The surface area of a cone with radius 5 and height 3 is
  70.04594474907123.
```

Submitting Your Assignment

Once you have completed your programs, submit each of them (q1.py, q2.py, q3.py, q4.py) electronically. You may resubmit your files as many times as you need until the due date. Only the most recent submission is graded.

You are required to include the following lines in the header of all your files:

```
# File: filename.py
# Author: Student name
# Date: xx/xx/2020
# Section: Student section number
# E-mail: student_email@tamu.edu
# Description:
# e.g. This program asks for ...
```

Submit your files on gradescope.com