**C/C++ BINARY SEARCH OF STRUCTURED RECORDS LAB REPORT**

**1) Enter your name, student ID, platform (Mac or PC) and date**

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Class: CIS054 C/C++ Programming

Platform (Mac or PC): gcc and Eclipse on MAC  
Date: 7/15/2017

**DESCRIPTION:**

Enter and run the Binary Search of Structured Records program.

**LAB REPORT:**

**2) Determine the Inputs, Processing and Outputs before creating the program**

|  |  |  |
| --- | --- | --- |
| **INPUTS** | **PROCESSING** | **OUTPUTS** |
| Ask the user for state abbreviation | set min and max index.  calculate mid based on min and max.  compare mid with user input. based on comparison, if found then exit, if not found then based on state abbreviation choose either upper half or lower half, recalculate new mid and repeat till found. | State not found; or State found in x tries. |

**DISCUSSION:**

**3) Complete the DISCUSSION section. It does not need to be long, but it needs to be complete.**3a) What did you do to develop the program? ("Followed the Directions" is not a complete description)

Ask the user for state abbreviation. Use the StateList struct array and set min and max index.

calculate mid based on min and max.

compare mid with user input. Based on comparison, if found then exit and print “found in x tries”, if not found in this iteration, then based on state abbreviation choose either upper half or lower half, recalculate new mid and repeat till found. At the end print State found in x tries; or State not found

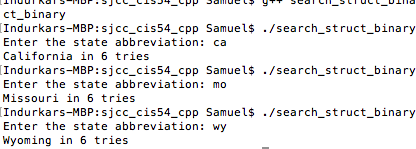
3b) What problems did you have and how did you overcome the problems?

\_stricmp was not present on my computer. I googled and found it is strcasecmp.

**PROGRAM OUTPUT:**

**4) Show screen shots for at least THREE searches: 1) search for a record at the beginning of the list, 2) search for a record anywhere in the middle of the list, 3) search for the record at the end of the list.**

Refer to previous lab assignments for instructions on how to capture a screen or portions of a screen for either the PC or a Mac



**PROGRAM LISTING:**

**5) Copy and paste the code that YOU typed to make the program work. Your program should include a comment block at the top that shows the name of the program, date, version and your name.**

/\*

\* search\_struct\_binary.cpp

\*

\* Created on: Jul 15, 2017

\* Author: Samuel

\*/

// Search\_Struct\_Binary.cpp

#include <iostream>

#include <cstring> // you may need this include to use stricmp or strcasecmp for C++

using namespace std;

typedef struct S\_STATE\_LIST {

char Abbreviation[3];

char StateName[15];

} States;

States StateList [] = {

{"AK", "Alaska"}, {"AL", "Alabama"}, {"AR", "Arkansas"}, {"AZ", "Arizona"},

{"CA", "California"}, {"CO", "Colorado"}, {"CT", "Connecticut"}, {"DE", "Delaware"},

{"FL", "Florida"}, {"GA", "Georgia"}, {"HI", "Hawaii"}, {"IA", "Iowa"}, {"ID", "Idaho"},

{"IL", "Illinois"}, {"IN", "Indiana"}, {"KS", "Kansas"}, {"KY", "Kentucky"},

{"LA", "Louisiana"}, {"MA", "Massachusetts"}, {"MD", "Maryland"}, {"ME", "Maine"},

{"MI", "Michigan"}, {"MN", "Minnesota"}, {"MO", "Missouri"}, {"MS", "Mississippi"},

{"MT", "Montana"}, {"NC", "North Carolina"}, {"ND", "North Dakota"}, {"NE", "Nebraska"},

{"NH", "New Hampshire"}, {"NJ", "New Jersey"}, {"NM", "New Mexico"}, {"NV", "Nevada"},

{"NY", "New York"}, {"OH", "Ohio"}, {"OK", "Oklahoma"}, {"OR", "Oregon"},

{"PA", "Pennsylvania"}, {"RI", "Rhode Island"}, {"SC", "South Carolina"},

{"SD", "South Dakota"}, {"TN", "Tennessee"}, {"TX", "Texas"}, {"UT", "Utah"},

{"VA", "Virginia"}, {"VT", "Vermont"}, {"WA", "Washington"}, {"WI", "Wisconsin"},

{"WV", "West Virginia"}, {"WY", "Wyoming"}

};

int main(int argc, char\* argv[])

{

int length = 50;

char Selection[10];

cout << "Enter the state abbreviation: ";

cin >> Selection;

// Binary Search

int imin = 0; // start index for the current search

int imax = length-1; // end index for the current search

int imid; // midpoint for roughly equal parts

int tries=0; // counter to see efficency

bool found = false;

while ( imax >= imin && !found )

{

tries++;

imid = (imin + imax) / 2;

// Note: your compiler may use stricmp or strcasecmp instead of \_stricmp

if ( strcasecmp(Selection, StateList[imid].Abbreviation) == 0 ) // found

{

found = true;

}

// Note: your compiler may use stricmp or strcasecmp instead of \_stricmp

// if need to go lower, change upper limit to search lower subarray

else if ( strcasecmp(Selection, StateList[imid].Abbreviation) < 0 )

{

imax = imid - 1;

}

// if need to go higher, change lower limit to search upper subarray

else

{

imin = imid + 1;

}

}

if (found)

cout << StateList[imid].StateName << " in " << tries << " tries" << endl;

else

cout << "Not Found" << endl;

return 0;

}