TED ÜNİVERSİTESİ

CMPE 224

PROGRAMMING ASSIGMENT 4

REPORT

Author:Melisa SUBAŞI

id: 22829169256

PROBLEM STATEMENT AND CODE DESIGN:

a)Problem Statement:

The objective is to implement a Trie data structure along with specific operations for a new electricity distribution company. The program reads city coordinates from an input text file, constructs a Trie to represent city connections, and performs various operations on this Trie, such as searching, counting prefixes, reverse finding, finding shortest unique prefixes, and finding the longest common prefix.

b)Top-down, stepwise refinement of the problem solution:

Trie Initialization:*A Trie data structure is initialized to represent connections between cities.*

File Reading and Trie Construction:*City coordinates are read from the input text file.City names are inserted into the Trie***.**

Trie Operations:

-Search Operation:*Checks if a given word is present in the Trie.*

-Count Prefix Operation*:Counts and prints the occurrences of each string as a prefix of other strings in the Trie.*

-Reverse Find Operation:*Prints all strings in the Trie that end with a given suffix in lexicographical order.*

-Shortest Unique Prefix Operation:*Prints the shortest unique prefix to identify each string in the Trie. Prints "not exists" if there is no unique prefix.*

-Longest Common Prefix Operation:*Prints the longest common prefix for all strings in the Trie. Prints "not exists" if there is no unique prefix.*

User Interaction:*The program interacts with the user through the console, allowing them to choose different operations on the Trie.*

c)Implementation and Functionality:

Trie and TrieNode Classes:

TrieNode class represents a node in the Trie with children and an end-of-word indicator.Trie class initializes a Trie and provides methods for inserting, searching, and performing various operations.

Trie Operations:

Operations are implemented as specified in the problem statement.The Trie is appropriately traversed to achieve the desired functionality.

User Interface:

The program interacts with the user through the console, prompting for the number of inputs and the input words.Users can choose different operations using operation codes.

Output Formatting:

Results are printed in a readable format as specified in the problem statement.

d)Code Assessment:

-The code effectively implements a Trie data structure and provides functionality for the specified operations.

-Proper data structures (Trie, TrieNode) are used to represent city connections.

-The code follows good coding practices with meaningful variable names and modularity.

-The program provides a solid foundation for solving the specified problem.

-There is room for improvement in terms of code comments for better readability.

-The program can be further optimized for edge cases and large datasets.