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DEPRATMENT OF DATA SCIENCE

Course code/Name: CSA08/ Python Programming

1.A valid number can be split up into these components (in order):

1. A decimal number or an integer.
2. (Optional) An 'e' or 'E', followed by an integer.

A decimal number can be split up into these components (in order):

1. (Optional) A sign character (either '+' or '-').
2. One of the following formats:
    1. One or more digits, followed by a dot '.'.
    2. One or more digits, followed by a dot '.', followed by one or more digits.
    3. A dot '.', followed by one or more digits.

An integer can be split up into these components (in order):

1. (Optional) A sign character (either '+' or '-').
2. One or more digits.

For example, all the following are valid numbers: ["2", "0089", "-0.1", "+3.14", "4.", "-.9", "2e10", "-90E3", "3e+7", "+6e-1", "53.5e93", "-123.456e789"], while the following are not valid numbers: ["abc", "1a", "1e", "e3", "99e2.5", "--6", "-+3", "95a54e53"].

Given a string s, return true if s is a valid number.

Test cases:

1.Input: s = "0"
Output: true
2.Input: s = "e"
Output: false
3.Input: s = " "
Output: false
4.Input: s = "."
Output: false
5.Input: s = "%"
Output: false

2. A party has been organised on a cruise. The party is organised for a limited time (T). The number of guests entering (E[i]) and leaving (L[i]) the party at every hour is represented as items of the list. The task is to find the maximum number of guests present on the cruise at any given instance within T hours.

Sample Input:
5 ---> Value of T
[7,0,5,1,3] ---> E[], element of E[0] to E[N-1], where input each element is separated by new line
[1,2,1,3,4] -----> L[],element of L[0] to L[N-1], where input each element is separated by new line
Sample Output:
8 -----> Maximum number of guests on cruise at an instance.

Testcases:

1. T=-4, E=[1,5,9,10] L=[0,2,3,4]
2. T= 0, E=[10,2,3,4], L=[1234]
3. T=4, E=[12,85], L=[100]
4. T=5, E=[42, 0, 35, 12, 15], L=[1,2,1,3,4]
5. T=1, E=[12], L=[10]

3.Modify string by replacing characters by alphabets whose distance from that character is equal to its frequency
Given a string S consisting of N lowercase alphabets, the task is to modify the string S by replacing each character with the alphabet whose circular distance from the character is equal to the frequency of the character in S.
Testcases:
1.Input: S="ghee"
Output: higg
Explanation:
The following modifications are done on the string S:

- The frequency of 'g' in the string is 1. Therefore, 'g' is replaced by 'h'.
- The frequency of 'e' in the string is 2. Therefore, 'e' is replaced by 'g'.
- The frequency of 'e' in the string is 2. Therefore, 'e' is replaced by 'g'.
- The frequency of 'h' in the string is 1. Therefore, 'h' is converted to 'i'.

modified string S is "higg".

2.S= "elephant"

3.S= "apple"

4. S= "orange"

5. S= "lion"

4. The year is divided into four seasons: spring, summer, fall and winter. While the exact dates that the seasons change vary a little bit from year to year because of the way that the calendar is constructed, we will use the following dates for this exercise:

Season	First day
Summer	March 20
Spring	June 21
Fall	September 22
Winter	December 21

Create a program that reads a month and day from the user. The user will enter the name of the month as a string, followed by the day within the month as an integer. Then your program should display the season associated with the date that was entered. Note: Enter First three letter for month example: Jan for January, Feb for February and so on....and first letter of the month should be capital

Input:
Enter the month: march
Enter the date: 21

Output:
The season is currently summer

Test Cases:

1. July, 29
2. September, 5
3. December, 30
4. March, 12
5. June, 27

5. Python program to remove words that are common in two Strings
Given two strings S1 and S2, representing sentences, the task is to print both sentences after removing all words which are present in both sentences.
Test cases:
1.Input: S1 = “sky is blue in color”, S2 =”Raj likes sky blue color “
Output: is in
Raj likes
Explanation: The common words are [sky, blue, color]. Removing these words from the two sentences modifies the sentences to the specified output.
2.Input: S1 = “learn python” , S2 = “python is easy to learn”
3.S1= “raju likes apple”, S2= “apple is red in color”

4.S1= “ sita likes orange” S2= “orange is rich in anti-oxidents”

5. S1= “raj is travelling to Chennai in train” S2= “the rain will reach Chennai at 8 pm”

6. Given a list of strings strs, group **the anagrams** together. You can return the answer in **any order**.
An **Anagram** is a word or phrase formed by rearranging the letters of a different word or phrase, typically using all the original letters exactly once.
strs[i] consists of lowercase English letters.

Test Cases:
1.Input: strs = ["eat","tea","tan","ate","nat","bat"]
Output: [["bat"],["nat","tan"],["ate","eat","tea"]]
2.Input: strs = [""]
Output: [[""]]
3.Input: strs = ["a"]
Output: [["a"]]
4.strs= “banana”
5.strs= 12345

7. Given two strings word1 and word2, return the minimum number of operations required to convert word1 to word2.
You have the following three operations permitted on a word:

- Insert a character
- Delete a character

- Replace a character

Test case:

1.Input: word1 = "horse", word2 = "ros"
Output: 3
2.Input: word1 = "intention", word2 = "execution"
Output: 5
3.Input: str1 = “sunday”, str2 = “saturday”
Output: 3
4.Input: str1 = “cat”, str2 = “cut”
Output: 1
5.Input: str1 = “girl”, str2 = “grill”
Output: 2

8. Scramble String
We can scramble a string s to get a string t using the following algorithm:
If the length of the string is 1, stop.
If the length of the string is > 1, do the following:
Split the string into two non-empty substrings at a random index, i.e., if the string is s, divide it to x and y where s = x + y.
Randomly decide to swap the two substrings or to keep them in the same order. i.e., after this step, s may become s = x + y or s = y + x.
Apply step 1 recursively on each of the two substrings x and y.
Given two strings s1 and s2 of the same length, return true if s2 is a scrambled string of s1, otherwise, return false.

Test cases:

1.Input: s1 = "great", s2 = "eatgr"
Output: true
2.Input: s1 = "abcde", s2 = "caebd"
Output: false
3.Input: s1 = "a", s2 = "a"
Output: true
4.s1= “ab” s2= “ad”
5s1=10 s2=-5

9. Write a python function shuffle(l1,l2) that takes as input two lists, 11 and l2, and returns a list consisting of the first element in l1, then the first element in l2, then the second element in l2, then the second element in l2, and so on. If the two lists are not of equal length, the remaining elements of the longer list are appended at the end of the shuffled output.

Sample Input:

Enter the number of elements of l1: 3
Enter the element: 1
Enter the element: 3
Enter the element: 5
Enter the number of elements of l2:5
Enter the element: 2
Enter the element: 4

Enter the element: 6
Enter the element: 8
Enter the element: 10

Sample output:

Shuffled list=[1,2,3,4,5,6,8,10]

Test cases:

1. 0,4
2. -1,1
3. 5,5
4. 10,5
5. 6,9

10. Reverse Words in a String

Given an input string s, reverse the order of the words.

A word is defined as a sequence of non-space characters. The words in s will be separated by at least one space.

Return a string of the words in reverse order concatenated by a single space.

Note that s may contain leading or trailing spaces or multiple spaces between two words. The returned string should only have a single space separating the words. Do not include any extra spaces.

Test Cases:

1.Input: s = "the sky is blue"
Output: "blue is sky the"
2.Input: s = " hello world "
Output: "world hello"
3.Input: s = "a good   example"
Output: "example good a"
4. s= “apple is red”
5.s= “Red rose”