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CPSC 335 Algorithm Engineering
Project 2 - Algorithm 1

Project Report - Algorithm 1

Pseudocode

Function FindTargetIndices

- define set A with string pairs for the string A and B
    - string A contains the long, jumbled string
    - string B contains the characters that will target an index in the string

The program will open an input file with string A and string B.
The program will read the text on the input file line by line. String A should be on the first line, with string B on the line below.
The program will lead the string A on the first line with the long, concatenated string with the names of the cities.
The program will then read the next line with the list of target words where in this case is a list of cities.
Once these lines have been read, the line with string B will be parsed to remove the brackets and splitting words.
The program will initialize an empty string in order to output the index of the starting key city words.
The empty list will be paired to store the index and word.
A for loop will be required for each word in string B:

- the program needs to find the occurrence of the word in the concatenated string.
- when the word is found, the index is stored and paired with the word

The paired list is sorted based on the index.
Once the indices and words are sorted, it will be organized into the outputs: ‘Output_order’ and ‘Output_array’.
Once the results have been organized, it will be outputted into ‘out2a.txt’.
The files will now close.

Sample input:
sanoaklandrialtofullertonmarcolongbreacoronamodestoclovissimithousand
['brea', 'modesto', 'clovis', 'corona']

The program will read the concatenated string and check for the first instance in which the targeted word is mentioned. The index will be saved to be outputted in ‘Output_order’.

Sample output:
Output_order = [34, 44, 51]
Output_array = ['brea', 'modesto', 'clovis']

Sample :
in2a.txt
sanoaklandrialtofullertonmarcolongbreacoronamodestoclovissimithousand
['brea', 'modesto', 'clovis', 'corona']
marcopolmonafremontrialtofullertonmarcolongfresnochinoclovissimisalinas
['fullerton', 'chino', 'fremont', 'fresno']
torranceoaklandrialtomarcooxnardchinofresnoirvineclovissimiorange
['oxnard', 'irvine', 'orange', 'marco']

out2a.txt
Results for Array 1:
Output_order = [34, 44, 51]
Output_array = ['brea', 'modesto', 'clovis']

Results for Array 2:
Output_order = [12, 25, 49]
Output_array = ['fremont', 'fullerton', 'chino']

Results for Array 3:
Output_order = [26, 43, 59]
Output_array = ['oxnard', 'irvine', 'orange']

Mathematical Analysis & Efficiency Class

Let m be the length of A string.
Let n be the number of words in B.
Let k be the average length of the words in B.

To read the input file there is a O(m+n) complexity because reading a file is linear.