

## Chapter 1: Setting up the tools

### Tools

Installing C++ Compilers on Windows

Installing VS Code on Windows

Configuring Visual Studio Code for C++ on Windows

Installing C++ Compilers on Linux

Installing Visual Studio Code on Linux

Configuring Visual Studio Code for C++ on Linux

Installing C++ Compilers on MacOS

Installing Visual Studio Code on MacOS

Configuring Visual Studio Code for C++ on MacOS

Online Compilers

## Chapter 2: Diving in

Your First C++ Program

Comments

Errors and Warnings

Statements and Functions

Data input and output

C++ Program Execution Model

C++ core language Vs Standard library Vs STL

## Chapter 3: Variables and data types

Variables and data types Introduction

Number Systems

Integer types : Decimals and Integers

Integer Modifiers

Fractional Numbers

Booleans

Characters And Text

Auto

Assignments

Variables and data types summary

Chapter 4: Operations on Data

Introduction on Data operations

Basic Operations

Precedence and Associativity

Prefix/Postfix Increment & Decrement

Compound Assignment Operators

Relational Operators

Logical Operators

Output formatting

Numeric Limits

Math Functions

Weird Integral Types

Data Operations Summary

Chapter 5: Flow Control

Flow Control Introduction

If Statements

Else If

Switch

Ternary Operators

Flow Control Summary

Chapter 6: Loops

Loops Introduction

For Loop

While Loop

Do While Loop

## Chapter 7: Arrays

Introduction to Arrays

Declaring and using arrays

Size of an array

Arrays of characters

Array Bounds

## Chapter 8: Pointers

Introduction to Pointers

Declaring and using pointers

Pointer to char

Program Memory Map Revisited

Dynamic Memory Allocation

Dangling Pointers

When new Fails

Null Pointer Safety

Memory Leaks

Dynamically allocated arrays

## Chapter 9: References

Introduction to References

Declaring and using references

Comparing pointers and references

References and const

## Chapter 10: Character Manipulation and Strings

Introduction to Strings

Character Manipulation

C-string manipulation

C-String concatenation and copy

Introducing std::string

Declaring and using `std::string`

Chapter 11: Functions

The One Definition Rule

First Hand on C++ Functions

Function Declaration and Function Definitions

Multiple Files - Compilation Model Revisited

Pass by value

Pass by pointer

Pass by reference

Chapter 12: Getting Things out of functions

Introduction to getting things out of functions

Input and output parameters

Returning from functions by value

Chapter 13: Function Overloading

Function Overloading Introduction

Overloading with different parameters

Chapter 14: Lambda functions

Introduction to Lambda Functions

Declaring and using lambda functions

Capture lists

Capture all in context

Summary

Chapter 15: Function Templates

Introduction to function templates

Trying out function templates

Template type deduction and explicit arguments

Template parameters by reference

Template specialization

## Chapter 16: C++20 Concepts Crash course

Introduction to C++20 Concepts

Using C++20 Concepts

Building your own C++20 Concepts

Zooming in on the requires clause

Combining C++20 Concepts

C++20 Concepts and auto

## Chapter 17: Classes

Introduction to classes

Your First Class

C++ Constructors

Defaulted constructors

Setters and Getters

Class Across Multiple Files

Arrow pointer call notation

Destructors

Order of Constructor Destructor Calls

The this Pointer

struct

Size of objects

## Chapter 18: Inheritance

Introduction to Inheritance

First try on Inheritance

Protected members

Base class access specifiers : Zooming in

Base class access specifiers - A demo

Closing in on Private Inheritance

Resurrecting Members Back in Context

Default Constructors with Inheritance

Custom Constructors With Inheritance

Copy Constructors with Inheritance

Inheriting Base Constructors

Inheritance and Destructors

Reused Symbols in Inheritance

Chapter 19: Polymorphism

Introduction to Polymorphism

Static Binding with Inheritance

Dynamic binding with virtual functions

Size of polymorphic objects and slicing

Polymorphic objects stored in collections (array)

Override

Overloading, overriding and function hiding

Inheritance and Polymorphism at different levels

Inheritance and polymorphism with static members

Final

Virtual functions with default arguments

Virtual Destructors

Dynamic casts

Polymorphic Functions and Destructors

Pure virtual functions and abstract classes

Abstract Classes as Interfaces

[Watch the full course below or on the freeCodeCamp.org YouTube channel \(31-hour watch\).](#)