Dept. of CSE, Bennett University

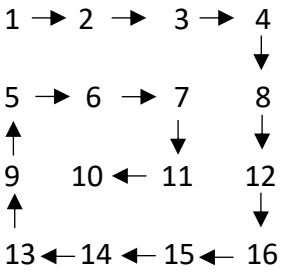
ECSE379L – Programming Using C++

Lab Assignment – 5

In this lab, you will write a C++ program to solve the following problem.

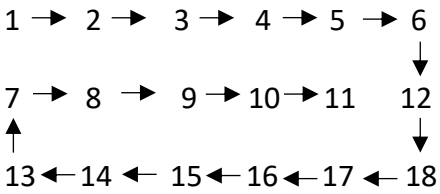
(1) Given a two dimensional matrix, you have to traverse the matrix in a hypothetical traversal way and display the numbers present in the corresponding location (see example below for better clarity). The matrix need not be a square matrix.

Sample Input (1):



Sample Output (1): 1,2,3,4,8,12,16,15,14,13,9,5,6,7,11,10

Sample Input (2):



Sample Output (2): 1,2,3,4,5,6,12,18,17,16,15,14,13,7,8,9,10,11

(2) Write a program to implement following encryption-decryption algorithm.

a. Alice wants to share some secret numeric data with Bob which is in the form of a 2D array. But to save its data from attacker Alice adopts the following encryption algorithm to encrypt the 2D numerical data array.

- The outer elements of the 2D array should be incremented by i+1.
- The inner elements of array should be decrement by j.

Here, i and j are the row and column numbers of the 2D array.

Your task is to Print the encrypted matrix.

b. Similarly, when Bob will receive the encrypted matrix, he should be able to decrypt the encrypted matrix to get back the original numeric data represented in matrix format. Your task is to find the equivalent decryption algorithm.

Sample Input for (a):

1 1 1 1
1 1 1 1
1 1 1 1

Sample Output for (a):

2 2 2 2
3 0 -1 3
4 4 4 4

(3) Here, your task is to create an overloaded function called "compare" using function overloading which accepts two values of same type (either integer, character or String).

a. Write the function int compare (int N1, int N2) which accepts two integer parameters N1 and N2 and compares them. The function should return 1 if N1 is greater, -1 if N2 is greater or 0 if both are equal.
b. Similarly, write another function int compare (char N1, char N2) that accepts two character parameters N1 and N2 and compares their numeric values. The function should return 1 if N1 is greater, -1 if N2 is greater or 0 if both are equal.
c. int compare (String N1, String N2) is another function that accepts two string parameters N1 and N2 and compares their lengths. The function should return 1 if N1 is greater, -1 if N2 is greater or 0 if both are equal.

In input, first line of input represents the type of function to call on the basis of arguments passed as 1 for integer, 2 for character and 3 for the string. Second and Third lines represent N1 and N2 respectively.

Sample Input:
1
215
215
Sample Output:
0

Sample Input:
3
Hello
Good
Sample Output:
-1

(4) Given a string S, character C1 and C2 as input, replace all the occurrences of the given character C1 with C2 in the given string S. Do not use any system library function to solve the problem and ignore the case.

Sample Input:
Bennett University
n
x
Sample Output:
Bexxett Uxiversity

Sample Input:
Times of India
i
j
Sample Output:
Times of Jndja

(5) You visited Raipur to attend a family function of your friend. Two buses started from Raipur to reach Bilaspur. The distance is nearly 115KM. On the way one of the bus got late due to some technical problem, and you were travelling into the other bus which reached Bilaspur at 9PM. While the members of the first bus were in the queue for the dinner, the members of the second bus also reached. And, they just follow the dinner queue. In return it was decided that now all the members will travel in a single bigger bus. Instead of allowing the members to travel into the random order, it is decided that the members will enter into the bus based on their age. Given the age details of all the members as integers, write a program so that all the members can be arranged in a queue based on their age, and in increasing order of their age. Also, calculate and display the average age of the passengers.