3 Lecture - CS301

Important Subjective

1. What is a linked list and how is it different from an array?

Answer: A linked list is a data structure where each element (node) contains a value and a reference to the next node. The first node in the list is called the head, and each subsequent node is linked to the previous node. In contrast, an array stores a fixed number of elements of the same type in contiguous memory locations.

2. How are nodes in a linked list allocated in memory?

Answer: Each node in a linked list is typically represented as a block of memory that contains the value and a pointer to the next node. The head node is stored in a variable, and each subsequent node is allocated dynamically as needed.

- 3. What is the time complexity of inserting a node at the beginning of a linked list? Answer: The time complexity of inserting a node at the beginning of a linked list is O(1), as it involves updating the head node pointer to point to the new node.
- 4. How do you traverse a linked list?

Answer: To traverse a linked list, start at the head node and follow the next node pointers until the end of the list is reached.

- 5. What is the difference between a singly linked list and a doubly linked list? Answer: In a singly linked list, each node contains a reference to the next node, while in a doubly linked list, each node contains references to both the next and previous nodes.
- 6. What is the time complexity of inserting a node at the end of a linked list? Answer: The time complexity of inserting a node at the end of a linked list is O(n), as it involves traversing the list to find the last node and updating its next node pointer to point to the new node.
- 7. How do you delete a node from a linked list?

Answer: To delete a node from a linked list, update the previous node's next node pointer to point to the next node, effectively removing the node from the list.

8. What is a circular linked list?

Answer: A circular linked list is a linked list where the last node's next node pointer points to the head node, creating a circular structure.

9. What is a sentinel node in a linked list?

Answer: A sentinel node is a special node added to the beginning or end of a linked list that acts as a marker to indicate the start or end of the list.

10. What is the space complexity of a linked list?

Answer: The space complexity of a linked list is O(n), where n is the number of nodes in the list. This is because each node requires its own block of memory.