

13 Lecture - CS101

Important Subjective

1. **What is an algorithm?**

Answer: An algorithm is a set of well-defined instructions or rules to solve a problem or accomplish a specific task.

2. **What is the difference between a linear search and a binary search algorithm?**

Answer: A linear search algorithm checks each element in a list sequentially until the desired element is found or the end of the list is reached. A binary search algorithm, on the other hand, starts at the middle of a sorted list and divides the list in half repeatedly until the desired element is found or determined to not exist.

3. **What is the time complexity of an algorithm, and why is it important?**

Answer: The time complexity of an algorithm is the amount of time it takes to run as a function of the input size. It is important because it helps to determine the efficiency and scalability of the algorithm.

4. **What is a sorting algorithm, and give an example?**

Answer: A sorting algorithm is an algorithm that arranges elements in a list or array in a specific order. An example of a sorting algorithm is the quicksort algorithm.

5. **What is a greedy algorithm, and when is it used?**

Answer: A greedy algorithm is an algorithm that makes the locally optimal choice at each step with the hope of finding a global optimum. It is used when a problem can be divided into subproblems and the solution to each subproblem does not affect the solution to other subproblems.

6. **What is a recursive algorithm, and give an example?**

Answer: A recursive algorithm is an algorithm that calls itself to solve subproblems. An example of a recursive algorithm is the factorial function.

7. **What is a divide and conquer algorithm, and give an example?**

Answer: A divide and conquer algorithm is an algorithm that breaks a problem down into smaller subproblems, solves each subproblem separately, and then combines the solutions to

the subproblems to solve the original problem. An example of a divide and conquer algorithm is the merge sort algorithm.

8. **What is a dynamic programming algorithm, and give an example?**

Answer: A dynamic programming algorithm is an algorithm that solves a problem by breaking it down into smaller subproblems, solving each subproblem only once, and storing the solutions to subproblems to avoid redundant computations. An example of a dynamic programming algorithm is the Fibonacci sequence.

9. **What is a heuristic algorithm, and give an example?**

Answer: A heuristic algorithm is an algorithm that uses a rule of thumb or an approximation to find a solution quickly, without guaranteeing the optimal solution. An example of a heuristic algorithm is the nearest neighbor algorithm.

10. **What is an optimization algorithm, and give an example?**

Answer: An optimization algorithm is an algorithm that finds the best solution to a problem with given constraints. An example of an optimization algorithm is the gradient descent algorithm used in machine learning.