13.Data Structure Internship

15-Day Data Structure Internship Curriculum

1. **Introduction to Data Structures** (1 day)
    - Understand the importance of data structures.
    - Learn about basic terminology (e.g., arrays, linked lists).
2. **Arrays and Strings** (2 days)
    - Study array operations (insertion, deletion, searching).
    - Explore string manipulation.
3. **Linked Lists** (2 days)
    - Understand singly linked lists and doubly linked lists.
    - Implement basic operations.
4. **Searching Algorithms** (2 days)
    - Learn linear search and binary search.
    - Analyze time complexity.
5. **Sorting Algorithms** (2 days)
    - Explore bubble sort, selection sort, and insertion sort.
    - Understand their efficiency.
6. **Stacks and Queues** (2 days)
    - Study stack and queue data structures.
    - Implement using arrays or linked lists.

30-Day Data Structure Internship Curriculum

8. **Trees and Binary Trees** (3 days)
    - Explore binary search trees (BSTs).
    - Learn about tree traversal algorithms.
9. **Graphs and Graph Algorithms** (3 days)
    - Understand graph representation (adjacency matrix, adjacency list).
    - Implement depth-first search (DFS) and breadth-first search (BFS).
10. **Hashing and Hash Tables** (2 days)
    - Study hash functions and collision resolution techniques.
    - Implement hash tables.
11. **Advanced Data Structures** (3 days)

- Learn about heaps, priority queues, and tries.
- Analyze their applications.

12. **Final Mini Coding Projects** (7 days)
    - Apply data structures to solve more complex problems.

45-Day Data Structure Internship Curriculum

13. **Advanced Graph Algorithms** (5 days)
    - Explore shortest path algorithms (Dijkstra's, Bellman-Ford).
    - Study minimum spanning trees (Prim's, Kruskal's).
14. **Dynamic Programming** (3 days)
    - Understand dynamic programming concepts.
    - Solve problems using memoization and tabulation.
15. **Advanced Coding Challenges** (3 days)
    - Tackle challenging problems on platforms like LeetCode or HackerRank.
16. **Final Comprehensive Data Structure Project** (12 days)
    - Work on an end-to-end project that combines multiple data structures.
    - Showcase your skills through documentation or presentation.