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CS 202
26 January 2016

Project 1 Documentation

Purpose: This program takes a user-defined text file of 10 names, prints those names to the console, prints an alphabetized version of those names to the console, and finally outputs the new alphabetized version of those names to a new user-defined text file.

Design: This program #includes the <iostream> and the <fstream> libraries. There are a total of three functions in this program. Besides the main function there is a function named strCompare, and a function named strCompare. Both of these functions make use of function prototypes. Within the main function, there is a 2-dimensional char array called names which is defined to hold 10 char arrays of 20 chars each. This provides ample space for each first name provided in the input text file. There are also two char arrays defined for both the input file name and the output file name. The program prompts the user to input both of these file names using cin, then it attempts to open the input file, given the name provided. If the file is opened successfully the program then populates the names arrays with the contents of the file using the insertion operator from the input filestream into each element of the array. The program then alphabetizes the names array. This is done in a do-while loop. Before this loop there is a int flag variable initialized to 0 which is used to decide whether the loop should continue running. Within the brackets of the "do" portion the flag is reset to 0. There is then a for loop inside the "do" portion which loops through each name in the names array. Within this for loop there is an if statement which checks if the name at this given index is supposed to go after the element which is currently occupying this index+1, alphabetically speaking. It does this check using the strCompare function, which will be explained later in this documentation. If this if statement is true, it will use strCopy to copy the name at this index into a temporary name char array variable called tempName which is defined above this do-while loop. Then the name at this index+1 is copied into this index of the names array. Then the tempName is copied into this index+1. These three copies result in a "swap" of the two names. The flag is then set to 1, so that the loop knows to continue looping. Once the flag is 0, we know that every name in the names array is in the right alphabetical order (In this case backwards-alphabetical order). Once this loop is finished each name in the names array is iterated through again, but this time starting at the end index and

stopping at the first index. Every element is outputted to the console using cout. Then the program closes the input file. Now the program will open the output file using the user-defined output file name. If this file is opened successfully a for loop is used to iterate through each name in the names array. The iteration starts at the end index of the names array and ends at the first index. That way when the program outputs each element of the names array on a new line of the text document, it is done in correct alphabetical order. The program then exits. The strCompare function works by taking two char arrays as parameters str1[] and str2[]. An index is initialized to 0 and will be used to increment through the characters of each char array. A while loop checks if the char value at this index of the first string matches this char value of this index of the second string. It also checks if the char value at this index is not equal to the null character. If both of these are true, index will be incremented. Once this while loop finishes, the program checks if the ascii int value of the char value at the index of the first string is different than the ascii int value of the char value at the index of the second string. If the first is greater, the function returns 1. If the second is greater, the function returns -1. If they are identical, the function returns 0. The strCopy function works by taking two parameters str1[] and str2[]. The goal of the function is to copy str2 into str1. An index is initialized to 0, and it is used in a while loop which checks if the char value at this index is not equal to the null character. If it is not the null character the char value at this index of str1 is set to the char value at this index of str2, and the index is incremented by 1. Once the loop lands on a null character in str2 it knows to stop the loop, and that char value at the index of str1 is set to the null character so it is a proper string.

Problems: I had no idea how to sort strings alphabetically. This took 90% of the time I put into this project. We never covered any kind of sorting algorithms like that in CS135 so that was a curve ball.

Changes I Would Make: Given more time I would go back and redo my sorting algorithm since it seems very inefficient. I would also populate the name array in correct alphabetical order instead of reverse-alphabetical. I would also move some of the code in the main function into other functions such as a function to alphabetize an array of strings. I would also consider moving the output file operations I did into right before I closed the input file. This way, if there was an error with the input file, the output file would not still be opened.