


# Alpha Plus

C++ 

APNA  
COLLEGE



' Let not the fruit of action be your motive to action. Your concern is with action alone, not with the fruit of action. '

- ***The Bhagavad Gita***

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# Batch Overview

- ✓ Complete C++ & Data Structures & Algorithms
- ✓ Live Doubt Assistance
- ✓ Student Community with TAs
- ✓ Live Resume Preparation & Mentorship sessions
- ✓ Library of Questions for Top Companies
- ✓ Coding Questions on all Important Topics (asked by Top Companies)



**Live**

+ VOD

**300+**

solved questions  
practice

**Duration** : 4 Months

Course access is for 15 Months

# Topics

C++

CATEGORY	CHAPTERS	OVERVIEW
Basics of Programming	Flowcharts & Pseudocodes Variables & Data Types Conditional Statements Operators	what are flowcharts, pseudocodes, decision making using flowcharts, examples  Our first Java program, Variables and data types, Taking input/output, How C++ code runs?  Introduction to if else, else if, Nested conditionals, switch  arithmetic, relational, logical & assignment operators
Loops & Functions	For loop, While loop, Do-while loop Patterns Functions	For loops, While loops, Do-while loops, Flow of execution of statements, break & continue, examples  Introduction to nested loops, basic to advanced patterns solved (floyd's triangle, rhombus etc.)  Introduction to functions, function calling, Pass by value, scope
Arrays	Introduction to Arrays Searching & Sorting	Introduction to arrays, arrays in memory, Passing arrays to functions, interview problems  Linear search, Binary search, Selection sort, Bubble sort, Insertion sort, count sort
2D Arrays & Strings	2D Arrays Strings	2D arrays, 2D arrays in memory, Examples using 2D Arrays  Introduction to strings & character arrays, storage of strings and their inbuilt functions

# Data Structures & Algorithms (DSA)

CATEGORY	CHAPTERS	OVERVIEW
Problem Solving Techniques	Recursion, Backtracking, Divide & Conquer  Bit Manipulation  Time & Space Complexity  Greedy Algorithms	Introduction to recursion, Principle of mathematical induction, factorial, Fibonacci numbers, Recursion using arrays, Recursion using strings, Recursion using 2D arrays, backtrack, merge sort, quick sort  Binary number system, bitwise operators, operations on bits, fast exponentiation  Order complexity analysis, Theoretical complexity analysis, Time complexity analysis of searching and recursive algorithms, Space complexity analysis of merge sort  Introduction to greedy approach to problem solving, solving classical problems
Object-oriented programming	Basic to Advanced OOP	Objects & Classes, Creating objects, Getters, and setters, Constructors and related concepts, Inbuilt constructor and destructor, Static members, Function overloading and related concepts, Abstraction, Encapsulation, Inheritance, Polymorphism, friend function, abstract classes
Linear Data Structures	Vectors  Linked lists  Stacks and Queues	Introduction to STL in C++, dynamic arrays, solved questions  Linked list Introduction, Inserting node in linked list, Deleting node from linked list, Midpoint of linked list, Merge two sorted linked lists, merge sort of a linked list, Reversing a linked list  Stacks Introduction, Stack using arrays, Dynamic Stack class, Stack using linked list, Inbuilt stack, Queue using arrays, Dynamic queue class, circular queue

# Data Structures & Algorithms (DSA)

CATEGORY	CHAPTERS	OVERVIEW
Trees	Binary Trees & BST	Introduction to Binary Trees, Constructing the tree, Binary Tree traversals, Diameter of binary tree, height & LCA of the tree, Introduction to Binary Search Trees, Searching a node in BST, BST class, Inserting and Deleting nodes in BST, Types of balanced BSTs
Advanced Data Structures	Heaps/Priority Queues	Introduction to Heaps, Min/Max heaps, Heap Sort, Priority Queues, how to implement priority queues, Introduction to CBT(Complete Binary Trees) and its implementation, Insert and Delete operations in heaps, Implementing priority queues, In-built Priority Queue
	Hashing (Maps & Sets)	Introduction to Hashing, unordered_map, map, unordered_sets, sets, Hash functions, Insert and Delete operation implementation in map/set, examples
	Tries	What are Tries, Creating a Trie node class, Insert, Search and Remove operation in Tries, Types of Tries, Questions on Tries
	Graphs	Introduction to Graphs, Graph Terminology, Graph implementation, Graph Traversals (DFS and BFS), Weighted and Directed Graphs, Minimum Spanning Trees, Cycle Detection in Graphs, Kruskal's algorithm, Prim's Algorithm, Dijkstra's algorithm, Bellman Ford Algorithm & a lot of questions
	Segment Trees	What are segment trees, Creation of segment trees, solving range queries
Dynamic Programming	DP & its Questions	Fundamentals of Dynamic Programming, Introduction to Memoization, Knapsack using DP, Factorial using DP, Fibonacci numbers using recursion, memoization and tabulation, Longest Common Subsequence (LCS) using recursion, Catalan's number, Edit distance using recursion, memoization and dynamic programming, Matrix Chain Multiplication and much more

Let's begin our **placement** journey!

Keep learning & keep exploring ❤️