33 Lecture - CS301

Important Subjective

1. What is a priority queue using a heap?

Answer: A priority queue using a heap is a data structure that stores a collection of elements where each element has a priority associated with it. It allows for efficient insertion and retrieval of elements with the highest priority.

2. How is a priority queue implemented using a heap?

Answer: A priority queue using a heap is implemented using an array-based binary heap data structure. The heap property ensures that the element with the highest priority is always at the top of the heap.

- 3. What is the time complexity of insertion in a priority queue using a heap?

 Answer: The time complexity of insertion in a priority queue using a heap is O(log n).
- 4. What is the time complexity of retrieval of the highest priority element in a priority queue using a heap?

Answer: The time complexity of retrieval of the highest priority element in a priority queue using a heap is O(1).

5. How is a new element inserted into a priority queue using a heap?

Answer: A new element is inserted into a priority queue using a heap by adding it to the end of the heap and then reorganizing the heap to maintain the heap property.

- 6. How is the highest priority element removed from a priority queue using a heap?

 Answer: The highest priority element is removed from a priority queue using a heap by removing the element at the top of the heap and then reorganizing the heap to maintain the heap property.
- 7. What happens if two elements in a priority queue using a heap have the same priority? Answer: If two elements in a priority queue using a heap have the same priority, their order in the heap is determined by their position in the array-based binary heap data structure.
- 8. How is the heap property maintained in a priority queue using a heap?

 Answer: The heap property is maintained in a priority queue using a heap by reorganizing the heap after every insertion or removal operation.
- 9. What is the difference between a max heap and a min heap?

Answer: A max heap is a binary heap where the element with the highest priority is at the top of the heap, while a min heap is a binary heap where the element with the lowest priority is at the top of the heap.

10. What is the advantage of using a priority queue using a heap over other data structures? Answer: The advantage of using a priority queue using a heap is that it allows for efficient insertion and retrieval of elements with the highest priority, with a time complexity of O(log n) for insertion and O(1) for retrieval.