Assignment 1

RULES GOVERNING ACADEMIC INTEGRITY ARE STRICTLY OBSERVED WITHOUT EXCEPTION. THIS IS AN INDIVIDUAL ASSIGNMENT

Purpose:

To allow you to exercise with a logical thinking process to formulate very simple algorithms, leading the way to the implementation of this logic in some programming language like Python. The logic will include simple inputs and outputs, looping, using counters, and conditional statements (if and else). This is an individual assignment.

Question:

Write a **separate** Python program for each of the following that will allow you to:

a. Accept two integers from the user (x and y). Generate and print all possible permutations of integer values in [0,x] and [0,y]. For example, if you input 2, and 3, you are to generate all possible permutations of integer numbers in [0,2], and [0,3]. i.e. 0,0 0,1 0,2 0,3 1,0, etc. (10 points)
b. Input a GPA of a student in the range [0,4]. If the GPA is in:
    a. [3-4] you say "Superb!"
    b. [2-3[you say "Good!"
    c. [1-2[you say "Hmm!"
    d. [0-1[you say "No comment!" (10 points)
c. Input a Canadian Postal code of the form LDL DLD (where L is a letter in [A-Z] and D is a digit in [0-9]. There is a space in between. You are to verify that the postal code is in this form. If not, you need to output an error message. For example, K2K 9H5 is a valid postal code. All letters need to be upper case. (10 points)
d. Ask the user to input from the keyboard a string composed of the characters ***a***, ***b***, or ***c***. Your input is case sensitive (a's are different than A's as an example). However, the user may decide to input a string with invalid characters. Your program will output to the screen the number of a's in the string, the number of b's, the number of c's, as well as the number of all other invalid characters (non a, b, or c). This means that you will not prohibit the user from inputting a string composed of other characters also. (10 points)
e. A **Stem and Leaf Plot** is a special table where each data value is split into a "stem" (the first digit or digits) and a "leaf" (usually the last digit). Like in the following example of Figure 2, where the stem of the number shows up on the left of the vertical line, and the leaf which shows up on the right of the vertical line (the last digit only). (25 points)

    For example, given the following aptitude test scores in Figure 1, the stem and leaf diagram shows in Figure 2. The first number in the diagram to illustrate, has a stem of 6, and a leaf of 8, thus indicating the presence of

68 as a value in the table. The last row has a stem of 14, and a leaf of 1, indicating that there is a 141 value in the list of numbers. You will also notice that all stems are sorted in ascending order going top down, and all the leaves going right to left.

112	72	69	97	107	73	92	76	86	73
126	128	118	127	124	82	104	132	134	83
92	108	96	100	92	115	76	91	102	81
95	141	81	80	106	84	119	113	98	75
68	98	115	106	95	100	85	94	106	119

Figure 1 – Aptitude Test Scores

6	8	9									
7	2	3	3	5	6	6					
8	0	1	1	2	3	4	5	6			
9	1	2	2	2	4	5	5	6	7	8	8
10	0	0	2	4	6	6	6	7	8		
11	2	3	5	5	8	9	9				
12	4	6	7	8							
13	2	4									
14	1										

Figure 2 – Stem and Leaf Diagram

Generate and print the stem and leaf diagram of the values in Figure 1.

You will be graded as follows for each problem:

- 60% of points for the correctness of the logic.
- 10% points for using proper messages in your program.
- 10% point for documentation (inserting proper comments).
- 20% points for a professional judgment of your overall solution.