



C++ Introduction

Format: Three Days:
Max Capacity 6

At the end of this course, delegates will be able to develop basic ANSI-compliant C++ console programs. No prior C++ knowledge is assumed although some knowledge of a development environment such as Microsoft Visual Studio & some programming experience would be beneficial.

Course Content

INTRODUCTION

- C++ PROGRAMS
- THE HISTORY OF C++
- COMPONENTS OF A C++ PROGRAM
- A SIMPLE C++ PROGRAM
- ADDING TWO NUMBERS TOGETHER
- VARIABLES
- KEYWORDS
- C++ AND .NET

THE C++ INTERACTIVE DEVELOPMENT ENVIRONMENT

- VISUAL STUDIO 2017
- STARTING A NEW PROJECT
- WRITING AND COMPILING A PROGRAM
- PROJECT SETTINGS

C++ SIMPLE DATA TYPES AND EXPRESSIONS

- FUNDAMENTAL DATA TYPES
- DECLARING VARIABLES
- INTEGER NUMBERS
- INTEGER OPERATORS
- COMPOUND ASSIGNMENTS
- INCREMENT AND DECREMENT

- PREFIX AND POSTFIX OPERATORS
- FLOATING POINT NUMBERS
- CHARACTER DATA
- BOOLEAN DATA
- UNSIGNED VARIABLES
- CONSTANTS
- TYPE CONVERSION
- THE SIZEOF OPERATOR

COMPOSITE DATA TYPES

- TYPEDEFS
- ENUMERATIONS

DYNAMIC MEMORY ALLOCATION

- THE STACK & THE HEAP
- MEMORY LEAKAGE
- THE NEW & DELETE OPERATORS
- MALLOC
- FREE
- CALLOC
- EALLOC
- PLACEMENT NEW OPERATOR

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Course Content (continued)

POINTERS

- MEMORY ADDRESSES
- DECLARING POINTERS
- MANIPULATING POINTERS
- POINTERS TO STRUCTURES
- STRINGS IN C++
- POINTERS TO CHAR
- CHARACTER MANIPULATION ROUTINES
- STRLEN()
- STRCPY() AND STRNCPY()
- STRCAT() AND STRNCAT()
- STRCMP() AND STRNCMP()
- CHARACTER TEST FUNCTIONS
- CHARACTER CONVERSION FUNCTIONS
- MICROSOFT & C++11 EXTENSIONS TO CHARACTER MANIPULATION ROUTINES
- TOKENISING STRINGS WITH STRTOK_S()
- NULL POINTERS
- C++11 NULLPTR
- SMART POINTERS (C++11)
- POINTERS TO ARRAYS
- POINTER ARITHMETIC
- THE VOID POINTER
- ARRAYS
- THE #INCLUDE COMPILER DIRECTIVE
- STRUCTURES
- UNIONS

- BIT STRUCTURES
- STRUCTURE ALIGNMENT

FLOW CONTROL

- SEQUENTIAL STATEMENTS
- THE IF STATEMENT
- THE WHILE STATEMENT
- THE FOR STATEMENT
- RANGE BASED FOR LOOP
- BREAK AND CONTINUE STATEMENTS
- THE SWITCH STATEMENT
- THE DO WHILE LOOP
- THE TERNARY CONDITIONAL OPERATOR

FUNCTIONS

- MODULAR PROGRAMMING
- HEADER FILES
- SOURCE FILES
- FUNCTION DECLARATIONS
- CALLING FUNCTIONS
- FUNCTION DEFINITION
- RETURNING VALUES USING THE RETURN STATEMENT
- FUNCTION OVERLOADING

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Course Content (continued)

- DEFAULT ARGUMENTS
- REFERENCES
- PASSING PARAMETERS
- PASSING COPIED PARAMETERS – BY VALUE
- PASSING REFERENCED PARAMETERS – BY REFERENCE
- ARGUMENT TYPES
- RETURN TYPES
- CALLING CONVENTIONS CDECL, FASTCALL, STDCALL & THISCALL
- C CALLING CONVENTION (__cdecl)
- STANDARD CALLING CONVENTION (__stdcall)
- FAST CALLING CONVENTION (__fastcall)
- THISCALL
- INLINE FUNCTIONS
- SCOPE OF VARIABLES
- STORAGE CLASS
- AUTOMATIC LOCAL VARIABLES
- POINTERS TO FUNCTIONS
- 64 BIT POINTERS
- COMMON PITFALLS

ARCHITECTURAL ISSUES NAMESPACES

- HEADER & SOURCE FILES
- #DEFINED CONSTANTS
- #DEFINED MACROS
- DELETING A DEFINITION

FILES IN C++

- FILES - REVIEW
- FILE TYPES
- TEXT FILE EXAMPLES
- BINARY FILE EXAMPLES

THE PRINCIPLES OF OBJECT ORIENTED PROGRAMMING - REVIEW

- OBJECT ORIENTED PRINCIPLES

CLASSES & OBJECTS

- CLASS IMPLEMENTATION
- WRITING CLASSES
- THE PUBLIC INTERFACE
- THE PRIVATE INTERFACE
- CLASS DEFINITION
- INSERTING CLASS DEFINITIONS
- USING OBJECTS
- OBJECT LIFETIME
- CONSTRUCTORS
- DESTRUCTORS

STATIC CLASS MEMBERS

- STATIC CLASS DATA MEMBERS
- STATIC CLASS MEMBER FUNCTIONS

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Course Content (continued)

THE C++ CONST MODIFIER OBJECTIVES

- CONSTANT VARIABLES & POINTERS CONSTANTS & FUNCTIONS
- CONSTANT CLASS MEMBER FUNCTIONS
- STATIC LOCAL VARIABLES
- GLOBAL VARIABLES
- REGISTER VARIABLES
- EXTERN VARIABLES
- VARIABLE LINKAGE VOLATILE VARIABLES
- DYNAMICALLY ALLOCATED OBJECTS