Basics Of Programming

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Agenda

- Programming Fundamentals
- Data Structures
- Algorithm Complexity Analysis
- Basic Algorithms
- Sorting Algorithms
- Searching Algorithms
- Advanced Data Structures
- Advanced Algorithms

Programming Fundamentals

- Introduction to programming languages (C, C++, Python, Java)
- Setting up development environments (IDEs, compilers, interpreters)
- Variables, data types, and operators
- Basic input/output and control structures (if statements, loops)
- Basic Programming in Python/Javascript

Contd…

- Functions and modular programming
- Arrays and strings
- Algorithm Complexity Analysis
  - Big O notation and algorithm analysis
  - Space complexity
  - Real-world examples of algorithm analysis

Data Structures

- Data Structures
  - Introduction to data structures
  - Arrays and linked lists
  - Stacks and queues
- Time & Space Complexity Revision
  - Constant Time (O(1))
  - Logarithmic Time (O(log n))
  - Linear Time (O(n))
  - Linearithmic Time (O(n log n))
  - Quadratic Time (O(n^2))

Algorithms

- Introduction to algorithms
- Sorting algorithms (Bubble, Selection, Insertion, Merge)
- Time and space complexity analysis
- Debugging and error handling

Searching Algorithms

- Linear search
- Binary search
- Hashing and hash tables

Problem Solving Techniques

- Recursion and recursive algorithms
- Dynamic programming

Advanced Data Structures

- Trees and binary trees
- Graphs and graph algorithms (BFS, DFS)

Advanced Algorithms

- Divide and conquer algorithms
- Greedy algorithms
- Backtracking algorithms