Programming with C++

Course Duration : 5 days

Course Overview

C++ is undoubtedly one of the most widely-used programming language for implementing object-oriented systems. The C++ language is based on the popular C language. The C++ Programming course provides thorough practical and theoretical coverage of the C++ language for the experienced application programmer who has little or no recent C++ experience.

This course helps eliminate misconceptions and poor programming practices that can cause so many problems, by focusing on features of the language and standard library that enforce good practice and encourage clear and robust code.

This is a highly practical course which uses a mix of tuition and practical sessions for each technical chapter designed to reinforce the C++ syntax and object-oriented programming techniques covered in the course.

Prerequisites

- Delegates who are relatively new to programming or who do not have experience in a modern programming environment, for instance on mainframe systems, should first attend the Programming Foundation course and follow it up with some practical work
- Delegates with Java or C# experience should attend C Programming for Java and C# Developers course instead.
- Delegates with recent C programming experience may find C++ for C Programmers more appropriate.

Objectives

Delegates will be able to :

- Understand the key concepts and vocabulary of object orientation
- Use fundamental and composite data types
- Define and use classes
- Write class member functions
- Use pointers and dynamic memory
- Use constructors and destructors
- Write code that is efficient and robust
- Build new classes from other classes using aggregation and association
- Build new classes from other classes using inheritance
- Use container classes, including template classes
- Use operator overloading
- Design and write code with polymorphic behaviour

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Course Content

C plus-plus Programs
Key features of C++
Identifiers and keywords
Simple declarations, expressions and statements
Basic I/O
Layout
Guidelines

Fundamental Data Types
Built-in types
Integer numbers
Floating Point numbers
Characters
Booleans
Assignment
Compound Assignment
Increment and Decrement
Defining constants
Type conversions

Composite Data Types
Defining and using enumerations
Built-in arrays and their limitations
Using the vector class
Built-in strings as character arrays
Using the string class
Defining and using structures

Control Flow
Simple and compound statements
Selection with if else and switch statements
Conditional expressions
Looping with while and for statements

Functions
Declaring, calling and defining functions
Overloading
Default arguments
Scope issues
Pass by copy
Pass by reference
Inline functions
Header files and source files
Pitfalls and guidelines

Object Concepts
Object behaviour
Object state
Object identity, Object-oriented programming
Classes
Encapsulation

Using Classes
Associating functionality with data
Class definitions
Public and private
Queries functions and modifier functions
Struct vs class

Pointers
Concepts and syntax
Pointers to structured types
Pointers for encapsulated objects
Null pointers
Pointers vs. references

Implementing Classes
Defining member functions
Object identity
The this pointer
Initialisation
Constructors
Default constructors
Member Initialisation
Scope issues
Inlining member functions

Operator Functions
Operators as functions
Global operators
Member operators
I/O stream operators
Pitfalls and guidelines

Object Relationships
Associations and their implementation
Compositions and their implementation
Navigation
Delegation
Multiplicity

Dynamic Memory
The need for dynamic memory
Dynamic objects
Using new and delete
Dynamic arrays
Using new[] and delete[]
Destructors

More Pointers
Pointers and arrays
Pointer arithmetic
Pointers as array iterators
Pointers and const
Pointers vs. references

Containers
Container concepts and classification
Template classes
Standard containers
Vector
List
Iterators
Template functions
Algorithms

Copying
Copy construction
Copy assignment
Compiler generated copy behaviour
Problems
Solutions
Reducing Copying
Restricting Copying

Class Relationships
Extension of existing classes using inheritance
Polymorphic behaviour
Type substitutability
Abstract base classes

Inheritance
Protected members
Substitutability
Scoping
Base class initialisation
Order of object construction and destruction
Guidelines

Polymorphism
Declaring and defining virtual functions
Virtual destructors
Pure virtual functions
Using polymorphism through pointers and references
Guidelines

Training Options

- Public scheduled courses at one of our training venues
- Private course at your company office. Training can be delivered throughout the UK
- For further information please contact us on 0191 377 8377

What's Included

- Comprehensive course manual and exercises