**Take Home Program 3 – Due on or before Sunday 9/23/2018**

1. **SortAndSearch.cpp – Objectives: Binary Search and Selection sort**

You are given a list of 20 names as follows:

{"Collins, Bill", "Smith, Bart", "Michalski, Joe", "Griffin, Jim",

"Sanchez, Manny", "Rubin, Sarah", "Taylor, Tyrone", "Johnson, Jill",

"Allison, Jeff", "Moreno, Juan", "Wolfe, Bill", "Whitman, Jean",

"Moretti, Bella", "Wu, Hong", "Patel, Renee", "Harrison, Rose",

"Smith, Cathy", "Conroy, Pat", "Kelly, Sean", "Holland, Beth"};

Write a program to sort and display the names in alphabet order (use selection sort).

The program prompts the user to enter the name being search (use binary search). The program also makes a correction to upper case the first character of the first and last name (see sample output).

**Sample output:**

The names in sorted order are:

Allison, Jeff

Collins, Bill

Conroy, Pat

Griffin, Jim

Harrison, Rose

Holland, Beth

Johnson, Jill

Kelly, Sean

Michalski, Joe

Moreno, Juan

Moretti, Bella

Patel, Renee

Rubin, Sarah

Sanchez, Manny

Smith, Bart

Smith, Cathy

Taylor, Tyrone

Whitman, Jean

Wolfe, Bill

Wu, Hong

Type the name to search (Last name, first name):

haRRIson, rOSe

Harrison, Rose was found in the array.

Another name search? (Y/N)y

Type the name to search (Last name, first name):

keLlY, kAY

Kelly, Kay was NOT found in the array.

Another name search? (Y/N)

**// Function prototypes**

void displayNames(const string[], int);

Called by main function; passed the array of names and the number of names. Prints the list of names.

void selectionSort(string[], int);

Called by main; passed the array of names and the number of names to sort into alphabetic ascending order.

string upperCaseIt(const strini g);

Called by main; passed a string being search. Convert the first character of the first and last name of the string passed in to uppercase only.

bool binarySearch(const string[], int, string);

Called by main function; passed the array of strings, the number of strings, and the string being searched for.

**Copy and paste your program (source) code and the outputs after this line**

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SortAndSearch.cpp

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Purpose: To write a program that

sorts and displays the names in

alphabetical order (use selection

sort). the program prompts the user

to enter the name being searched (use

binary search). the program also makes

a correction to upper case the first

character of the first and last name

\*/

//#include “stdafx.h”

#include <iostream>

#include <string>

#include <cctype>

#include <iomanip>

using namespace std;

void displayNames(string[], int); //passed the array of names and the number of names

void selectionSort(string[], int); //passed the array of names and number of names

//to sort into alph. order

string upperCaseIt(string); //passed a string being searched. convert the

//first character of the first and last name of the string passed into uppercase

bool binarySearch(string[], int, string); //passed the array of strings, number of

//strings, and the string being searched for

int main()

{

string nameArray[] = {"Collins, Bill", "Smith, Bart", "Michalski, Joe",

"Griffin, Jim", "Sanchez, Manny", "Rubin, Sarah",

"Taylor, Tyrone", "Johnson, Jill", "Allison, Jeff",

"Moreno, Juan", "Wolfe, Bill", "Whitman, Jean",

"Moretti, Bella", "Wu, Hong", "Patel, Renee",

"Harrison, Rose","Smith, Cathy", "Conroy, Pat",

"Kelly, Sean", "Holland, Beth"};

string answer;

string firstName, lastName, fullName;

bool checkValue;

displayNames(nameArray, 20);

do {

cout << "Type the name to search (Last, First): " << endl;

cin >> lastName >> firstName;

firstName = upperCaseIt(firstName);

lastName = upperCaseIt(lastName);

fullName = lastName + " " + firstName;

//cout << lastName << " " << firstName << endl;

checkValue = binarySearch(nameArray, 20, fullName);

if (checkValue == false)

{

cout << fullName << " was NOT found in the array." << endl;

}

if (checkValue == true)

{

cout << fullName << " was found in the array." << endl;

}

cout << "Another name search? (Y/N) ";

cin >> answer;

} while (answer == "y" || answer == "Y" || answer == "yes" || answer == "Yes" || answer == "YES");

return 0;

}

void displayNames(string list[], int ARRAY\_SIZE)

{

int i;

selectionSort(list, 20);

for (i = 0; i < ARRAY\_SIZE; i++)

{

cout << list[i] << endl;

}

cout << endl;

}

void selectionSort(string list[], int ARRAY\_SIZE)

{

int startScan, minIndex;

string minValue;

for (startScan = 0; startScan < (ARRAY\_SIZE - 1); startScan++) //(array\_size - 1) = (0 - 19)

{

minIndex = startScan;

minValue = list[startScan];

for (int i = startScan + 1; i < ARRAY\_SIZE; i++)

{

if (list[i] < minValue)

{

minValue = list[i];

minIndex = i;

}

}

list[minIndex] = list[startScan];

list[startScan] = minValue;

}

}

string upperCaseIt(string name)

{

int i = 0;

name[0] = toupper(name[0]);

for (i = 1; i < name.length(); i++)

{

if (isupper(name[i]))

{

name[i] = tolower(name[i]);

}

}

return name;

}

bool binarySearch(string array[], int size, string value)

{

int first = 0, last = size - 1, middle;

bool found = false;

while (!found && first <= last)

{

middle = (first + last) / 2;

if (array[middle] == value) // if value is found in the middle

{

found = true;

//position = middle;

}

else if (array[middle] > value) // if value is in lower half

{

last = middle - 1;

}

else

{

first = middle + 1; // if value is in upper half

}

}

return found;

}



