

# Homework - 3

## IC100 Introduction To Programming

### Question 1

- A Write a function `void encrypt(char str[ ], int k)` to encrypt a string using Caesar's cipher, and print it. If `p` is some plaintext (i.e., an unencrypted message),  $p_i$  is the  $i^{th}$  character in `p`, and `k` is a secret key (i.e., a non-negative integer), then each letter,  $c_i$ , in the ciphertext (i.e. the encrypted message), `c`, is computed as:

$$c_i = (p_i + k) \% 26$$

The user has to enter the string to be encrypted, and the key. Then each letter in the plaintext is 'shifted' by a number of places equal to the key. Note:  $p_i$  denotes alphabet number from the set 0, ..., 25 with 0 corresponding to 'a' or 'A', 1 corresponding to 'b' or 'B' and so on.

Example:

Input:

Hello!

3

Output:

Khoor!

Note: Avoid transformation into ASCII 0..31, i.e. operate only in the ASCII region of 32..127. Also note that in the example, the special characters remain unchanged.

- B Write another function `void decrypt(char str[ ], int k)` to decrypt a string using Caesar's cipher, and print it. Example:

Input:

Khoor!

3

Output:

Hello!

- C Write a main function, which takes a string and a key as input, and prints the encrypted version using Caesar's cipher. Then it decrypts the string and prints the decrypted version using the above functions.

## Question 2

Take as input size of an array, then take as many numbers as input. Take variable say K as input, print right-shifted array by K.

Example

Input:

8

1 2 3 4 5 6 7 8

3

Output:

6 7 8 1 2 3 4 5

## Question 3

Take as input size of an array, then take as many numbers as input. Swap smallest and the largest values(consider all values in array to be distinct) in array and print it:

Example

Input:

8

5 2 4 88 22 -3 0 -1

Output:

5 2 4 -3 22 88 0 -1

## Question 4

You are given an array A of size n and an integer b. You have to find out all pairs of elements from array A whose sum is equal to b and print them. In the first line, you are given 2 integers, n (size of array) and b. In the next line, you are given n integers (the elements of array A). You have to output all pairs of elements from array A whose sum is equal to b. Output each new pair in a new line.

Example

Input:

5 5 // n = 5, b = 5

1 2 3 4 5 // Array A

Output:

1 4

2 3

## Question 5

Strings are one-dimensional array of characters terminated by a null character `'\0'`. In this question, you are given a string of characters as input and you have to output the number of words in the input string. Words are separated by space character (`' '`) or tab character (`'\t'`). The first line contains a single integer `n` denoting the size of the input string. The second line consists of the string with `n` characters. Output a single integer denoting the number of words in the input.

Example

Input:

18 //n = 18

Hello world IC100 // Input string

Output:

3

Input:

1 // n = 1

// The single character input is a space character

Output:

0

## Submission

Please submit your homework in piazza under hw3 folder and make it a private submission to the instructors. Zip all the codes and name the zip as `yourname_rollno`

Submission deadline is 8:00pm Jan 8.