International Standard

ISO/IEC 14882

Programming languages — C++

Langages de programmation — C++

Seventh edition
2024-10

Reference number
ISO/IEC 14882:2024(en)

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Published in Switzerland

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Foreword

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

This seventh edition cancels and replaces the sixth edition (ISO/IEC 14882:2020), which has been technically revised.

The main changes are as follows:

— improved support for Unicode;

— improved support for programming with constant expressions and constant evaluation;

— addition of a new way to declare non-static member functions with an "explicit `this` parameter";

— addition of support for `#elifdef` and `#elifndef` preprocessing directives;

— change of overloaded `operator[]` to allow multiple parameters;

— change of lifetime rules in range-based for loops;

— addition of a new "decay-copying" declaration "`auto(x)`";

— support for extended floating-point types;

— addition of facilities for explicit lifetime management;

— addition of facilities for expressing assumptions;

— addition of standard library modules;

— addition of new standard library container and view types;

— addition of new standard library algorithms;

— addition of a generator type for use with coroutines;

— addition of an "expected" type for error handling;

— addition of string formatting and printing facilities;

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— technical corrections and enhancements of existing core language and library facilities.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at https://www.iso.org/members.html and https://www.iec.ch/national-committees.

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Introduction

Clauses and subclauses in this document are annotated with a so-called stable name, presented in square brackets next to the (sub)clause heading (such as "[lex.token]" for 5.6, "Tokens"). Stable names aid in the discussion and evolution of this document by serving as stable references to subclauses across editions that are unaffected by changes of subclause numbering.

The cross references at the end of the document can be used to associate the stable names with their corresponding subclause number and to look up their location.

The indexes at the end of the document can be used to look up certain related entities such as grammar productions, names used by the standard library, and language constructs with implementation-defined behavior.

Aspects of the language syntax of C++ are distinguished typographically by the use of *italic, sans-serif* type or `constant width` type to avoid ambiguities; see 4.3.

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Programming languages — C++

1 Scope [intro.scope]

This document specifies requirements for implementations of the C++ programming language. The first such requirement is that an implementation implements the language, so this document also defines C++. Other requirements and relaxations of the first requirement appear at various places within this document.

C++ is a general purpose programming language based on ISO/IEC 9899:2018. C++ provides many facilities beyond those provided by ISO/IEC 9899:2018, including additional data types, classes, templates, exceptions, namespaces, operator overloading, function name overloading, references, free store management operators, and additional library facilities.

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2 Normative references [intro.refs]

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

— ISO/IEC 2382, *Information technology — Vocabulary*

— ISO 8601-1:2019, *Date and time — Representations for information interchange — Part 1: Basic rules*

— ISO/IEC 9899:2018, *Information technology — Programming languages — C*

— ISO/IEC/IEEE 9945:2009, *Information Technology — Portable Operating System Interface (POSIX®)*[1] *Base Specifications, Issue 7*

— ISO/IEC/IEEE 9945:2009/Cor 1:2013, *Information Technology — Portable Operating System Interface (POSIX®) Base Specifications, Issue 7 — Technical Corrigendum 1*

— ISO/IEC/IEEE 9945:2009/Cor 2:2017, *Information Technology — Portable Operating System Interface (POSIX®) Base Specifications, Issue 7 — Technical Corrigendum 2*

— ISO 80000-2:2019, *Quantities and units — Part 2: Mathematics*

— Ecma International, *ECMAScript*[2] *Language Specification*, Standard Ecma-262, third edition, 1999.

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