


C++ & DSA Summer Bootcamp


Comprehensive Curriculum with Practice Problems

 **Duration:** 4 Weeks

 **Schedule:** 3 Days/Week (Total 12 Classes)

 **Class Duration:** 2 Hours

 **Ideal For:** CS Freshers, B.Tech/BCA/MCA Students, School Coders

 **Mode:** Live Online (Interactive + Hands-on)

Week 1: C++ Fundamentals & Programming Basics

Class	Topics Covered	Practice Problems
1	Introduction to C++, How Programming Works, Setup (IDE & Compiler), Input/Output	• Input/Output (CodeChef) • Basic Syntax (HackerRank) • Hello World Program • Simple Calculator (Addition, Subtraction)
2	Variables, Data Types, Operators, Typecasting, Debugging Basics	• Solve Me First (HackerRank) • Data Types • Simple Interest Calculator • Temperature Converter (F to C) • Swap Two Numbers
3	Conditionals (<code>if-else</code> , <code>switch</code>), Loops (<code>for</code> , <code>while</code> , <code>do-while</code>)	• FizzBuzz • Leap Year (GFG) • Pattern Problems (CodeStudio) • Check Prime Number • Print First N Fibonacci Numbers • Sum of Digits

Week 2: Functions, Arrays & Strings

Class	Topics Covered	Practice Problems
4	Functions & Recursion, Pass by Value/Reference, Basic Math	• Factorial Using Recursion • Power(x, n) • GCD and LCM • Sum of Natural Numbers • Tower of Hanoi • Check Armstrong Number
5	Arrays – 1D Basics, Traversal, Insertion, Deletion, Searching	• Find the Largest Element • Linear Search • Reverse an Array • Find Second Largest Element • Check if Array is Sorted • Remove Duplicates from Sorted Array
6	Strings – Input/Output, Character Arrays vs <code>string</code> , Manipulation	• Reverse a String • Palindrome Check • Count Vowels and Consonants • Convert to Uppercase/Lowercase • Check Anagrams • Remove Spaces from String

Week 3: DSA Essentials – Sorting & Searching

Class	Topics Covered	Practice Problems
7	Sorting – Bubble, Selection, Insertion	• Sort Colors • Sort an Array • Implement All Three Sorting Algorithms • Count Sort Implementation • Sort Even and Odd Elements Separately • Sort 0s, 1s, and 2s
8	Binary Search (Iterative & Recursive), <code>lower_bound</code> , <code>upper_bound</code>	• Binary Search • Search Insert Position • First and Last Occurrence • Search in Rotated Sorted Array • Find Peak Element • Square Root using Binary Search
9	2D Arrays – Matrix I/O, Row/Column Sum, Diagonals	• Spiral Matrix • Matrix Diagonal Sum • Transpose of a Matrix • Matrix Multiplication • Search in a 2D Matrix • Rotate Image by 90 Degrees

Week 4: Problem Solving & STL Introduction

Class	Topics Covered	Practice Problems
10	Pointers, Dynamic Memory, Intro to Linked Lists	• Middle of Linked List • Reverse Linked List • Dynamic Array Implementation • Delete Node in a Linked List • Detect Cycle in Linked List • Implement Stack using Linked List
11	STL – <code>vector</code> , <code>pair</code> , <code>map</code> , <code>set</code>	• Two Sum (Using map) • Intersection of Two Arrays • Frequency Counter using map • Remove Duplicates using set • Sort a Vector of Pairs • Implement a Phone Directory
12	Bootcamp Project + Mock Interview Prep + Q&A + Certification Info	• Mini Project (Student Records System using STL) • Library Management System • Bank Account Management System • To-Do List Application • Mock Interview Problems Set

Certification Requirements

- **Attendance:** Minimum 80% (10 out of 12 classes)
- **Assignments:** Complete at least 75% of practice problems

Support & Contact

For any queries related to the bootcamp, please contact:

- **Email:** info@pareekshagpt.com

This curriculum is designed to build a strong foundation in C++ programming and data structures & algorithms. The progressive learning approach ensures concepts are reinforced through practice.