DATA STRUCTURES AND ITS APPLICATIONS UE21CS252A

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Hashing

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Hashing

Time taken for search

- Linear DS: Array List, Linked List --- O(n)
- Non linear DS: Balanced Binary Search Tree --- O(log n)
- Can we search in O(1) time ??
    - Hashing

Hashing

Hashing is the process of transforming any given key into another value.

This is usually represented by a shorter, fixed-length value or key that makes it easier to find the original key.

The most popular use for hashing is the implementation of hash tables.

A hash table stores key and value pairs in a list that is accessible through its index.

Hashing

Direct Mapping

Eg: Employee Records

Hashing

Hash function: A function which maps key value into a hash table range

- Folding
- Truncation
- Modulo

Hashing

Collision: The phenomenon when two or more keys generate the same hash.

Collision resolution:

- Open addressing (Closed Hashing)
- Separate Chaining (Open Hashing)

Hashing

Collision resolution:

- Open addressing (Closed Hashing)
- Open addressing handles collisions by storing all data in the hash table itself and then seeking out availability in the next spot created by the algorithm.
    - Linear Probing, Quadratic Probing, Double Hashing

- Separate Chaining (Open Hashing)
- Separate chaining handles collision by making every hash table cell point to linked lists of records with identical hash function values.

Hashing

Collision resolution:

- Rehashing (Hash again)
  - Increase the table size when the load factor becomes more than a predefined value (Say 0.75) and hash all the keys present in the table again and store in the new table of increased size.

  Load factor=No. of filled records/Total capacity

References

- Live lecture Videos on Hashing for the course UE19CS202, Data Structures, by Dr. Shylaja S S
- What is hashing and how does it work? (techtarget.com)

THANK YOU

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