

## **A Job Ready Bootcamp in C++, DSA and IOT**

C++ Job Ready course has been created specifically to familiarize you with the concepts & applications of C++ in industry. This Course is for the students who want to build strong concepts & theories with Project Building with data structures and IOT applications. Through this course, you will be confident enough to crack any kind of interview related to C++.

### **Introduction**

- Introduction to C++ Language
- Features of C++
- History of C++
- Version history of C++
- An introduction to programming for absolute beginner
- How to develop a software using C++?
- Setup Environment on Windows
- Setup Environment on Mac
- Setup Environment on Linux
- Exploring first program
- Tokens: Constant, Variables and Keywords
- Data Types, Variable Declaration
- Input/output statements: cout and cin
- unary operator
- Arithmetic Operators
- Bitwise Operators
- Relational Operators
- Logical Operators
- Assignment Operators
- Other Operators

## **Flow Control Statements**

- Decision Control: if, if else, conditional operator
- Decision Control: Nested if else, if else ladder
- Iterative Control: while
- Iterative Control: do while
- Iterative Control: for Loop
- Break and Continue
- Nested Loops
- Star Pattern Problems
- Switch case control
- Menu Driven Programming

## **Functions and Recursion**

- What is a function?
- usages of function in modular coding
- Type of function in C++
- predefined function
- user defined function
- Tracing a code with multiple functions
- merits and demerits of function
- Ways to define a function
- Recursion
- Inline function
- Default Arguments

## **Making the hard jargon simple - Pointers**

- Pointers Introduction
- Address of operator (&)
- Dereferencing operator (\*)
- Base Address
- Extended Concept of Pointers
- Pointer's Arithmetic
- Application of pointers
- Call by value

- call by address
- Reference Variable
- call by reference
- Difference between pointers and reference variable?
- Types of pointers
- Wild Pointer
- dangling pointer
- null pointer
- void pointer
- Function pointers

## **Arrays and Strings**

- Array basics
- Declaring Arrays
- Initializing Arrays
- Accessing Array Elements
- Two Dimensional
- Multidimensional Arrays
- pointers to an array
- passing arrays to function
- array of pointers
- pointer to array

## **Strings**

- String basics
- String and Functions
- Handling Multiple strings
- Handling Strings with pointers
- Assignment
- Concatenation
- Substrings
- Character access
- String Utilities
- String comparison

- String I/O
- String Searching
- String reverse
- string Transformation
- String length

## **Object Oriented Programming**

- Introduction to OOP
- Object oriented Vs procedural programming
- key principals of OOPS
- Encapsulation through structure
- Encapsulation through classes
- Classes and Objects
- Access specifier
- Instance Members
- Static members
- Function call by passing object and returning object
- Function Polymorphism (Function overloading)
- Constructor
- Constructor overloading
- Default constructor
- Copy constructor
- Destructor
- Deep copy Vs shallow copy
- Operator Overloading
- Overloading of pre and post increment operator
- Friend Function
- Friend operator
- Benefits of Friend function
- Overloading of insertion and extraction operator
- Abstraction in c++
- Data hiding in c++
- Private constructor in C++
- Private Destructor in C++

## **Memory Management with Pointers**

- What is Memory Management?
- Why is memory management required?
- Object Pointer
- The this pointer
- New Operator
- Delete Operator
- Memory Leak

## **Inheritance**

- C++ Inheritance
- Advantage of C++ Inheritance
- Types Of Inheritance
- Single inheritance
- Multiple inheritance
- Hierarchical inheritance
- Multilevel inheritance
- Hybrid inheritance
- Visibility mode in inheritance
- Public , private and protected
- Constructor and destructor in inheritance
- Diamond problem
- Inheritance method
- Function overriding
- Function hiding
- Base pointer
- Virtual function
- Pure Virtual function
- Abstract class in c++
- Virtual destructor

## **Exception handling**

- History of Exception handling
- Error Vs exception
- Run time Exception and compile time Exception
- C++ Standard Exceptions
- Demo of exception one by one
- Try
- Catch
- Throw
- Catch all
- Define New Exceptions
- Handle Any Type of Exceptions

## **File Management in C++**

- What is file handling?
- Introduction to stream
- ofstream
- ifstream
- fstream
- Txt file vs binary file
- Opening a File
- Mode of file opening
- Writing data to a File
- appending data to a file
- Reading data from a File
- Close a File
- Object by object reading and writing
- Renaming a file
- Removing a file
- File Position Pointers

## **Standard Template Library**

- Template
- Overview of STL
- Iterator
- Types of Iterators
- Sequence Containers
- Vector
- List
- Deque
- Arrays
- forward\_list
- Container Adaptor
- Queue
- Priority Queue
- Stack
- Associative Containers
- Set
- Multiset
- Map
- Multimap
- Unordered Associative Containers
- Unordered set
- Unordered multiset
- Unordered map
- Unordered multimap
- Functors
- Function Pointers
- lambda
- String
- Pair
- Tuple
- Algorithms

## **Data Structures and its Implementation in C++**

- Introduction to Data Structures
- Why you should learn data structure?
- use case of data structure
- Why product based companies focus on data structure

## **All about Arrays**

- Down side of using conventional arrays
- Array data structure
- Dynamic Arrays

## **Linked List**

- Singly Linked List
- Doubly Linked List
- Circular Linked List
- Circular Doubly Linked List

## **Stack and Queues**

- Stack Introduction
- Implementation of Stack using arrays
- Implementation of Stack using Linked List
- Queue Introduction
- Implementation of Queue using arrays
- Implementation of Queue using Linked List
- Two way stack
- Double Ended Queue
- Priority Queue

## **Tree**

- Tree Introduction
- Binary Tree and its variations
- Binary Search Tree
- Implementation of BST



## **Graph**

- Graph Introduction
- Implementation of Graph

## **Competitive Programming**

- Introduction to Competitive Programming
- Develop solving approach with 20 examples

## **Project Work**

- Number Guessing Game
- Employee Record Management
- Book Record Management
- Library Management System
- Quiz Master
- Tic Tac Toe Game

## **Industry/IOT based Project Work**

- Applications of C++ in IOT

## **Arduino Simulation Overview**

- Arduino introduction
- usages of Arduino in real time
- basic component of Arduino
- pin diagram of Arduino
- introduction of sensors
- environment setup for Arduino
- Controlling Element
- Blinking LED
- Push Button
- Potentiometer Controller
- Servo Motor
- DC Motor
- Photo Resistor

## **Arduino Based Projects**

- Project Detail description
- business use case of this project
- Project architecture
- project setup
- Component identification for project
- Project 1 – Street Light Project
- Project 2 – Intruder Buzzer System Design
- Project 3 – Ice Cream Factor Sensor Design
- Project 4 – Passive Infrared
- Project 5 – Designing African Home with PIR Sensor
- Project 6 – Agriculture Design – Moisture Sensor
- Project 7 – Music Generator Sensor Design
- conclusion of project
- Production of project
- integration in real time

## **FAANG interview Preparation**

- Overview of FAANG companies
- Interview Preparation guide for Amazon
- Interview Preparation guide for Google
- Interview Preparation Guide for Microsoft
- Interview Preparation Pro Tips from Industrial Mentors
- Interview Questions and their solutions
- 100+ MCQs

## **Resume development**

- Key points for your resume
- Templates for resume
- Project for your resume
- prepare your GIT
- prepare your social media profile
- prepare your demo for your resume
- Detail project report

- resume verification
- place where you can apply for job
- Final touch
- Go get your Dream job

### **300+ Practice Problems**

- Section -1: Introduction - 30 Problems
- Section -2: Flow Control Statements - 80 Problems
- Section -3: Functions and Recursion - 40 Problems
- Section -4: Making the hard jargon simple - Pointers -10 Problems
- Section -5: Arrays and Strings - 40 Problems
- Section -6: Object Oriented Programming - 30 Problems
- Section -7: Memory Management - 10 Problems
- Section -8: Standard Template Library - 30 Problems

### **DSA**

- Section -1: DSA All about Arrays - 15 Problems
- Section -2: DSA Linked List - 15 Problems
- Section -3: DSA Stack and Queues - 15 Problems
- Section -4: DSA Tree - 5 Problems
- Section -5: DSA Graph - 5 Problems
- Section -6: DSA Algorithms - 5 Problems

### **Mini-Challenges**

- It will be assigned by mentor after every major module