Problem Description:

This timed lab will consist of some Python functions that you must write. The first function you will write involves modifying elements in a list based upon their index in the list and the data contained in the element.

Function 1 - numFilter:

Write a function called numFilter that takes in one parameter, a list. This list may contain any number of items, which may be of any Python type. You should process each item in the list, and perform the following actions on each item:

1. If the item is a positive number (either an integer or a float), replace that item in the list with the number times the position of the item in the list (i.e. its index). However, if the index of the number is 0, you should multiply the number by 1 instead of 0.
2. If the item is a negative number (either an integer or a float), you should replace the number with the string “-”.
3. If the item is not in either of the two categories above (Note: 0 is neither positive or negative), replace the item with “*”

Once processed, you should return the list.
Test cases:

numFilter([0,-30,9,"hello",3,6,-3,"here"]) --> ['*', '-', 18, '*', '-', '*']
numFilter([10,3,-5,0,'Cat']) --> [10, 3, '-', '*', '*']

Function 2 – stddev:

This function, named stddev, should take in one parameter, a list of numbers which may be either integers or floats. This function will compute the population standard deviation, which is computed using the following formula.

1. Compute the average of the list.
2. Subtract the average of the list from each data point, then square this difference.
3. Average all of the differences you found in step 2.
4. Take the square root of the average found in step 3. This number is the standard deviation.

You should return the resulting standard deviation.

Test Cases:

stddev([2,4,4,4,5,5,7,9]) → 2.0
stddev([2,4,4,0,5,5,7,9.7,21.5,7.2]) → 5.616618199593062

Function 3 – isAnagram:

This function named isAnagram, which takes in two parameters, both strings, which will return True if the given string is an anagram, and False if it is not. The two strings are anagrams if both strings contain the same number of each letter in them. For example, “mary” and “army” are anagrams. For this program, you will only be dealing with single-word anagrams that also lack punctuation. You may assume that all strings will be lowercase characters.

Test Cases:

isAnagram("aardvark", "varkarad") → True
isAnagram("aardvark", "anteater") → False
isAnagram("army", "mary") → True

Grading:

numFilter:
+1: Correct function header
+2: Handles all positive numbers correctly
+2: Handles all negative numbers correctly
+1: Handles all other data correctly.
+1: Returns the list after manipulations have been completed.

stddev:
+1: Correct function header
+2: Correctly finds list average.
+2: Correctly finds difference from mean for each number, squared.
+1: Correctly averages and takes sqrt of differences squared.
+1: Returned the population standard deviation as a float.

isAnagram:
+1: Correct function header
+2: Correctly finds that strings of different length are not anagrams
+3: Correctly finds that strings that have the same count of each letter are anagrams (Method of doing this is unimportant)
+1: Returned Boolean value