CS260 - Data Structure
Programming Assignment 2: Autocomplete
Assignment Report

Write your name here

January 13, 2022

Question 1 : 4 points

Data Structure: Answer the question below regarding the data structure you used in your implementation:

(a) [2 points] How did you store the contents of the file in memory?

> **Solution:** write your answer here

(b) [2 points] In terms of the size of the input file being defined as n, what was the **space complexity** (i.e., amount of memory used) of your application? Explain. (Note: use asymptotic notation)

> **Solution:** write your answer here

Question 2 : 6 points

Sorting: Answer the question below regarding the sorting algorithm you used in your implementation:

(a) [2 points] Which sorting algorithm did you use in your program? Briefly explain how it works.

> **Solution:** write your answer here

(b) [2 points] In terms of the size of the input file being defined as n, what was the **runtime complexity** of your sort algorithm? Explain.

> **Solution:** write your answer here

(c) [2 points] In terms of the size of the input file being defined as n, what was the **space complexity** of your sort algorithm? Explain.

> **Solution:** write your answer here

Question 3 : 6 points
    Searching: Answer the question below regarding the searching algorithm you used in your implementation:

    (a) [2 points] How did you search for an interval of words that all start with the same substring? Briefly explain how your algorithm works.

> **Solution:** write your answer here

    (b) [2 points] In terms of the size of the input file being defined as n, what was the **runtime complexity** of your search algorithm? Explain.

> **Solution:** write your answer here

    (c) [2 points] In terms of the size of the input file being defined as n, what was the **space complexity** of your search algorithm? Explain.

> **Solution:** write your answer here

Question 4 : 4 points
    Overall:

    (a) [2 points] Do you think your algorithm could have been improved? If so, how? What would improve: runtime, memory usage, both? Explain.

> **Solution:** write your answer here

    (b) [2 points] Assume that you have an input file of size 50 thousand entries. In terms of runtime, how long will your program take:

- if it searches for a single query word and then terminates?
- if it searches for 1 million query words and then terminates?

    Would you suggest a faster algorithm than yours for the first (or the second) case to improve runtime? Briefly explain.

> **Solution:** write your answer here