

5 Lecture - CS502

Important Subjective

1. What is linear time sorting?

Answer: Linear time sorting is a class of sorting algorithms that can sort a given set of data in linear time, meaning the time complexity is proportional to the number of elements being sorted.

What is the time complexity of counting sort?

Answer: The time complexity of counting sort is $O(n)$, where n is the number of elements being sorted.

What is the difference between comparison-based sorting algorithms and linear time sorting algorithms?

Answer: Comparison-based sorting algorithms compare elements to determine their order, while linear time sorting algorithms use other methods to determine their order, such as counting or bucketing.

Can counting sort be used to sort negative integers?

Answer: No, counting sort cannot be used to sort negative integers because it requires non-negative integers as input.

What is the purpose of the bucket sort algorithm?

Answer: The bucket sort algorithm divides the input data into a number of smaller buckets, which are then sorted using another algorithm. The sorted buckets are then concatenated to form the final sorted output.

What is the time complexity of radix sort?

Answer: The time complexity of radix sort is $O(d(n+k))$, where d is the number of digits in the maximum element, n is the number of elements being sorted, and k is the maximum value of a digit.

Is radix sort a stable sorting algorithm?

Answer: Yes, radix sort is a stable sorting algorithm because it maintains the relative order of equal elements.

How does counting sort work?

Answer: Counting sort works by counting the number of occurrences of each element in the input, and then using this information to determine the final sorted order.

What is the difference between bucket sort and radix sort?

Answer: Bucket sort divides the input into a fixed number of equally sized buckets, while radix sort divides the input into a variable number of buckets based on the value of a digit.

Can linear time sorting algorithms be used for all types of data?

Answer: No, linear time sorting algorithms have certain restrictions on the types of data they can sort, such as requiring non-negative integers for counting sort.