Fossil's Technical Test #1

For Senior level and above

Overview

At senior level, besides strong programming skills, we expect our team member to excel at problem solving and technical writing skills. He/she needs to be able to transfer the solutions throughly to other colleagues, including junior members.

In this test, you will be put in a tough situation where you are required to write a solution/technical document for your team, so they can work on the concrete implementation of the problem *(with many weird technical constraints, of course)*.

You do not have any other way to communicate with your team except this document. So, your document should be as detailed as possible, as easy to understand as possible that even junior members can confidently do it.

Don't forget that "A picture is worth a thousand words"!

The problem - An English encyclopedia

- It is expected to store up to several billions of words/phrases.
- A word/phrase can be from one character to 1024 characters long.
- A word/phrase explanation can be from one byte to 1GB long.

Functional requirements

- Adding a new word and its explanation into the encyclopedia.
- Removing an existing word from the encyclopedia.
- Searching for an explanation of a given word/phrase.
- Modifying the explanation of an existing word.

The challenge

- **Key requirement** - The search feature must has the complexity class better than O(n). *For example: O(log2n) is better but O(n/26) is not.*
- **Key requirement** - Single file only. Every word/phrase, its explanation, index, additional data, etc. must be stored in one file

only. Adding a second file will result in a fatal error.

- The generous client told us that we can be care-free about the storage. They will scale it as much as the file needs.
- Do not use any existing storage/database libraries, even the built-in ones. You can only use the standard library for `I/O handling`. In other words, any `file read/write` function will be implemented by our team, using the language's basic `I/O functions`.
- Load the whole encyclopedia into the memory is forbidden.
- Text file format & system's `Serialization` are not allowed.

Test duration

- We expect the document be sent back in 1 week since you received the test.
- You are allowed to extend the test duration as you need. It will not affect your performance. We value the quality of the delivered solution. So do your best!