43 Lecture - CS301

Important Subjective

1. **What is hashing?**
   Hashing is a technique used to store and retrieve data in a data structure known as a hash table. It involves using a hash function to map data values to specific index locations in the hash table.

2. **What is a collision in hashing?**
   A collision occurs when two or more data values map to the same index location in a hash table. Collisions can be resolved through various techniques such as chaining or open addressing.

3. **What is the load factor in hashing?**
   The load factor is the ratio of the number of elements stored in a hash table to the size of the table. It can impact the performance of hash table operations, with higher load factors resulting in more frequent collisions and slower performance.

4. **What is a hash function?**
   A hash function is a mathematical function used to map data values to specific index locations in a hash table. It takes a data value as input and produces a hash code, which is used to determine the index location for storing the data value in the hash table.

5. **What is the difference between linear probing and quadratic probing in hashing?**
   Linear probing and quadratic probing are two techniques used in open addressing to resolve collisions in hash tables. Linear probing involves searching for the next available index location to store the data value, while quadratic probing uses a quadratic function to determine the next index location to search.

6. **What is a perfect hash function?**
   A perfect hash function is one that maps each data value to a unique index location in a hash table, with no collisions. It is used in situations where the set of data values is known in advance and a static hash table can be created.

7. **What is rehashing in hashing?**
   Rehashing is the process of creating a new hash table with a larger size and rehashing all the data values from the old hash table to the new one. It is typically performed when the load factor of the hash table exceeds a certain threshold.

8. **What is the role of a hash table in a dictionary data structure?**
   A hash table is commonly used as the underlying data structure for implementing a dictionary, with data values being stored as key-value pairs. The hash table allows for efficient retrieval of data values based on their associated keys.

9. **What is a hash collision resolution technique that uses linked lists?**
   Chaining is a collision resolution technique in which each index location in a hash table is associated with a linked list. When a collision occurs, the data values are added to the linked list at the corresponding index location.

10. **What is the worst-case time complexity of a hash table operation?**
    In the worst case, a hash table operation such as insertion, deletion, or retrieval can have a time complexity of O(n), where n is the number of data values stored in the hash table. However, with a well-designed hash function and appropriate collision resolution technique, the average time complexity can be much lower.