Python Programming, Spring 2021

**Programming Exam 1**

File format: **ID\_Q*n*.py**, where *n* is the question number.

For example, if your ID is 0812345, the filename of question1 is 0812345\_Q1.py

1. [30%] Given a list L with n data elements, n > 1, can you use the range accessing without any loop statement to extract the following three lists from L?
2. [10%] L1 contains all even-indexed elements in L.
3. [10%] L2 contains all odd-indexed elements in L.
4. [10%] L3 is the result of swapping any L[x] and L[x + 1], where x is an even index and   
   x + 1 < n.

Note that the order of elements in L1 and L2 must be the same as L.

For example:

If L = [0, 'A', 1, 'B', 2, 'C'], then

L1 is [0, 1, 2],

L2 is ['A', 'B', 'C'], and

L3 is ['A', 0, 'B', 1, 'C', 2].

Another example:

If L = [0, 'A', 1, 'B', 2, 'C', 3], then

L1 is [0, 1, 2, 3],

L2 is ['A', 'B', 'C'], and

L3 is ['A', 0, 'B', 1, 'C', 2, 3].

1. [30%] Input a list of real numbers.

(1) [15%] Design a program that allows your user can input N real numbers by the following rules:

1. Using a list named A to collect these n numbers.
2. The user can type ‘Q’ or ‘q’ to stop the input.
3. If the user typed a non-number string, your program should ignore it and ask the user to input the next number.

(2) [15%] Calculate the standard deviation s of these N numbers by the following equation, where α is the mean of A.

1. [40%] Design a program to solve the advanced coin change problem. Your customer will give you two integers, Price and Payment. Now, you have a list L, which contains n positive and non-zero integers to represent n coin types. You can assume that the Payment >= Price and the order of these n integers is largest to smallest. Can you calculate the best combination of these n coin types to find the change for your customer?

For example, if L = [100, 50, 10, 5, 1], Price is 17, and Purchase is 500.

The answer will be

100 \* 4

50 \* 1

10 \* 3

5 \* 0

1 \* 3

Another example, if L = [128, 64, 32 16, 8, 4, 2], Price is 17, and Purchase is 500.

The answer will be a message, ‘Not found!’.