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Assignment 3 Report

Instruction: Complete the report then convert it to PDF to submit.

Academic Honesty Pledge: I affirm that I have not given or received any unauthorized help in this assignment, and that this work is my own. Any authorized references are acknowledged below.

Sign or type your name here: _______Vikram Thangavel________________________

Problem 1

Function myAdd()

- References: Zybook (8.8.2) and previous assignments
- Error conditions: Array out of bound: If size of array is bigger than the maximum size of array, addition will be unsuccessful and will return code -1.
- Brief algorithm: If array size is lower than the maximum size, array will search for a location that respects the conditions of sorting in an increasing order. When the location is found, number will be inserted in that location.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: There is a for loop that iterates through the array to find a location to insert the number. The time grows as the input size increases. Therefore, the running time is O(n).

Function myRemove()

- References: Zybook (8.8.2) and previous assignments
- Error conditions: Array out of bound: If the number we are looking to remove from the array is not found, it will return code -1.
- Brief algorithm: The function locates the number that we are looking to remove. Then, from that point, it removes that number and shifts all the cell blocks in the array.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: There exists a for loop that iterates through the array in order to locate the number. Since there is only one for loop, the running time is O(n).

Function search()

- References: Zybook (8.8.2) and previous assignments
- Error conditions: Array out of bound: If number is not found in the array, it will return a negative number which is code -1.
- Brief algorithm: The array is searched for a specific number. If the number is located, the index of that number in the array is returned otherwise, a negative number will be returned.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: Since there is a for loop that iterates through the array and it is performing a linear search to locate that number, the running time is O(n).

Problem 2
Function strgLen(s)

- References: https://www.programiz.com/c-programming/c-pointers-arrays
- https://www.geeksforgeeks.org/length-string-using-pointers/
- Previous assignments
- Error conditions No error conditions. Regardless of character type used for input, it will always output a length.
- Brief algorithm: The string will count the number of characters in the string until it locates a null character. After, the number of characters in the string will be the length of the string.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: A while loop is used and counts the number of characters from the start till the end (linear search is sued). Therefore, the running time of the function is O(n).

Function strgCopy(s, d)

- References: https://www.learn-c.org/en/Arrays_and_Pointers
  https://www.eskimo.com/~scs/cclass/notes/sx10b.html
- https://www.w3schools.in/c-program/copy-string-using-pointers/
- Previous assignments
- Error conditions There is no error conditions in this function.
- Brief algorithm: The first string is iterated in a while loop until a null character is found and each character is copied into another string.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: This function uses a linear search to copy each character to a destination string. Therefore, the running time is O(n).

Function strgChangeCase(s)

- References: https://stackoverflow.com/questions/55191144/converting-upper-case-to-lower-case-using-pointers-in-c
- Previous assignments
- Error conditions: No error conditions in this function.
- Brief algorithm: This function iterates through the string and checks if the type of case of letter of each character. If the character is uppercase, it will turn into lowercase and if it's lowercase, it will turn into uppercase (Using ASCII values).
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: The function uses a linear search to iterate through the string from start till end. Therefore, the running time is O(n).

Function strgDiff(s1, s2)

- References: https://forgetcode.com/c/542-compare-two-strings-using-pointers
- Previous assignments
- Error conditions: No error conditions.
- Brief algorithm: This function iterates through one of the strings and compares each character of the string with the other string. If the null character is reached in the iteration, it means both strings are equal and returns code -1. If the string does not have similar characters, it will return the index where the difference occurs.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: The function uses a linear search to compare each character of each string. Therefore, the running time is O(n).

Function strgInterleave(s1, s2, d)

- References: Previous assignments
- Error conditions No error conditions.
- Brief algorithm: The two strings are compared to determine which one is the smallest. Then, with the smallest string, it is used to interleave the two strings until one of the strings run out of characters to merge. After, the left-over characters are concatenated to the final string.
- Running time of the function (algorithm): O(n)
- Brief explanation of the running time: This function uses multiple for loops in order to concatenate the strings. However, they are not nested and are presented in an orderly way. As they are using linear search in each for loops, the running time is O(n).