INTERNATIONAL STANDARD

**ISO/IEC 15145**

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# Information technology — Programming languages — Forth

*Technologies de l'information — Langages de programmation — Forth*


Reference number
ISO/IEC 15145:1997(E)

# Contents

# 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 liason 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. 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.

International Standard ISO/IEC 15145 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces.*

Annexes A to F of this International Standard are for information only.

## Introduction

The purpose of this International Standard is to promote the portability of Forth programs for use on a wide variety of computing systems, to facilitate the communication of programs, programming techniques, and ideas among Forth programmers, and to serve as a basis for the future evolution of the Forth language.

Forth is a language for direct communication between human beings and machines. Using natural-language diction and machine-oriented syntax, Forth provides an economical, productive environment for interactive compilation and execution of programs. Forth also provides low-level access to computer-controlled hardware, and the ability to extend the language itself. This extensibility allows the language to be quickly expanded and adapted to special needs and different hardware systems.

Forth was invented by Mr. Charles Moore to increase programmer productivity without sacrificing machine efficiency. Forth is a layered environment containing the elements of a computer language as well as those of an operating system and a machine monitor. This extensible, layered environment provides for highly interactive program development and testing.

In the interests of transportability of application software written in Forth, standardization efforts began in the mid-1970s by an international group of users and implementors who adopted the name "Forth Standards Team". This effort resulted in the Forth-77 Standard. As the language continued to evolve, an interim Forth-78 Standard was published by the Forth Standards Team. Following Forth Standards Team meetings in 1979, the Forth-79 Standard was published in 1980. Major changes were made by the Forth Standards Team in the Forth-83 Standard, which was published in 1983.

The first meeting of the Technical Committee on Forth Programming Systems was convened by the Organizing Committee of the X3J14 Forth Technical Committee on August 3, 1987, and has met subsequently on November 11-12, 1987, February 10-12, 1988, May 25-28, 1988, August 10-13, 1988, October 26-29, 1988, January 25-28, 1989, May 3-6, 1989, July 26-29, 1989, October 25-28, 1989, January 24-27, 1990, May 22-26, 1990, August 21-25, 1990, November 6-10,1990, January 29-February 2, 1991, May 3-4, 1991, June 16-19, 1991, July 30-August 3, 1991, March 17-21, 1992, October 13-17, 1992, January 26-30, 1993, June 28-30, 1993, and June 21, 1994.

This project has operated under joint sponsorship of IEEE as IEEE Project P1141. The TC gratefully acknowledges the support of IEEE in this effort and the participation of the IEEE members who contributed to our work as sponsored members and observers.

Requests for interpretation, suggestions for improvement or addenda, or defect reports are welcome. They should be sent to the X3 Secretariat, Computer and Business Equipment Manufacturers Association, 1250 Eye Street, NW, Suite 200, Washington, DC 20005.

# Information technology — Programming languages — Forth

## 1 General

### 1.1 Scope

This International Standard specifies an interface between a Forth System and a Forth Program by defining the words provided by a Standard System.

#### 1.1.1 Inclusions

This International Standard specifies:

- the forms that a program written in the Forth language may take;
- the rules for interpreting the meaning of a program and its data.

#### 1.1.2 Exclusions

This International Standard does not specify:

- the mechanism by which programs are transformed for use on computing systems;
- the operations required for setup and control of the use of programs on computing systems;
- the method of transcription of programs or their input or output data to or from a storage medium;
- the program and Forth system behavior when the rules of this International Standard fail to establish an interpretation;
- the size or complexity of a program and its data that will exceed the capacity of any specific computing system or the capability of a particular Forth system;
- the physical properties of input/output records, files, and units;
- the physical properties and implementation of storage.

### 1.2 Document organization

#### 1.2.1 Word sets

This International Standard groups Forth words and capabilities into *word sets* under a name indicating some shared aspect, typically their common functional area. Each word set may have an extension, containing words that offer additional functionality. These words are not required in an implementation of the word set.

The "Core" word set, defined in clauses 1 through 6, contains the required words and capabilities of a Standard System. The other word sets, defined in clauses 7 through 17, are optional, making it possible to provide Standard Systems with tailored levels of functionality.

##### 1.2.1.1 Text clauses

Within each word set, clause 1 contains introductory and explanatory material and clause 2 introduces terms and notation used throughout this International Standard. There are no requirements in these clauses.

Clauses 3 and 4 contain the usage and documentation requirements, respectively, for Standard Systems and Programs, while clause 5 specifies their labeling.

#### 1.2.1.2 Glossary clauses

Clause 6 of each word set specifies the required behavior of the definitions in the word set and the extensions word set.

### 1.2.2 Annexes

The annexes do not contain any required material.

Annex A provides some of the rationale behind the committee's decisions in creating this International Standard, as well as implementation examples. It has the same numbering as the body of this International Standard to make it easy to relate each requirements clause to its rationale clause.

Annex B is a short bibliography on Forth.

Annex C provides an introduction to Forth.

Annex D discusses the compatibility of ANS Forth with earlier Forths, emphasizing the differences from Forth 83.

Annex E presents some techniques for writing portable programs in ANS Forth.

Annex F includes the words from all word sets in a single list, and serves as an index of ANS Forth words.

## 1.3 Future directions

### 1.3.1 New technology

This International Standard adopts certain words and practices that are increasingly found in common practice. New words have also been adopted to ease creation of portable programs.

### 1.3.2 Obsolescent features

This International Standard adopts certain words and practices that cause some previously used words to become obsolescent. Although retained here because of their widespread use, their use in new implementations or new programs is discouraged, because they may be withdrawn from future revisions of this International Standard.

This International Standard designates the following words as obsolescent:

| | | |
|---|---|---|
| 6.2.0060 `#TIB` | 15.6.2.1580 `FORGET` | 6.2.2240 `SPAN` |
| 6.2.0970 `CONVERT` | 6.2.2040 `QUERY` | 6.2.2290 `TIB` |
| 6.2.1390 `EXPECT` | | |

## 1.4 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 646:1991, *Information technology - ISO 7-bit coded character set for information interchange*[1].

ANSI X3.172-1990, *Dictionary for Information Systems*[1].

ANSI X3.4-1974, *American Standard Code for Information Interchange* (ASCII)[1].

ANSI/IEEE 754-1985, *Floating-point Standard*[1].

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[1]Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.