

Updated for C++ 20



A Tour of C++

Third Edition

Bjarne Stroustrup



C++ In-Depth Series Bjarne Stroustrup

A Tour of C++

Third Edition

A Tour of C++

Table of Contents

Cover

Half Title

Title Page

Copyright Page

Contents

Preface

1 The Basics

1.1 Introduction

1.2 Programs

1.3 Functions

1.4 Types, Variables, and Arithmetic

1.5 Scope and Lifetime

1.6 Constants

1.7 Pointers, Arrays, and References

1.8 Tests

1.9 Mapping to Hardware

1.10 Advice

2 User-Defined Types

2.1 Introduction

2.2 Structures

2.3 Classes

2.4 Enumerations

Table of Contents

2.5 Unions

2.6 Advice

3 Modularity

3.1 Introduction

3.2 Separate Compilation

3.3 Namespaces

3.4 Function Arguments and Return Values

3.5 Advice

4 Error Handling

4.1 Introduction

4.2 Exceptions

4.3 Invariants

4.4 Error-Handling Alternatives

4.5 Assertions

4.6 Advice

5 Classes

5.1 Introduction

5.2 Concrete Types

5.3 Abstract Types

5.4 Virtual Functions

5.5 Class Hierarchies

5.6 Advice

6 Essential Operations

6.1 Introduction

6.2 Copy and Move

6.3 Resource Management

Table of Contents

6.4 Operator Overloading

6.5 Conventional Operations

6.6 User-Defined Literals

6.7 Advice

7 Templates

7.1 Introduction

7.2 Parameterized Types

7.3 Parameterized Operations

7.4 Template Mechanisms

7.5 Advice

8 Concepts and Generic Programming

8.1 Introduction

8.2 Concepts

8.3 Generic Programming

8.4 Variadic Templates

8.5 Template Compilation Model

8.6 Advice

9 Library Overview

9.1 Introduction

9.2 Standard-Library Components

9.3 Standard-Library Organization

9.4 Advice

10 Strings and Regular Expressions

10.1 Introduction

10.2 Strings

10.3 String Views

Table of Contents

10.4 Regular Expressions

10.5 Advice

11 Input and Output

11.1 Introduction

11.2 Output

11.3 Input

11.4 I/O State

11.5 I/O of User-Defined Types

11.6 Output Formatting

11.7 Streams

11.8 C-style I/O

11.9 File System

11.10 Advice

12 Containers

12.1 Introduction

12.2 vector

12.3 list

12.4 forward_list

12.5 map

12.6 unordered_map

12.7 Allocators

12.8 Container Overview

12.9 Advice

13 Algorithms

13.1 Introduction

13.2 Use of Iterators

Table of Contents

- 13.3 Iterator Types
- 13.4 Use of Predicates
- 13.5 Algorithm Overview
- 13.6 Parallel Algorithms
- 13.7 Advice

14 Ranges

- 14.1 Introduction
- 14.2 Views
- 14.3 Generators
- 14.4 Pipelines
- 14.5 Concepts Overview
- 14.6 Advice

15 Pointers and Containers

- 15.1 Introduction
- 15.2 Pointers
- 15.3 Containers
- 15.4 Alternatives
- 15.5 Advice

16 Utilities

- 16.1 Introduction
- 16.2 Time
- 16.3 Function Adaption
- 16.4 Type Functions
- 16.5 source_location
- 16.6 move() and forward()
- 16.7 Bit Manipulation

Table of Contents

16.8 Exiting a Program

16.9 Advice

17 Numerics

17.1 Introduction

17.2 Mathematical Functions

17.3 Numerical Algorithms

17.4 Complex Numbers

17.5 Random Numbers

17.6 Vector Arithmetic

17.7 Numeric Limits

17.8 Type Aliases

17.9 Mathematical Constants

17.10 Advice

18 Concurrency

18.1 Introduction

18.2 Tasks and threads

18.3 Sharing Data

18.4 Waiting for Events

18.5 Communicating Tasks

18.6 Coroutines

18.7 Advice

19 History and Compatibility

19.1 History

19.2 C++ Feature Evolution

19.3 C/C++ Compatibility

19.4 Bibliography

Table of Contents

19.5 Advice

Module std

A.1 Introduction

A.2 Use What Your Implementation Offers

A.3 Use Headers

A.4 Make Your Own module std

A.5 Advice

Index