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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC1, Information technology, Subcommittee SC22, Programming languages, their environments and system software interfaces.

This fifth edition cancels and replaces the fourth edition (ISO/IEC 9899:2018), which has been technically revised. The main changes are contained in Annex M.

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 www.iso.org/members.html and www.iec.ch/national-committees.

Introduction

With the introduction of new devices and extended character sets, new features could be added to future editions of this document. Subclauses in the language and library clauses warn implementers and programmers of usages which, though valid in themselves, could conflict with future additions.

Certain features are *obsolescent*, which means that they could be considered for withdrawal in future revisions of this document. They are retained because of their widespread use, but their use in new implementations (for implementation features) or new programs (for language [6.11] or library features [7.33]) is discouraged.

This document is divided into four major subdivisions:

— preliminary elements (Clauses 1–4);

— the characteristics of environments that translate and execute C programs (Clause 5);

— the language syntax, constraints, and semantics (Clause 6);

— the library facilities (Clause 7).

In any given subsequent clause or subclause, there are section delineations in **bold** to describe the semantics, restrictions, and behaviors of programs for this language and potentially the use of its library clauses in this document:

— **Syntax**
which pertains to the spelling and organization of the language and library;

— **Constraints**
which detail and enumerate various requirements for the correct interpretation of the language and library, typically during translation;

— **Semantics**
which explain the behavior of language features and similar constructs;

— **Description**
which explain the behavior of library usage and similar constructs;

— **Returns**
which describes the effects of constructs provided back to a user of the library;

— **Runtime-constraints**
which detail and enumerate various requirements that are expected to be checked and which shall not be violated, typically during execution;

— **Environmental limits**
which list limitations an implementation may impose on a library or language construct which might otherwise be unlimited;

— **Recommended practice**
which provides guidance and important considerations for implementers of this document.

Examples are provided to illustrate possible forms of the constructions described. Footnotes are provided to emphasize consequences of the rules described in that subclause or elsewhere in this document. References are used to refer to other related subclauses. Recommendations are provided to give advice or guidance to implementers. Annexes define optional features, provide additional

information and summarize the information contained in this document. A bibliography lists documents that were referred to during the preparation of this document.

The language clause (Clause 6) is derived from "The C Reference Manual"[15].

The library clause (Clause 7) is based on the *1984 /usr/group Standard*[16].

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Information technology — Programming languages — C

1. Scope

This document specifies the form and establishes the interpretation of programs written in the C programming language. It is designed to promote the portability of C programs among a variety of data-processing systems. It is intended for use by implementers and programmers. It specifies:

— the representation of C programs;

— the syntax and constraints of the C language;

— the semantic rules for interpreting C programs;

— the representation of input data to be processed by C programs;

— the representation of output data produced by C programs;

— the restrictions and limits imposed by a conforming implementation of C.

This document does not specify:

— the mechanism by which C programs are transformed for use by a data-processing system;

— the mechanism by which C programs are invoked for use by a data-processing system;

— the mechanism by which input data are transformed for use by a C program;

— the mechanism by which output data are transformed after being produced by a C program;

— the size or complexity of a program and its data that will exceed the capacity of any specific data-processing system or the capacity of a particular processor;

— all minimal requirements of a data-processing system that is capable of supporting a conforming implementation.

Annex J gives an overview of portability issues that a C program can encounter.

2. Normative references

The following documents are referred to in the text in such a way that some or all 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 2382:2015, *Information technology — Vocabulary*.

ISO 4217, *Codes for the representation of currencies*.

ISO 8601 series, *Data elements and interchange formats — Information interchange — Representation of dates and times*.

ISO/IEC 10646, *Information technology —Universal Coded Character Set (UCS)*.

ISO/IEC 60559:2020, *Information technology — Microprocessor Systems — Floating-Point arithmetic*.

ISO 80000–2, *Quantities and units — Part 2: Mathematics*.

The Unicode Consortium. *Unicode Standard Annex, UAX #44, Unicode Character Database [online]*. Edited by Ken Whistler. Available at `https://www.unicode.org/reports/tr44`.

The Unicode Consortium. *The Unicode Standard, Derived Core Properties*. Available at `https://www.unicode.org/Public/UCD/latest/ucd/DerivedCoreProperties.txt`.