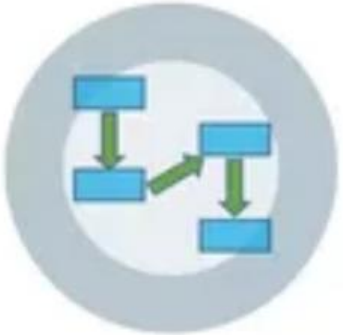
Open Addressing & Chaining

Data Structures and Algorithms



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Data Structures and Algorithms
Course Contents:
Abstract data types, complexity analysis, Big Oh notation, Stacks (linked lists and array implementations), Recursion and analyzing recursive algorithms, divide and conquer algorithms, Sorting algorithms (selection, insertion, merge, quick, bubble, heap, shell, radix, bucket), queue, dequeuer, priority queues (linked and array implementations of queues), linked list & its various types, sorted linked list, searching an unsorted array, binary search for sorted arrays, hashing and indexing, open addressing and chaining, trees and tree traversals, binary search trees, heaps, M-way tress, balanced trees, graphs, breadth-first and depth-first traversal, topological order, shortest path, adjacency matrix and adjacency list implementations, memory management and garbage collection

Open Addressing and Chaining

- Open addressing and chaining are two common techniques used in hash table data structures to deal with collisions, which occur when two keys map to the same hash value.
- Open addressing is a technique where, when a collision occurs, the algorithm probes through a sequence of other hash table slots (usually by incrementing the index of the slot) until it finds an empty slot to insert the key-value pair.

Open Addressing and Chaining cont…

- There are different variants of open addressing, such as:
- Linear probing,
- Quadratic probing, and
- Double hashing.

Open Addressing and Chaining cont…

- Chaining, on the other hand, is a technique where each slot in the hash table is a pointer to a linked list of key-value pairs that hash to that slot.
- When a collision occurs, the new key-value pair is simply added to the end of the linked list for that slot.
- Both techniques have their advantages and disadvantages.

Open Addressing and Chaining cont…

- Open addressing can be faster in terms of memory usage and cache efficiency since the data is stored in contiguous memory locations.
- However, it can suffer from clustering, which means that keys that hash to the same slot tend to be placed close together in the table, causing long probe sequences and poor performance.

Open Addressing and Chaining cont…

- Chaining can handle a larger number of collisions and doesn't suffer from clustering, but it can be slower in terms of memory usage and cache efficiency since each slot has to store a pointer to a linked list.
- The choice of which technique to use depends on the specific requirements of the application and the characteristics of the data being hashed.