Lab Assignment - 4

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Problem Statement -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.

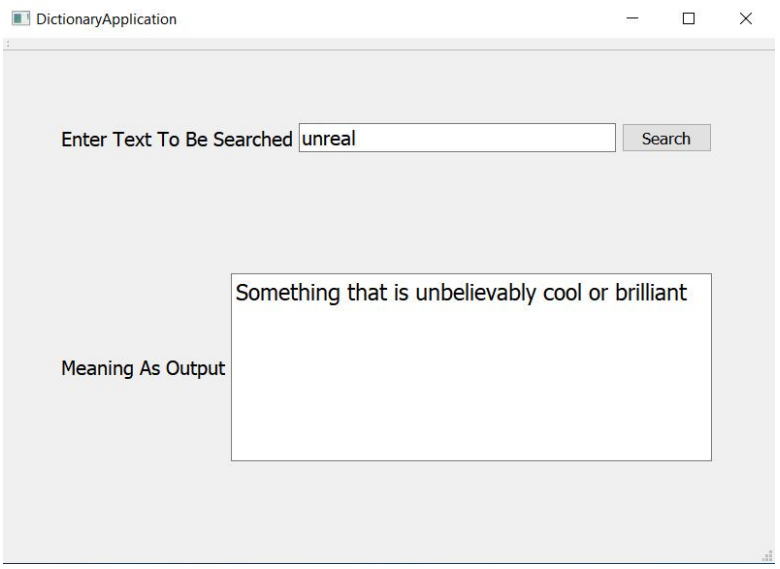
Also, create an installer of your program for Windows OS. You can use the software like InstallSimple or InstallShield or WIX or NSIS to do so.

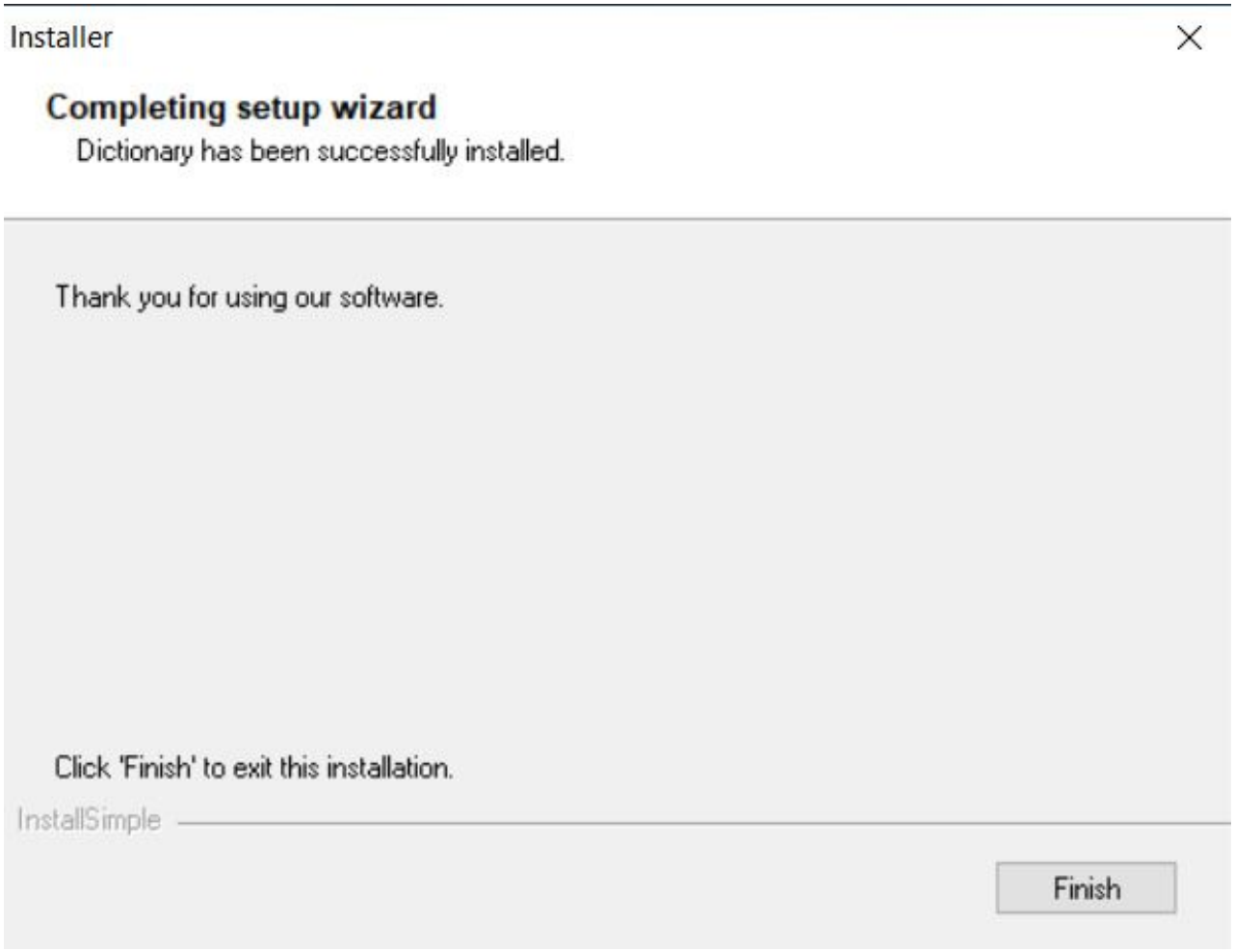
DATA STRUCTURES USED:

M-way Search Tree(For the word dictionary)
Trie(From the STL)
2D-Array(statically Allocated)

ALGORITHMS USED:

M-way search and insert algorithm for insertion in the dictionary.
Read csv file using fstream in C++.
Created GUI for the program using Qt libraries and made and install using InstallShield.


DictionaryApplication
Enter Text To Be Searched
unreal
Search
Meaning As Output
Something that is unbelievably cool or brilliant


Installer
Completing setup wizard
Dictionary has been successfully installed.
Thank you for using our software.
Click 'Finish' to exit this installation.
InstallSimple
Finish

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.

DATA STRUCTURES USED:

Vectors from STL.

ALGORITHMS USED:

Use of recursion to find the solution.
Use of Backtracking algorithm.

```
[radhika@localhost Assignment4]$
[radhika@localhost Assignment4]$ ./Q2
Enter n
4
0 1 0 0
0 0 0 1
1 0 0 0
0 0 1 0

0 0 1 0
1 0 0 0
0 0 0 1
0 1 0 0

2
[radhika@localhost Assignment4]$ ./Q2
Enter n
6
0 1 0 0 0 0
0 0 0 1 0 0
0 0 0 0 0 1
1 0 0 0 0 0
0 0 1 0 0 0
0 0 0 0 1 0

0 0 1 0 0 0
0 0 0 0 0 1
0 1 0 0 0 0
0 0 0 0 1 0
1 0 0 0 0 0
0 0 0 1 0 0

0 0 0 1 0 0
1 0 0 0 0 0
0 0 0 0 1 0
0 1 0 0 0 0
0 0 0 0 0 1
0 0 1 0 0 0

0 0 0 0 1 0
0 0 1 0 0 0
1 0 0 0 0 0
0 0 0 0 0 1
0 0 0 1 0 0
0 1 0 0 0 0

4
[radhika@localhost Assignment4]$
```

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”.

DATA STRUCTURES USED:

Maps(using STL) which act as key value pairs.
Arrays

ALGORITHMS USED:

Checked for a specific value in map to find optimal subarray
Used maps to store the sum to a certain index from start.

```
[radhika@localhost Assignment4]$ ./Q3
Enter the number of elements in array
8
Enter the numbers in array : 15 0 2 -3 1 5 3 -2
Enter the value of n : 5
Length of the longest subarray is 5
Index from 1 to 5
[radhika@localhost Assignment4]$
```