End-Semester Assignment
Information Technology Workshop 1 (ITW1)

Time: 10 days **Marks:[3 x 10 = 30]**

Note: All questions are compulsory.

1. Write a python program to sort a list of elements using the quick sort algorithm.
   Example: Sample Data: [10, 80, 30, 90, 40, 50, 70]
   Expected Result: [10, 30, 40, 50, 70, 80, 90]

2. Write a python program using functions that asks the user for a long string containing multiple words. Print back the user string, except with the words in backward order.
   Example: I type the string: This is ITW1 2020; then I would see the string: 2020 ITW1 is This, as an output.

3. Write a python program that accepts multiple sensntences as input and prints the sentences after converting all the characters into captial letters in the sentences.
   Example: Input: Hello students
   Good luck for your examinations
   Output: HELLO STUDENTS
   GOOD LUCK FOR YOUR EXAMINATIONS

4. Write a python program using a given string “S” and width “W” to wrap the string “S” into a word of width “W”. Also, print the first and last character of each word in a string of two characters.
   Example: Input S : ABCDEFGHIJKL
   W: 4
   Output_1:ABCD Output_2: AD
   EFGH EH
   IJKL IL

5. Write a python program using functions that ask the user for an integer “N” as input and print an alphabet rangoli of size “N”.
   Example: Input: 3
   Output:
   c
   c b c
   c b a b c
   c b c
   c

6. Write a python program using functions that ask the user for a positive integer “N” as input and print a numerical triangle of height “N-1” like the one below:
   Example: Input: 5
   Output: 1
   2 2
   3 3 3
   4 4 4 4

7. From a given array **A[]** of positive integers of size **N** and a positive integer **K**, write a python code to find the maximum possible length of subarray which can be made equal by adding some integer value to each element of the sub-array such that the sum of the added elements does not exceed **K**.
   Example: Input**:** N = 5, A[] = {1, 4, 9, 3, 6}, K = 9
   Output: 3

Explanation:
{1, 4} : {1+3, 4} = {4, 4}
{4, 9} : {4+5, 9} = {9, 9}
{3, 6} : {3+3, 6} = {6, 6}
{9, 3, 6} : {9, 3+6, 6+3} = {9, 9, 9}
Hence, the maximum length of such a subarray is 3.

8. Write a python program to create an 8x3 integer array from a range of 10 to 34 so that the difference between each element is 1 and then split the array into four equal-sized sub-arrays.

Example: Creating 8x3 array

```
[[10 11 12]
 [13 14 15]
 [16 17 18]
 [19 20 21]
 [22 23 24]
 [25 26 27]
 [28 29 30]
 [31 32 33]]
```

Dividing 8x3 array into 4 sub array

```
[array([[10, 11, 12],[13, 14, 15]]),
 array([[16, 17, 18],[19, 20, 21]]),
 array([[22, 23, 24],[25, 26, 27]]),
 array([[28, 29, 30],[31, 32, 33]])]
```

9. Write a python program that accepts input from the user and checks whether the input is a palindrome or not.

Example: Input: Malayalam
Output: true

10. Write a python program that accepts a string as input from the user to find the input string permutations.

Example: Input: ABC
Output: ABC
ACB
BAC
BCA
CAB
CBA

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