First edition
2002-12-01

Information technology — Programming languages — COBOL

Technologies de l'information — Langages de programmation — COBOL

Reference number
ISO/IEC 1989:2002(E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International standards are drafted in accordance with the rules given in the ISO/IEC Directives, part 3.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 1989 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces*.

This first edition of ISO/IEC 1989 cancels and replaces ISO 1989:1985, which has been technically revised. It incorporates Amd.1:1992 and Amd.2:1994. This edition introduces the following significant technical enhancements:

- features for object-oriented programming
- additional features for detection and reporting of exceptions
- a boolean data type for bit handling and boolean operations
- native binary and floating-point data types
- a national character data type for processing multiple-octet coded character sets
- cultural adaptability, multilingual features, and tailoring for a given local language or culture
- increased portability of arithmetic
- free-form source and library text
- compiler directives for portable specification of processing options
- conditional compilation
- an enhanced report writer
- features for data validation
- several enhancements to the CALL statement, including recursion
- improved interoperability with other programming languages
- user-defined functions
- a screen handling facility
- file sharing and record locking
- support for ISO/IEC 10646-1 and ISO/IEC 10646-2 for data interchange

A complete list of technical changes is given in Annex F.

Annexes A through D form a normative part of this International Standard. Annexes E through H are for information only.

Introduction

COBOL began as a business programming language, but its present use has spread well beyond that to a general-purpose programming language. COBOL is well known for its file handling capabilities, which are extended in this revision by the addition of file sharing and record locking capabilities. Other major enhancements add object-oriented capabilities, handling of national characters, and enhanced interoperability with other programming languages. Annex E, Concepts, includes an explanation of the major new features and is the suggested starting point for the reading of this document.

The previous revision of the COBOL standard was published in 1985 and extended by an amendment that added the Intrinsic Functions module in 1989 and a correction amendment in 1993. Implementors have provided language extensions in response to the demands of their users. Several changes and extensions have, therefore, been made to this revision in order to prevent further divergence, and to ensure consistency and coherence.

Development of the COBOL language began before the invention of formal techniques for specification of programming languages. Hence, the COBOL standard uses its own description techniques, which are described in 5, Description techniques. These techniques involve general formats, which describe the syntax, and natural language.

This revision is a result of the standardization efforts of working group ISO/IEC JTC 1/SC22/WG4 and technical committee J4, a subgroup of Accredited Standards Committee INCITS. During the development of this revision, great care was taken to minimize changes that would impact existing programs. Most substantive changes that potentially impact existing programs were introduced to resolve ambiguities in the previous revision. Details of the substantive changes are given in Annex F, Substantive changes list.