11 Lecture - CS301

Important Subjective

1. What is a Priority Queue?

Answer: A Priority Queue is an abstract data type that stores a collection of elements with priority values assigned to each element. Elements with higher priority values are given precedence over those with lower priority values.

2. What is the difference between a Queue and a Priority Queue?

Answer: A Queue is a data structure that follows the First-In-First-Out (FIFO) principle, while a Priority Queue follows the priority-based ordering principle. In a Queue, elements are added to the back and removed from the front, while in a Priority Queue, elements are removed based on their priority values.

3. What are the commonly used data structures to implement a Priority Queue?

Answer: The commonly used data structures to implement a Priority Queue are binary heap, Fibonacci heap, and sorted array.

4. What is a binary heap?

Answer: A binary heap is a complete binary tree where the parent node has a higher priority value than its children nodes.

5. What are the operations that can be performed on a Priority Queue?

Answer: The operations that can be performed on a Priority Queue are inserting an element, deleting the element with the highest priority, and changing the priority of an element.

6. What is the time complexity of inserting an element into a Priority Queue?

Answer: The time complexity of inserting an element into a Priority Queue depends on the implementation. For a binary heap, the time complexity is O(log n), while for a Fibonacci heap, it is O(1).

7. What is the time complexity of deleting the element with the highest priority from a Priority Queue?

Answer: The time complexity of deleting the element with the highest priority from a Priority Queue depends on the implementation. For a binary heap, the time complexity is O(log n), while for a Fibonacci heap, it is O(log n) amortized.

8. What is the difference between a Max Heap and a Min Heap?

Answer: In a Max Heap, the parent node has a higher priority value than its children nodes, while in a Min Heap, the parent node has a lower priority value than its children nodes.

9. What is the application of Priority Queues?

Answer: Priority Queues are used in various applications such as task scheduling, Dijkstra's shortest path algorithm, Huffman coding, A* search, and many more.

10. How can a Priority Queue be implemented in C++?

Answer: A Priority Queue can be implemented in C++ using the std::priority_queue class from the Standard Template Library (STL).