**Divide And Conquer**

**🧠 Theory Questions (Basic to Advanced)**

**✅ Basic Level**

1. What is Divide and Conquer?
2. What are the three steps in the Divide and Conquer approach?
3. Difference between Divide and Conquer vs Dynamic Programming?
4. What are the advantages of Divide and Conquer?
5. What are some real-life examples of Divide and Conquer?

**✅ Intermediate Level**

1. What is the time complexity of Merge Sort and how is it derived?
2. How does Quick Sort use Divide and Conquer?
3. Why is Binary Search considered Divide and Conquer?
4. Is recursion necessary for Divide and Conquer?
5. Can Divide and Conquer be implemented iteratively?

**✅ Advanced Level**

1. How does Strassen’s Matrix Multiplication improve over brute force?
2. Explain the Master Theorem and its use in Divide and Conquer.
3. What are the drawbacks of Divide and Conquer approach?
4. When is Divide and Conquer not a good choice?
5. Compare brute force, divide-and-conquer, and greedy approaches.

**💻 Coding Questions (Basic to Advanced)**

**✅ Basic Level**

1. Implement Binary Search using Divide and Conquer
2. Find maximum and minimum element in an array using Divide and Conquer
3. Count number of elements in an array (recursive divide method)
4. Implement Merge Sort
5. Implement Quick Sort

**✅ Intermediate Level**

1. Find the kth smallest/largest element in an array
2. Count number of inversions in an array (using modified Merge Sort)
3. Search in a rotated sorted array
4. Find the closest pair of points (Divide and Conquer version)
5. Find peak element in an array

**✅ Advanced Level**

1. Strassen’s Matrix Multiplication Algorithm
2. Karatsuba Algorithm for fast multiplication of large integers
3. Find majority element in an array (using divide and conquer)
4. Find the median of two sorted arrays
5. Implement Ternary Search

**📝 Bonus Concept Questions**

* What is the recurrence relation for Merge Sort?
* How to solve recurrence relations using the Master Theorem?
* What is the difference between Merge Sort and Insertion Sort in terms of space?