Lab Assignment :4

CSN-261:Data structures Lab

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Sub Batch:O2
Tools used : C(language),Linux(os), Github(csv),Doxygen(documentation),GDB(debugger)

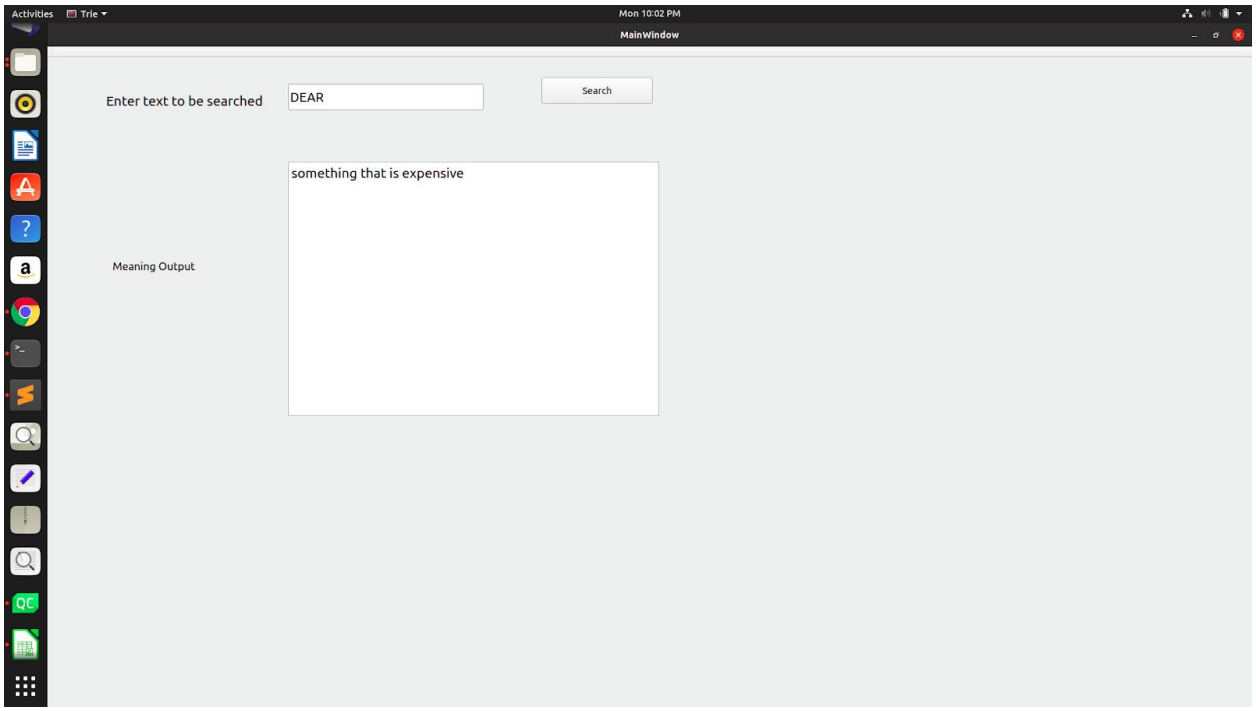
PROBLEM 1:

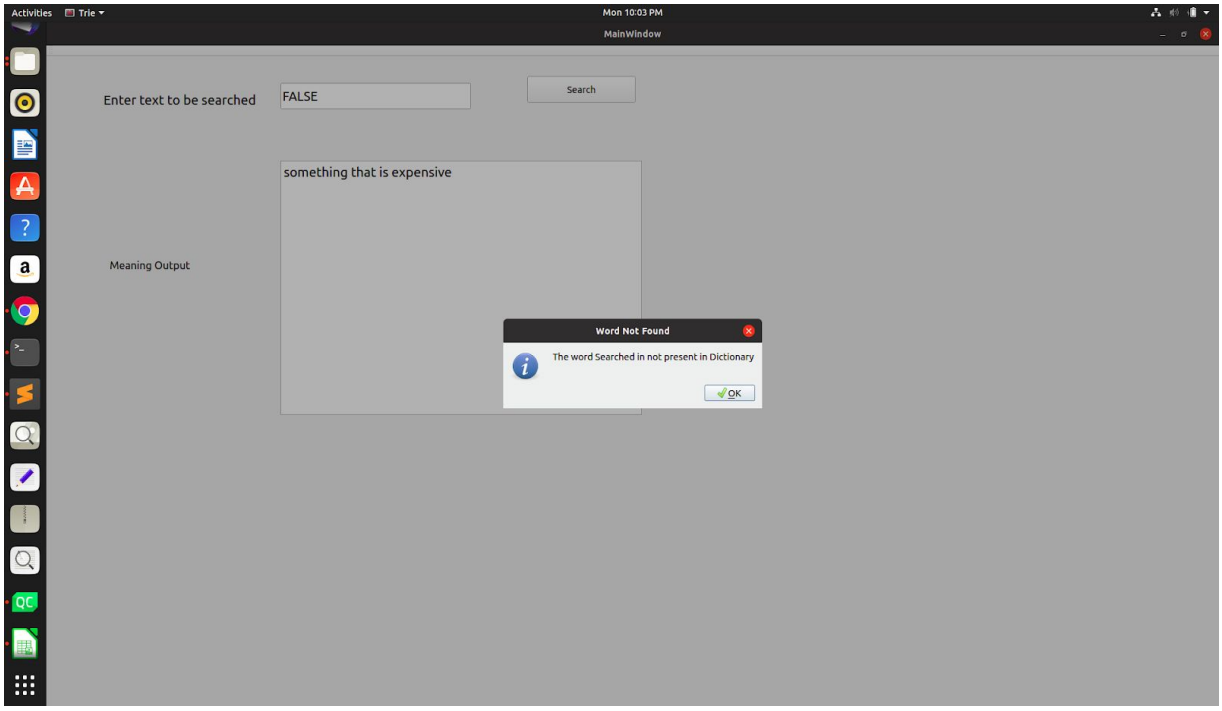
Create a dictionary using Trie data structure (without using STL) having words and their meanings. You need to read the words and their respective meanings from a CSV file (uploaded in Piazza, named as TrieInput.csv), where 1st column is for words and 2nd column shows its meaning. Given a word you have to print its meaning. If no such word is found in the dictionary, then print “Invalid word”. Create a GUI using Qt library to accept a word in a text box and display the meaning in an another box, as shown in the Figure 1. Also, create an installer of your program for Windows OS. You can use the software like InstallSimple or InstallShield or WIX or NSIS to do so.

DATA STRUCTURES AND ALGORITHM:

I have used trie data structure for implementing the dictionary.
The GUI has been created using Qt.

OUTPUTS :





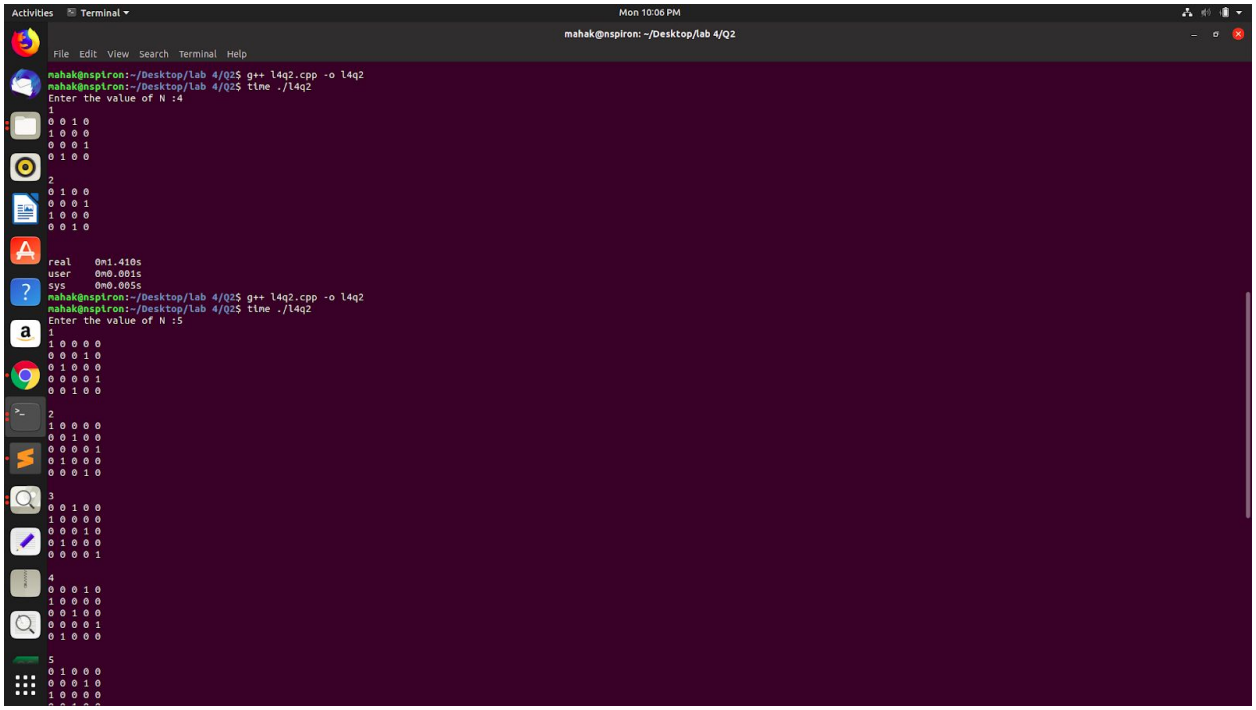
Problem Statement 2:

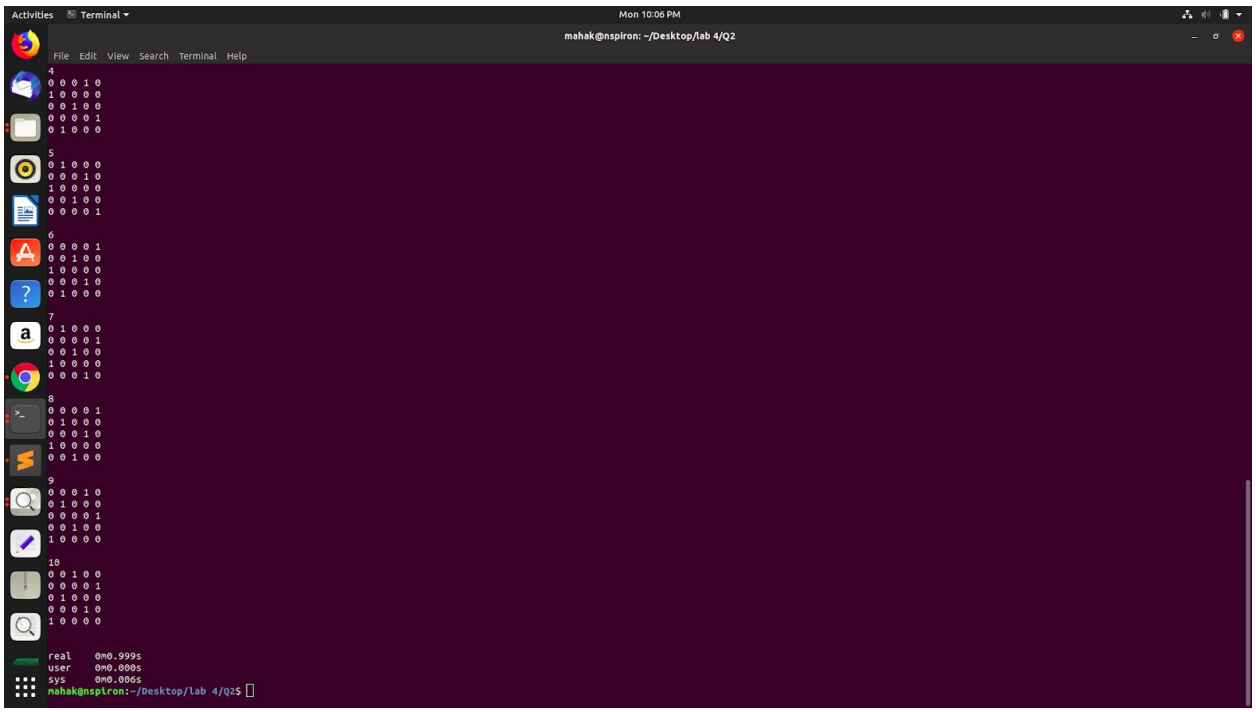
Implement N Queens problem to show all the possible combinations in N x N binary matrix and to display the total number of such combinations at the end, where 1 represents the position of N queens in the N x N matrix and remaining cells are represented by 0. A sample output for N=4 is shown below.

DATA STRUCTURES AND ALGORITHM USED

I have used Backtracking for implementing N queen problem.

OUTPUT


Activities
Terminal
Mon 10:06 PM
mahak@nspiron: ~/Desktop/lab 4/Q2
File Edit View Search Terminal Help
mahak@nspiron:~/Desktop/lab 4/Q2$ g++ l4q2.cpp -o l4q2
mahak@nspiron:~/Desktop/lab 4/Q2$ time ./l4q2
Enter the value of N :4
1
0 0 1 0
1 0 0 0
0 0 0 1
0 1 0 0
2
0 1 0 0
0 0 0 1
1 0 0 0
0 0 1 0
real 0m1.410s
user 0m0.001s
sys 0m0.005s
mahak@nspiron:~/Desktop/lab 4/Q2$ g++ l4q2.cpp -o l4q2
mahak@nspiron:~/Desktop/lab 4/Q2$ time ./l4q2
Enter the value of N :5
1
1 0 0 0 0
0 0 0 1 0
0 1 0 0 0
0 0 0 0 1
0 0 1 0 0
2
1 0 0 0 0
0 0 1 0 0
0 0 0 0 1
0 1 0 0 0
0 0 0 1 0
3
0 0 1 0 0
1 0 0 0 0
0 0 0 1 0
0 1 0 0 0
0 0 0 0 1
4
0 0 0 1 0
1 0 0 0 0
0 0 1 0 0
0 0 0 0 1
0 1 0 0 0
5
0 1 0 0 0
0 0 0 1 0
1 0 0 0 0


Activities
Terminal
Mon 10:06 PM
mahak@nspiron: ~/Desktop/lab 4/Q2
File Edit View Search Terminal Help
4
0 0 0 1 0
1 0 0 0 0
0 0 1 0 0
0 0 0 0 1
0 1 0 0 0
5
0 1 0 0 0
0 0 0 1 0
1 0 0 0 0
0 0 1 0 0
0 0 0 0 1
6
0 0 0 0 1
0 0 1 0 0
1 0 0 0 0
0 0 0 1 0
0 1 0 0 0
7
0 1 0 0 0
0 0 0 0 1
0 0 1 0 0
1 0 0 0 0
0 0 0 1 0
8
0 0 0 0 1
0 1 0 0 0
0 0 0 1 0
1 0 0 0 0
0 0 1 0 0
9
0 0 0 1 0
0 1 0 0 0
0 0 0 0 1
0 0 1 0 0
1 0 0 0 0
10
0 0 1 0 0
0 0 0 0 1
0 1 0 0 0
0 0 0 1 0
1 0 0 0 0
real 0m0.999s
user 0m0.000s
sys 0m0.006s
mahak@nspiron:~/Desktop/lab 4/Q2$

CPU TIME:

real 0m1.410s
user 0m0.001s
sys 0m0.005s

Problem Statement 3:

Given an integer array having N number of elements, write a C++ program using hash map (using STL) to find the length of the largest subarray from the given input array, where the summation of the elements of the subarray is equal to n. In the output, if any solution exists then print the starting and ending index (with respect to given input array) of the largest subarray and also print its length. Otherwise, print "Not Found", as described in the following output

Input:

N = 8 15 0 2 -3 1 5 3 -2
n = 5

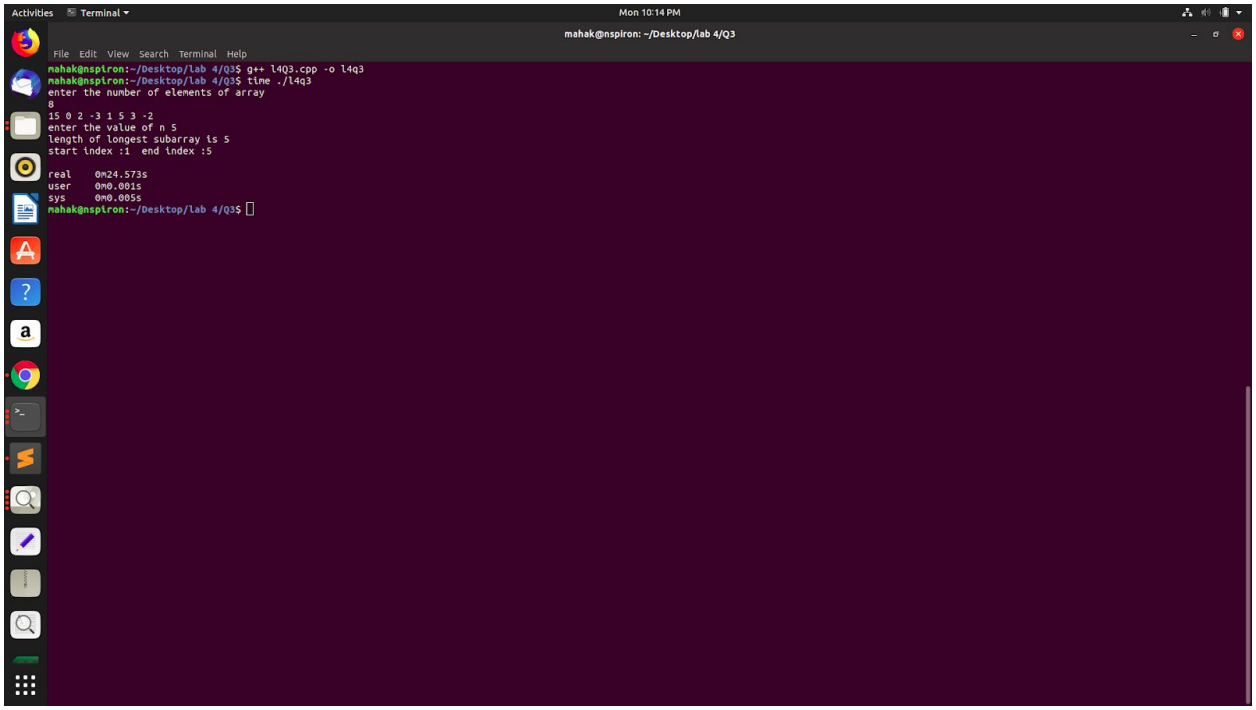
Output:

Length of longest subarray is 5 Index from 1 to 5.

DATA STRUCTURE AND ALGORITHM USED:

I have used Hash map to store the sum of the array.
Basic map function like 'find' is used to iterate through the map until given k is found .

OUTPUT:



CPU TIME:

real 0m24.573s

user 0m0.001s

sys 0m0.005s