Contact Management System

Using Skip Lists

Linked List with Levels: Each node in the skip list has multiple pointers, forming a hierarchy of linked lists.

Probabilistic Structure: The levels of pointers are determined randomly, allowing for efficient search, insertion, and deletion.

Operations

Search: We used skip lists to enable users to search for any contact in the database

Insertion: Adding contacts to a skip list is efficient, with the structure adjusting its levels dynamically.

Deletion: Skip lists support efficient removal of contacts while maintaining its balance and structure

Update: Skip lists allow us to efficiently update any contact

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Importance

Efficiency: Skip lists offer efficient search, insertion, and deletion operations with an average-case time complexity of O(log n).

Simplicity: Compared to other balanced search trees like AVL or Red-Black trees, skip lists are simpler to implement and understand.

Versatility: Skip lists are versatile and applicable in various scenarios, including database indexing, caching, and priority queues.

Usage in Daily Life

Database Indexing: Skip lists are commonly used in database systems to speed up searching for records based on indexed columns, improving query performance.

Cache Implementation: Skip lists can be utilized in cache systems to efficiently store and retrieve frequently accessed data, reducing access time and improving system performance.