**Priyanshu Srivastava**

**Steps to Execute The code**

To run Code, run the following command on terminal or cmd

Compile the Code: Open a terminal and navigate to the directory containing the source code and compile the code

gcc compound\_word\_finder.cpp

Run the compiled program: To compile a C++ program, use a command

./compound\_word\_finder

**Compound Word Finder**

This is a program designed to find the longest and second-longest compound words from a list of words in a given text file. The program uses a trie data structure and dynamic programming with caching to efficiently identify compound words.

Design Decisions

Trie Data Structure: We utilize a trie data structure for storing and searching words.

Dynamic Programming with Caching: A caching mechanism is used to store the results of previous compound word checks, which avoids redundant computations and improves overall performance.

We use isCompoundWord function to breakdown the word into prefix and suffix. This function also uses trie to search for Compound words from a list.

Approach

Read Input File: The program reads a list of words from an input file and stores them in a vector called wordList.

Sort by Length: The wordList is sorted in descending order of word lengths, enabling efficient compound word checks without the need for sorting during processing.

Trie Insertion: The sorted wordList is inserted into a trie data structure. The trie structure helps in fast word retrieval and searching.

Searching for Compound Words: The core logic of identifying compound words is implemented in the isCompoundWord function. This function breaks down a word into prefixes and suffixes and utilizes the trie structure to determine if both parts exist in the list of words, indicating a compound word.

Caching Mechanism: The program uses a caching mechanism to store and reuse the results of previous compound word checks. This prevents redundant computations, which enhances the program's efficiency.

Longest and Second-Longest Search: After processing all words, the program identifies the longest and second-longest compound words based on their lengths.