REPORT FILE
Assignment 4
CSN 261 : Data Structures Lab

Submitted to : Dr. Sudip Roy

NIHARIKA AGRAWAL
BTech. II year
CSE Dept
18114051
Sub Batch: O2

Tools used : C++(language), Linux(OS & CLI) , Windows,Github(csv) , Doxygen(documentation) , GDB compiler (debugger) , Qt creator(IDE), InstallSimple, Sources provided by faculty.

Problem Statement 1:

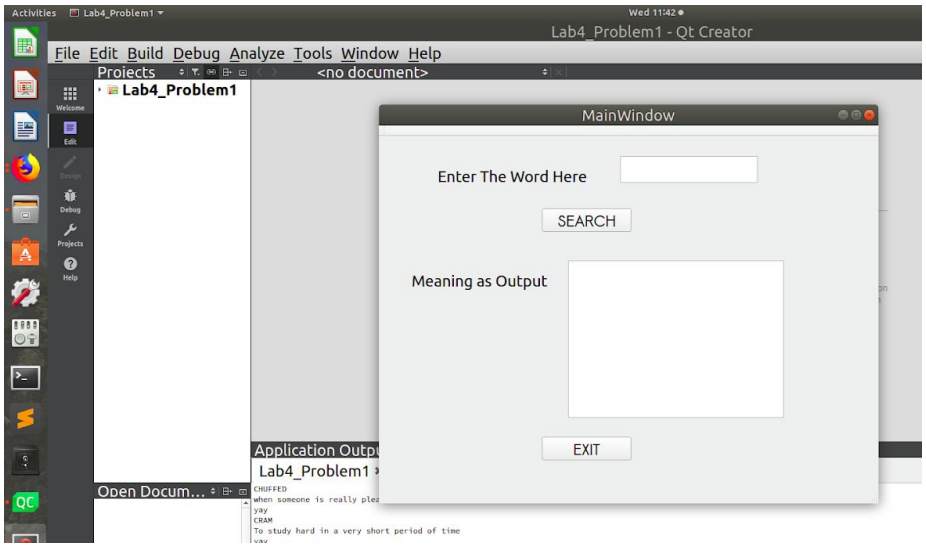
Create a dictionary using Trie data structure (without using STL) having words and their meanings. You need to read the words and their respective meanings from a CSV file (uploaded
in Piazza, named as TrieInput . csv), where 1st column is for words and 2nd column shows its
meaning.
Given a word you 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.

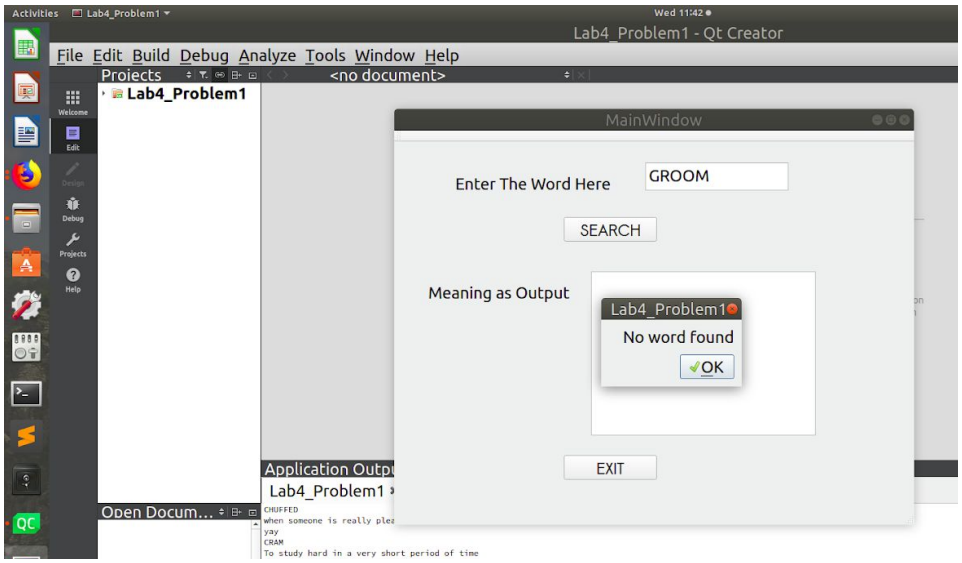
Data structures and algorithm used:

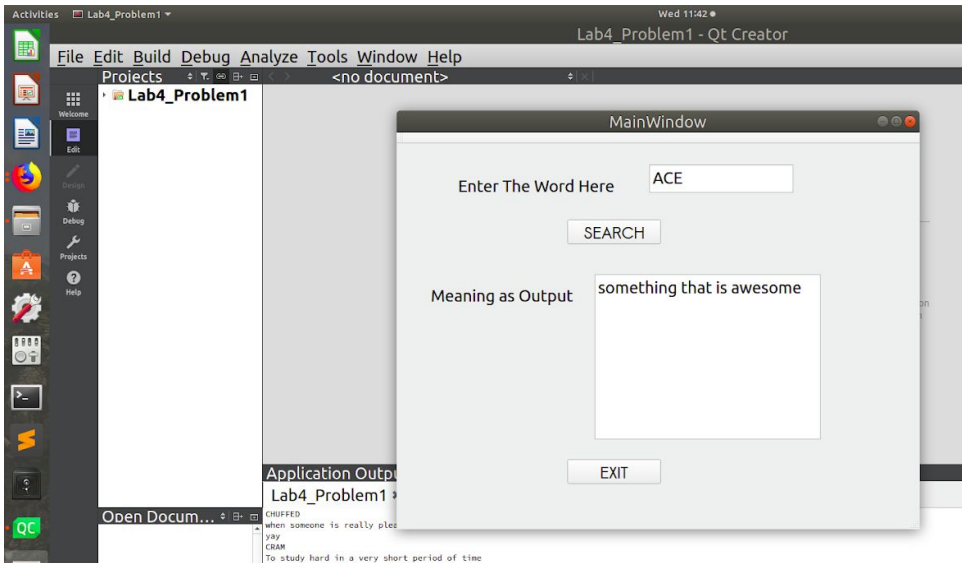
For this program, the TRIE data structure is used to implement dictionary and also file handling is done. Qt Creator IDE is used to create a a widget application Qt Project and implement code , in mainwindow.cpp.
It also contains event handler functions , for ex: whenever a button is clicked, what should happen.
Qt designer is used to design widget form window by dragging and dropping objects(manual coding is not required, automatic xml code is generated: mainwindow.ui)

Install Simple software is used to make a setup wizard for my project folder for WINDOWS OS.(Qt and Qt applications are cross platform)

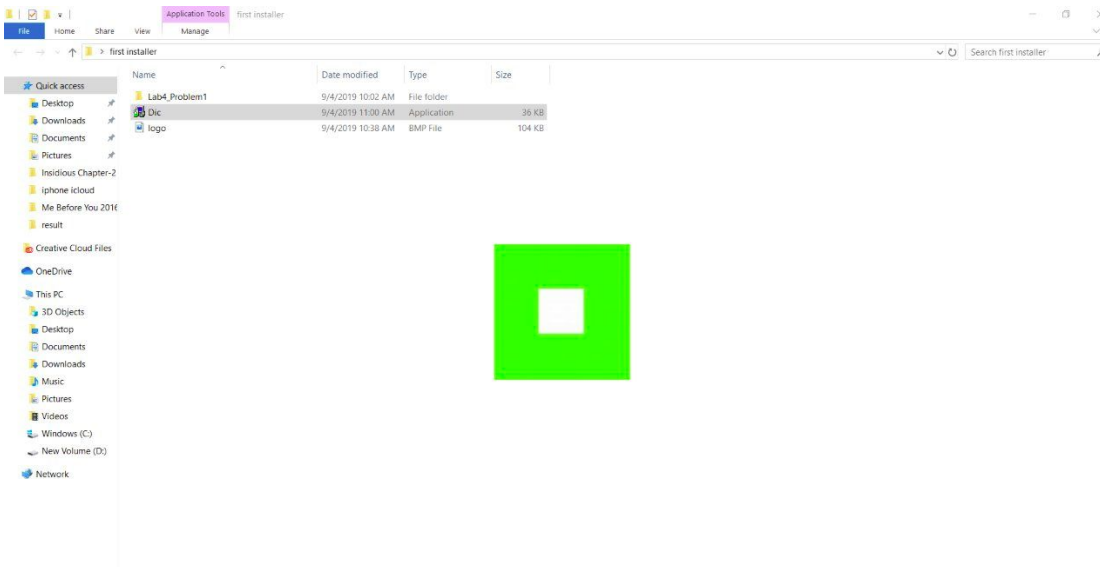
Outputs:

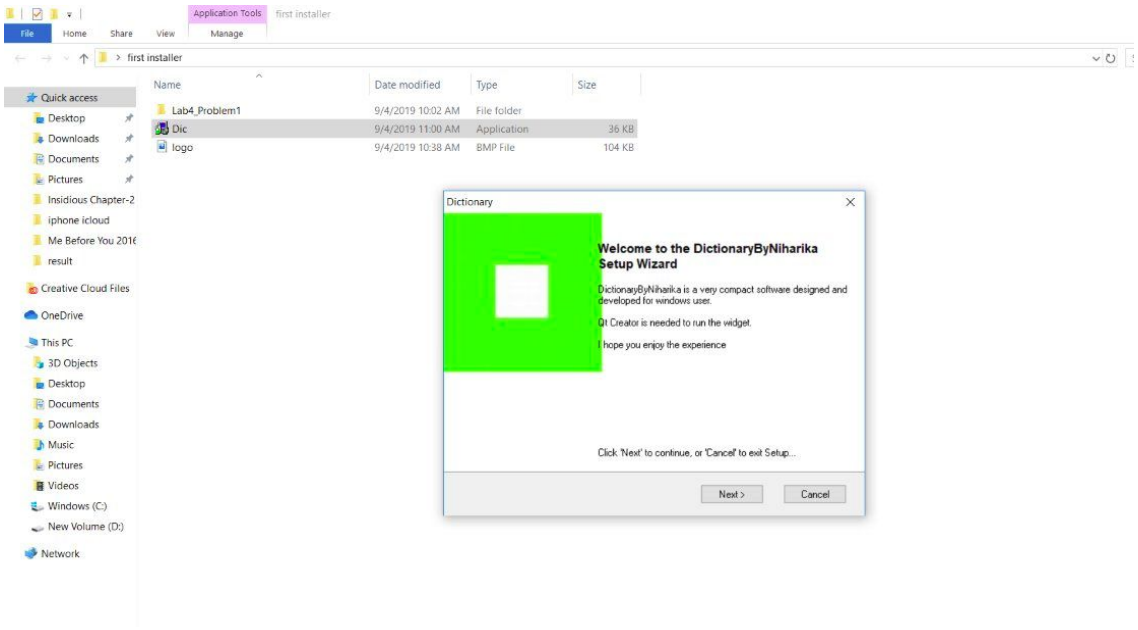

Lab4_Problem1 - Qt Creator
File Edit Build Debug Analyze Tools Window Help
Projects
<no document>
Lab4_Problem1
MainWindow
Enter The Word Here
SEARCH
Meaning as Output
EXIT
Application Outpu
Lab4_Problem1
Open Docum...
CHUFFED
when someone is really plea
yay
CRAM
To study hard in a very short period of time

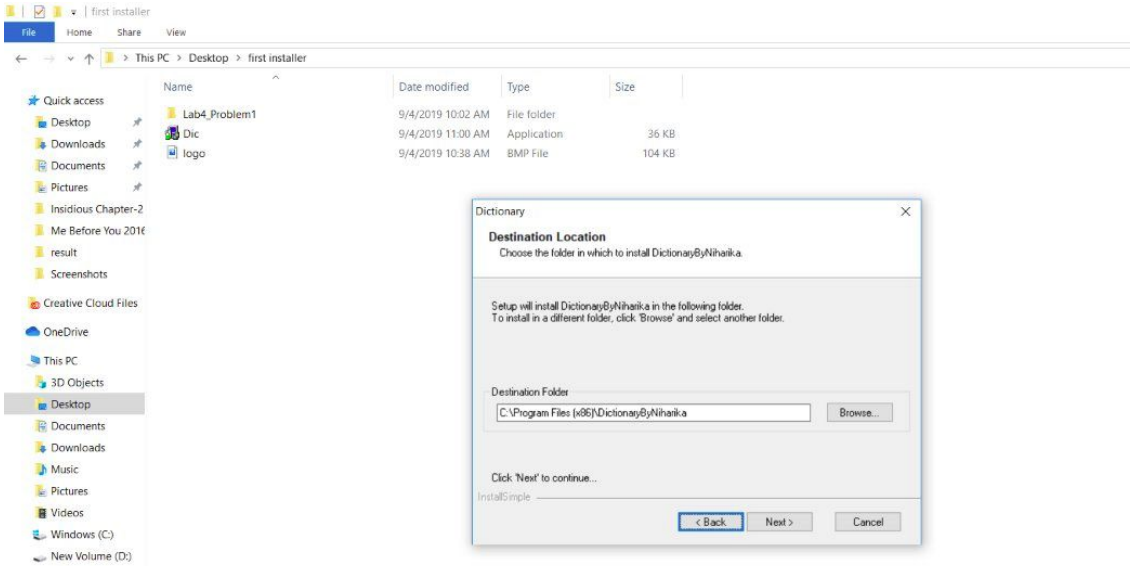

Lab4_Problem1 - Qt Creator
File Edit Build Debug Analyze Tools Window Help
Projects
<no document>
Lab4_Problem1
MainWindow
Enter The Word Here
GROOM
SEARCH
Meaning as Output
Lab4_Problem1
No word found
OK
EXIT
Application Outpu
Lab4_Problem1
Open Docum...
CHUFFED
when someone is really plea
yay
CRAM
To study hard in a very short period of time

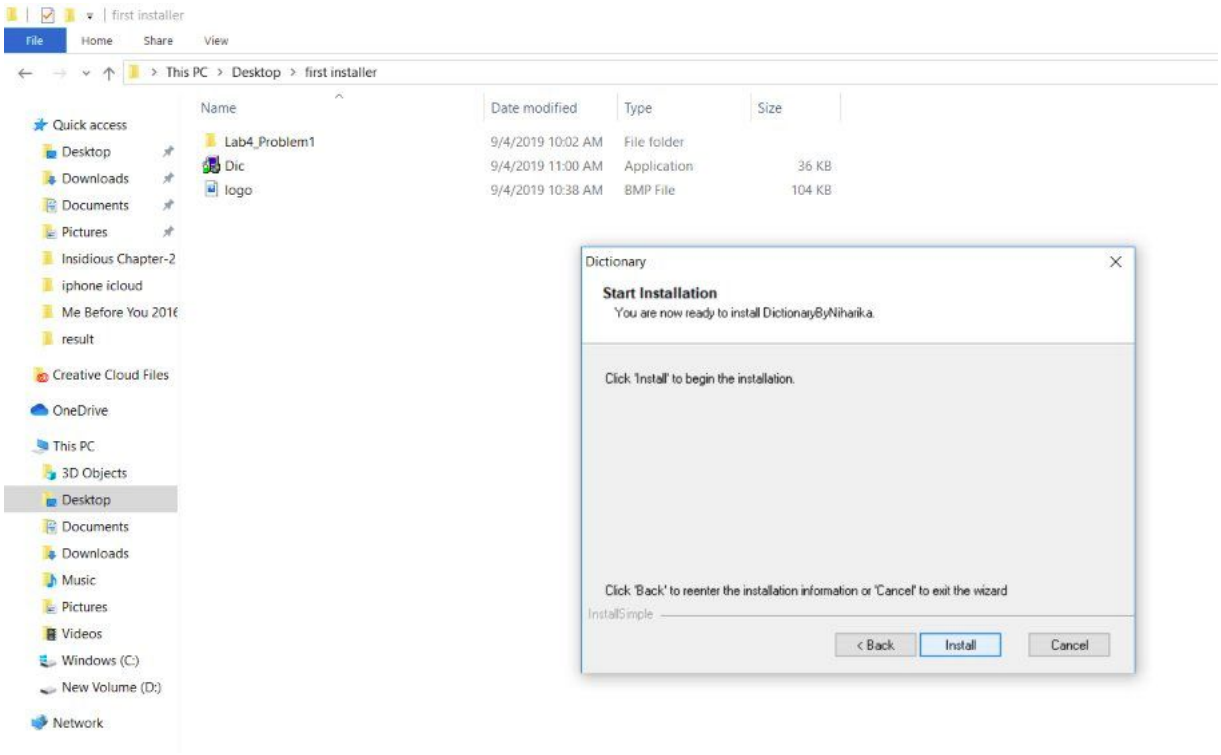

Lab4_Problem1 - Qt Creator
File Edit Build Debug Analyze Tools Window Help
Projects
<no document>
Lab4_Problem1
MainWindow
Enter The Word Here
ACE
SEARCH
Meaning as Output
something that is awesome
EXIT
Application Outpu
Lab4_Problem1
Open Docum...
CHUFFED
when someone is really plea
yay
CRAM
To study hard in a very short period of time

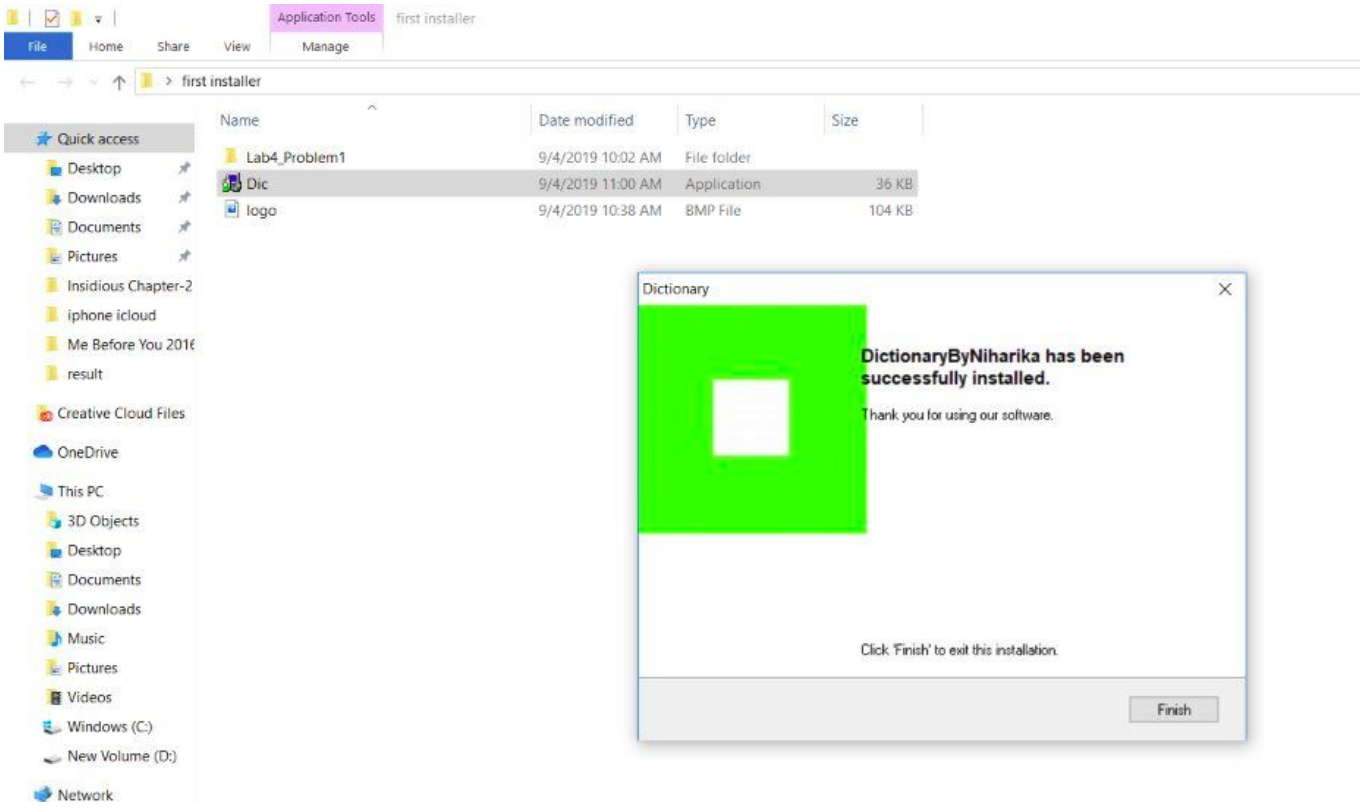
Installer

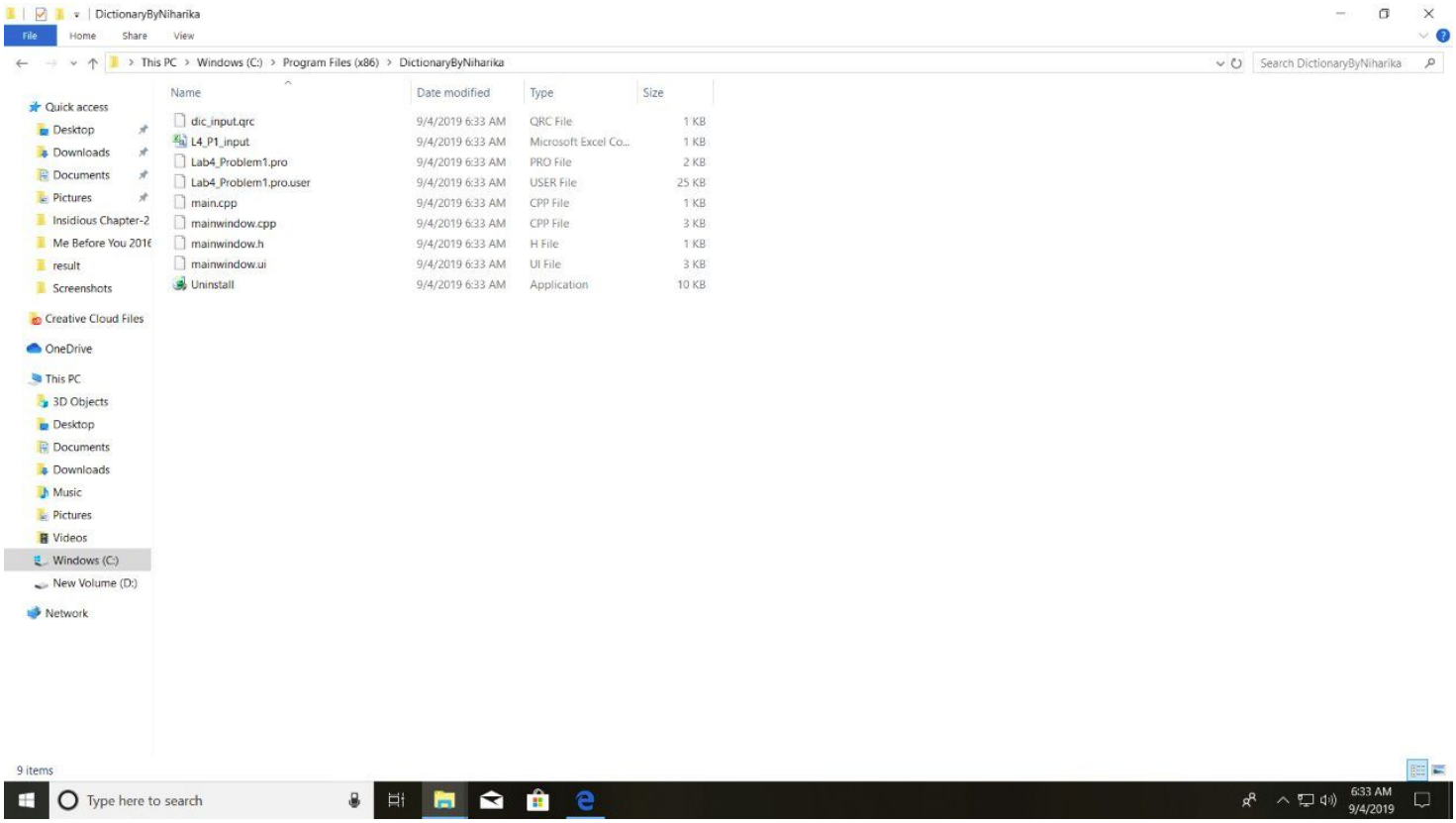

Application Tools
first installer
File
Home
Share
View
Manage
first installer
Search first installer
Quick access
Desktop
Downloads
Documents
Pictures
Insidious Chapter-2
iphone icloud
Me Before You 2016
result
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
New Volume (D:)
Network
Name
Date modified
Type
Size
Lab4_Problem1
9/4/2019 10:02 AM
File folder
Dic
9/4/2019 11:00 AM
Application
36 KB
logo
9/4/2019 10:38 AM
BMP File
104 KB


Application Tools
first installer
File
Home
Share
View
Manage
first installer
Quick access
Desktop
Downloads
Documents
Pictures
Insidious Chapter-2
iphone icloud
Me Before You 2016
result
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
New Volume (D:)
Network
Name
Date modified
Type
Size
Lab4_Problem1
9/4/2019 10:02 AM
File folder
Dic
9/4/2019 11:00 AM
Application
36 KB
logo
9/4/2019 10:38 AM
BMP File
104 KB
Dictionary
Welcome to the DictionaryByNiharika Setup Wizard
DictionaryByNiharika is a very compact software designed and developed for windows user.
Qt Creator is needed to run the widget.
I hope you enjoy the experience
Click 'Next' to continue, or 'Cancel' to exit Setup...
Next >
Cancel


first installer
File
Home
Share
View
This PC
Desktop
first installer
Quick access
Desktop
Downloads
Documents
Pictures
Insidious Chapter-2
Me Before You 2016
result
Screenshots
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
New Volume (D:)
Network
Name
Date modified
Type
Size
Lab4_Problem1
9/4/2019 10:02 AM
File folder
Dic
9/4/2019 11:00 AM
Application
36 KB
logo
9/4/2019 10:38 AM
BMP File
104 KB
Dictionary
Destination Location
Choose the folder in which to install DictionaryByNiharika.
Setup will install DictionaryByNiharika in the following folder.
To install in a different folder, click 'Browse' and select another folder.
Destination Folder
C:\Program Files (x86)\DictionaryByNiharika
Browse...
Click 'Next' to continue...
InstallSimple
< Back
Next >
Cancel


first installer
File
Home
Share
View
This PC > Desktop > first installer
Quick access
Desktop
Downloads
Documents
Pictures
Insidious Chapter-2
iphone icloud
Me Before You 2016
result
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
New Volume (D:)
Network
Name
Date modified
Type
Size
Lab4_Problem1
9/4/2019 10:02 AM
File folder
Dic
9/4/2019 11:00 AM
Application
36 KB
logo
9/4/2019 10:38 AM
BMP File
104 KB
Dictionary
Start Installation
You are now ready to install DictionaryByNiharika.
Click 'Install' to begin the installation.
Click 'Back' to reenter the installation information or 'Cancel' to exit the wizard
InstallSimple
< Back
Install
Cancel


Application Tools
first installer
File
Home
Share
View
Manage
first installer
Quick access
Desktop
Downloads
Documents
Pictures
Insidious Chapter-2
iphone icloud
Me Before You 2016
result
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
New Volume (D:)
Network
Name
Date modified
Type
Size
Lab4_Problem1
9/4/2019 10:02 AM
File folder
Dic
9/4/2019 11:00 AM
Application
36 KB
logo
9/4/2019 10:38 AM
BMP File
104 KB
Dictionary
DictionaryByNiharika has been successfully installed.
Thank you for using our software.
Click 'Finish' to exit this installation.
Finish


DictionaryByNiharika
File
Home
Share
View
This PC › Windows (C:) › Program Files (x86) › DictionaryByNiharika
Search DictionaryByNiharika
Quick access
Desktop
Downloads
Documents
Pictures
Insidious Chapter-2
Me Before You 2016
result
Screenshots
Creative Cloud Files
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
New Volume (D:)
Network
Name
Date modified
Type
Size
dic_input.qrc 9/4/2019 6:33 AM QRC File 1 KB
L4_P1_input 9/4/2019 6:33 AM Microsoft Excel Co... 1 KB
Lab4_Problem1.pro 9/4/2019 6:33 AM PRO File 2 KB
Lab4_Problem1.pro.user 9/4/2019 6:33 AM USER File 25 KB
main.cpp 9/4/2019 6:33 AM CPP File 1 KB
mainwindow.cpp 9/4/2019 6:33 AM CPP File 3 KB
mainwindow.h 9/4/2019 6:33 AM H File 1 KB
mainwindow.ui 9/4/2019 6:33 AM UI File 3 KB
Uninstall 9/4/2019 6:33 AM Application 10 KB
9 items
Type here to search
6:33 AM
9/4/2019

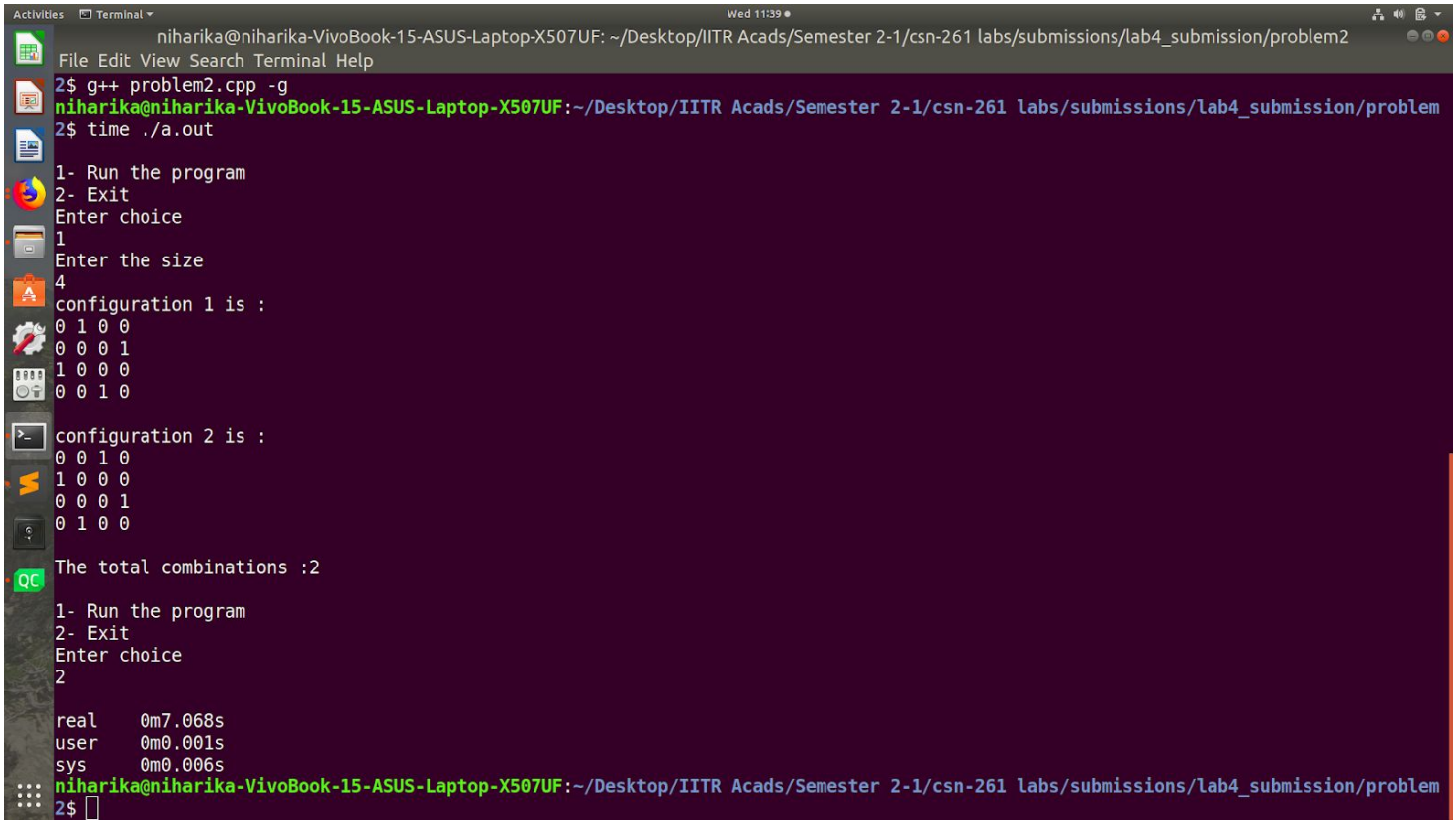
Problem Statement 2:

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:

The stack STL in C++ is used and The NQueens problem is implemented using BACKTRACING . Class is formed . A fixViolation() function is been formed to check the placement of queen .
The matrix of nXn size is traversed and each time queen is inserted and corresponding coordinates are pushed in stack and then the fixViolation() is called. If it returns true then process is proceeded to next row else the latest coordinate are popped out of stack and process is repeated for one position(column) ahead in row.

Outputs:



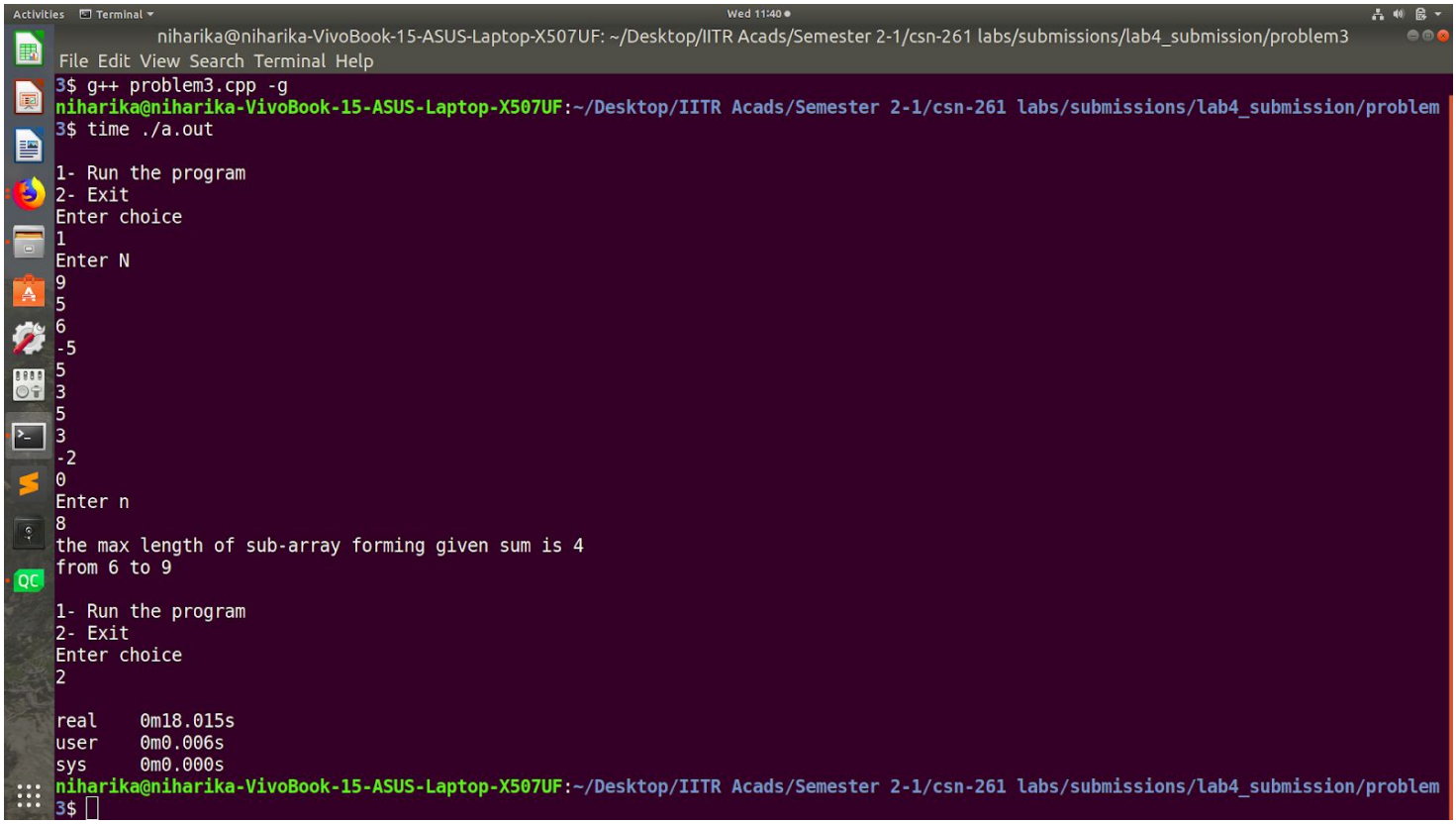
Problem Statement 3:

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.

Data structures and algorithm used:

The hashtable is implemented using < MAP> STL container in C++.The complexity for the program is O(1). Algorithm used is , we insert the keyvalue = sum generated each time and mappedvalue= index of the input array at that point. At every new sum , we check if keyvalue already exist or not and then check if keyvalue corresponding to (sum-n) exist or not, if yes then the maximum length of subarray is calculated as = (current index - mappedvalue of (sum-n))

Outputs:



The END