**CSCE 110: Programming I**

**Lab 3**

**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 L3q<num>.py, where num is the question number. For example, your solution to the first question will be stored in the file L3q1.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.
* 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 L3q1.py that :

1. Gets a five-digit number from a user and store it in an appropriately named string variable. Change the variable to an integer, and then reverse the four-digit number and store it in another variable. Print the reversed variable and its type.
2. Gets information of a student such as a student’s first name and last name. Concatenate these two inputs using the appropriate operator and store it in a string variable. Print the variable containing the full nameand its length.

**Sample Output:**

1. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section A\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
2. Enter the five digit number: 34589
3. The reverse of the four digit number is 98543 and it's type is <class 'int'>
4. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section B\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
5. Enter the First name : John
6. Enter the Last name : Doe
7. The full name of the student is John Doe, and length of the variable full\_name is 8

2. A **palindrome** is a word, number, phrase, or another sequence of characters that reads the same backward as forward. For example level, radar, noon, 10101 to name a few. Write a Python program stored in a file L3q2.py that:

1. Gets an input string from the user and store it in a string variable***.*** Compute the length of the variableand print its length.
2. Convert the string in the input variable to all Upper-Case characters, and store the result in another variable***.*** Print the output variable.
3. Creates a palindrome using only the output variable and store it in a variable called ***palindrome*** and print the variable ***palindrome.*** Check if the variable ***palindrome*** is actually a palindrome and store the comparison result in variable ***check\_palindrome.***

Note: The length of the variable ***palindrome*** should be twice the length of the input variable.

1. Compare if the length of the variable ***palindrome*** is twice the length of the inputand store the result in the a boolean variable. Print the boolean variable***.***

**Sample Output:**

1. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section A\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
2. Enter the input string: abc
3. The length of the input string is 3
4. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section B\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
5. The input string with characters converted to upper case is ABC
6. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section C\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
7. The Palindrome is ABCCBA
8. Comparison Result is True
9. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section D\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
10. The length comparison variable is True

3. Write a Python program stored in file L3q3.py that:

1. Gets the scores secured by a student in five subjects namely subject1, subject2, subject3, subject4, subject5. Calculate the average score of all the subjects and store it in a variable called ***avg\_score.***

Note: The scores entered must be greater than zero and the maximum score that the student can score in each subject is 100.

1. Checks if the variable ***avg\_score*** is greater than or equal to subject4 score and prints the result.
2. Checks if subject1 score is equal to subject5 score and print the result.
3. Checks if subject2 score is less than or equal to subject3 score and print the result.
4. Deletes the variable in which subject5 score is stored. The student is writing the test for subject5 again. What score should the student get in subject5 to get an average score of 95? Print the score. Is it possible to get that score? Print the result.

**Sample Output:**

1. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section A\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
2. Enter the subject1 Score :96
3. Enter the subject2 Score :89
4. Enter the subject3 Score :89
5. Enter the subject4 Score :95
6. Enter the subject5 Score :96
7. The average score is 93.0
8. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section B\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
9. Is average score greater than or equal to subject4 score? False
10. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section C\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
11. Is subject1 score equal to subject5 score? True
12. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section D\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
13. Is subject2 score less than or equal to subject3 score? True
14. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section E\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
15. subject5 score should be 106 to get an average score of 95
16. Is it possible to score 106? False

4. Write a Python program stored in file L3q4.py that:

1. Gets the weights of a population of three dogs and prints them. (Note: Assume the weights are in pounds.)
2. Finds the mean of the weights and stores the result in an appropriately named variable. Print the mean of the weights.
3. Computes the variance of the weights and stores the result in another appropriately named variable. Print the variance of the weights.
4. Computes the standard deviation of the weights and stores the result in a third appropriately named variable. Print the standard deviation of the weights.

**Note:** Do ***not*** use any math libraries.

Mean (*μ) =* average of the values

Variance (*σ2*) = average squared deviation of values from the mean.

Equation for variance equals the sum of X values minus the average of X values squared divided by the number of values N

Standard deviation (*σ*) = square root of the variance. It is a measure of the extent to which data varies from the mean.

N = Total number of values.

Note :- Do not use ‘if’ conditions/statements.

**Sample Output:**

1. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section A\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
2. Enter the weight of dog1 : 47
3. Enter the weight of dog2 : 50
4. Enter the weight of dog3 : 44
5. The weight of dog number 1 is : 47 lbs
6. The weight of dog number 2 is : 50 lbs
7. The weight of dog number 3 is : 44 lbs
8. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section B\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
9. The mean weight is : 47.0 lbs
10. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section C\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
11. The variance of the weights is : 6.0 lbs^2
12. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section D\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
13. The standard deviation is : 2.449489742783178 lbs

5. Write a program stored in the file L3q5.py that:

A) Gets two inputs from the user. Stores the inputs in variables called ***string\_one*** and ***string\_two.*** Verifies whether the length is according to the constraints and prints the verification result.

Certain constraints are imposed on the input pattern. The constraints are :

**For the first input :**

* The input starts with a letter.
* Every letter is followed by exactly one number.
* A letter cannot be next to another letter.
* A number cannot be next to another number.
* The length should be 5.
* The input is made of only numbers and letters. This means that the input should not contain any symbols or special characters.

**For the second input:**

* The input starts with a number.
* Every number is followed by exactly one letter.
* A number cannot be next to another number.
* A letter cannot be next to another letter.
* The length should be 7.
* The input is made of only numbers and letters. This means the input should not contain any symbols or special characters.

B) Extracts only the numbers from the variable ***string\_one*** and stores it in a variable called ***numbers\_one*** and extracts only the letters from the variable ***string\_one*** and stores it in a variable called ***letters\_one.*** Prints ***numbers\_one*** and ***letters\_one.***

C) Extracts only the numbers from the variable ***string\_two*** and stores it in a variable called ***numbers\_two,*** and extracts only the letters from the variable ***string\_two*** and stores it in a variable called ***letters\_two.*** Prints ***numbers\_two*** and ***letters\_two.***

D) Calculates the quotient and remainder when ***numbers\_two*** is divided by ***numbers\_one*** and stores it in a variable called ***quotient1*** and ***remainder1*** respectively. Print ***quotient1*** and ***remainder1.***

E) Concatenates ***letters\_two*** with ***letters\_one*** and stores it in a variable called ***result1***. Print ***result1.***

**Sample Output:**

1. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section A\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
2. Enter the first input: d4o2g
3. Enter the second input: 2e0w2e1
4. Is the length of string\_one equal to 5? : True
5. Is the length of string\_two equal to 7? : True
6. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section B\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
7. letters\_one is : dog
8. numbers\_one is : 42
9. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section C\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
10. letters\_two is : ewe
11. numbers\_two is : 2021
12. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section D\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
13. The quotient is: 48, and the remainder is: 5
14. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Section E\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*
15. The result of concatenating letters\_two with letters\_one is: ewedog

**Submitting Your Assignment**

Once you have completed your programs, submit each of them (L3q1.py, L3q2.py, L3q3.py, L3q4.py, L3q5.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/2021 # Section: Student section number  # E-mail: student\_email@tamu.edu  # Description: # e.g. This program asks for ...** |

Submit your files on [gradescope.com](https://www.gradescope.com/)