Sunbeam Institute of Information Technology
Pune and Karad
PG - DESD

Module – Data Structures

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Hash Table

- **Open Addressing:**
  - All key-value pairs are stored in the hash table itself.
  - If key (to find) is not matching with the key in the slot calculated by hash function, it is probed in next possible slot using one of the following.
  - **Linear Probing:** In linear probing, if collision occurs next free slot will be searched/probed linearly.
  - **Quadratic Probing:** In quadratic probing, if collision occurs next free slot will be searched/probed quadratically.
  - **Double Hashing:** In double hashing, if collision occurs next free slot will be searched/probed by using another hash function, so two hash functions can be use to find next/probe next free slot.

Hash Table

- **Load Factor = n / m**
  - n = Number of key-value pairs to be inserted in the hash table
  - m = Number of slots in the hash table
  - If n < m, then load factor < 1
  - If n = m, then load factor = 1
  - If n > m, then load factor > 1
- **Limitations of Open Addressing**
  - Open addressing requires more computation.
  - Cannot be used if load factor is greater than 1 (i.e. number of pairs are more than number of slots in the table).
- **Chaining/Separate Chaining:**
  - Another collision handling technique.
  - Each slot of hash table holds a collection of key-values for which hash value of keys are same.
  - This collection in each slot is also referred as bucket.
  - Chaining is simple to implement, but requires additional memory outside the table.

Thank you!

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