GeeksforGeeks

C++ Foundation

Detailed
Course Syllabus

1. C++ Basics

a. Background Introduction
b. Why do we need Programming Languages
c. C++ Introduction
d. C++ Standards and Implementation
e. Writing First Code in C++
f. Comments in C++
g. Practice Problems

2. Variables and Data Types

a. Variable in C++ and Naming Rules
b. Data Types in C++
c. Range of Data Types
d. Global variable and scope
e. sizeof in C++
f. static in C++
g. const in C++
h. auto in C++
i. Literals in C++
j. Type Conversion in C++
k. Swap two numbers
l. Practice Problems

3. Input Output in C++

a. Input in C++ (cin)
b. Output in C++ (cout)
c. Buffering in C++
d. Escape Sequence in C++
e. IO Manipulation
f. Floating Point: Default Print Format, Manipulating Default format, fixed and scientific
g. Practice Problems

4. Operators

a. Arithmetic Operators
b. Comparison Operators
c. Logical Operators
d. Assignment Operators
e. Operator Precedence and Associativity
f. Bitwise Operators
g. Day Before N days
h. Sum of N Natural Numbers
i. Last Digit of a Number
j. Practice Problems

5. Flow Control

a. If Else
b. Nested If Else
c. Switch
d. Ternary
e. Even Odd
f. Largest of 3 numbers
g. Leap Year
h. Calculator Program
i. Practice Problems

6. Function

a. Introduction to function
b. Function Definition and Declaration
c. Inline function
d. Function Overloading
e. First Digit of a Number
f. Prime Factorization
g. Practice Problems

7. Loops

a. For Loop

b. While Loop
c. Do while loop
d. Continue
e. Break
f. Square Pattern
g. Triangle Pattern
h. Inverted Triangle Pattern
i. Pyramid pattern
j. Count Digits of a Number
k. Factorial of a Number
l. Check for Prime
m. All Divisors of a Number
n. GCD of Two Numbers
o. LCM of Two Numbers
p. Fibonacci Numbers
q. Check for prime
r. Table of a Number
s. Practice Problems on Loops

8. Array

a. Introduction to Arrays
b. Declaration and initialization of an array
c. Size of an Array
d. Array Traversal
e. Check if Array is Sorted
f. Count Distinct in an array
g. Sum of an array
h. Average of an array
i. Maximum in an array
j. Practice Problems

9. References

a. References in C++
b. Function Parameters & References
c. Range based for Loop & References
d. Const & R value References
e. Practice Problems

10. Pointers

a. Address and Dereference Operators
b. Introduction to Pointers
c. Application of Pointers
d. Function Pointer
e. Array Parameter and Pointers
f. Pointers vs Arrays
g. Null in C++
h. nullptr in C++
i. Pointer Arithmetic
j. Dynamic Memory Allocation
k. Practice Problems

11. Strings

a. Introduction to strings
b. C style String in C++
c. String class in C++
d. Operation on strings
e. String Comparison
f. getline() in c++
g. String Traversal
h. Reverse a string
i. Palindrome
j. Pattern Searching
k. Practice Problems

12. Structure and Union

a. Struct in C++
b. Struct vs Class in C++
c. Structure (Pointer Array and Argument)
d. Structure Alignment and Padding in C++
e. Union in C++
f. Complex Number using C++
g. Practice Problems

13. Vectors

a. Introduction to vectors
b. Vector Declaration
c. Operation on Vectors
d. Get Smaller Elements
e. Separate Even Odd
f. Practice Problems

14. Multidimensional Array

a. Multidimensional Array in CPP
b. Passing 2D array in as argument in CPP
c. Transpose of a Matrix
d. Matrix Multiplication
e. Practice Problems

15. Templates in C++

a. Template in C++
b. Function Template in C++
c. Class Template in C++
d. Practice Problems

16. Object Oriented Programming in C++

a. Object Oriented Programming in C++
b. Constructor and Destructor
c. This Pointer
d. Static Member in C++
e. Inheritance
f. Virtual Functions
g. Multiple Inheritance
h. Operator Overloading
i. Friend Function
j. Practice Problems

17. Exception Handling

a. Exception Handling in C++
b. Try throw and Catch in Exception Handling
c. Stack Unwinding in Exception Handling
d. User Defined Exception
e. Practice Problems

18. Advanced

a. Smart Pointer Introduction
b. unique_ptr, shared_ptr and weak_ptr in C++
c. Function Pointers
d. Passing function as Parameters
e. Lambda Expression
f. Lambda Expression Examples
g. Capture List in Lambda Expression
h. Practice Problems