



## 2. Terms, notation, and references

The phrase **See**: is used throughout this Standard to direct the reader to other sections of the Standard that have a direct bearing on the current section.

In this Standard, **shall** states a requirement on a system or program; conversely, **shall not** is a prohibition; **need not** means **is not required to**; **should** describes a recommendation of the Standard; and **may**, depending on context, means **is allowed to** or **might happen**.

Throughout the Standard, typefaces are used in the following manner:

- This proportional serif typeface is used for text, with italic used for symbols and the first appearance of new terms;
- A bold proportional sans-serif typeface is used for headings;
- A bold monospaced serif typeface is used for Forth-language text.

### 2.1 Definitions of terms

Terms defined in this section are used generally throughout this Standard. Additional terms specific to individual word sets are defined in those word sets. Other terms are defined at their first appearance, indicated by italic type. Terms not defined in this Standard are to be construed according to the Dictionary for Information Systems, ANSI X3.172-1990.

**address unit:**

Depending on context, either 1) the units into which a Forth address space is divided for the purposes of locating data objects such as characters and variables; 2) the physical memory storage elements corresponding to those units; 3) the contents of such a memory storage element; or 4) the units in which the length of a region of memory is expressed.

**aligned address:**

The address of a memory location at which a character, cell, cell pair, or double-cell integer can be accessed.

**ambiguous condition:**

A circumstance for which this Standard does not prescribe a specific behavior for Forth systems and programs.

Ambiguous conditions include such things as the absence of a needed delimiter while parsing, attempted access to a nonexistent file, or attempted use of a nonexistent word. An ambiguous condition also exists when a Standard word is passed values that are improper or out of range.

**cell:**

The primary unit of information in the architecture of a Forth system.

**cell pair:**

Two cells that are treated as a single unit.

**character:**

Depending on context, either 1) a storage unit capable of holding a character; or 2) a member of a character set.

**character-aligned address:**

The address of a memory location at which a character can be accessed.

**character string:**

Data space that is associated with a sequence of consecutive character-aligned addresses. Character strings usually contain text. Unless otherwise indicated, the term **string** means **character string**.

**code space:**

The logical area of the dictionary in which word semantics are implemented.

**compile:**

To transform source code into dictionary definitions.

**compilation semantics:**

The behavior of a Forth definition when its name is encountered by the text interpreter in compilation state.

**counted string:**

A data structure consisting of one character containing a length followed by zero or more contiguous data characters. Normally, counted strings contain text.

**cross compiler:**

A system that compiles a program for later execution in an environment that may be physically and logically different from the compiling environment. In a cross compiler, the term **host** applies to the compiling

environment, and the term **target** applies to the run-time environment.

**current definition:**

The definition whose compilation has been started but not yet ended.

**data field:**

The data space associated with a word defined via [CREATE](#).

**data space:**

The logical area of the dictionary that can be accessed.

**data-space pointer:**

The address of the next available data space location, i.e., the value returned by [HERE](#).

**data stack:**

A stack that may be used for passing parameters between definitions. When there is no possibility of confusion, the data stack is referred to as **the stack**. Contrast with return stack.

**data type:**

An identifier for the set of values that a data object may have.

**defining word:**

A Forth word that creates a new definition when executed.

**definition:**

A Forth execution procedure compiled into the dictionary.

**dictionary:**

An extensible structure that contains definitions and associated data space.

**display:**

To send one or more characters to the user output device.

**environmental dependencies:**

A program's implicit assumptions about a Forth system's implementation options or underlying hardware. For example, a program that assumes a cell size greater than 16 bits is said to have an environmental dependency.

**execution semantics:**

The behavior of a Forth definition when it is executed.

**execution token:**

A value that identifies the execution semantics of a definition.

**find:**

To search the dictionary for a definition name matching a given string.

**immediate word:**

A Forth word whose compilation semantics are to perform its execution semantics.

**implementation defined:**

Denotes system behaviors or features that must be provided and documented by a system but whose further details are not prescribed by this Standard.

**implementation dependent:**

Denotes system behaviors or features that must be provided by a system but whose further details are not prescribed by this Standard.

**input buffer:**

A region of memory containing the sequence of characters from the input source that is currently accessible to a program.

**input source:**

The device, file, block, or other entity that supplies characters to refill the input buffer.

**input source specification:**

A set of information describing a particular state of the input source, input buffer, and parse area. This information is sufficient, when saved and restored properly, to enable the nesting of parsing operations on the same or different input sources.

**interpretation semantics:**

The behavior of a Forth definition when its name is encountered by the text interpreter in interpretation state.

**initiation semantics:**

The behavior of a Forth definition, or of the portion of a Forth definition following [DOES>](#), when it begins execution.

**keyboard event:**

A value received by the system denoting a user action at the user input device. The term **keyboard** in this document does not exclude other types of user input devices.

**line:**

A sequence of characters followed by an actual or implied line terminator.

**name space:**

The logical area of the dictionary in which definition names are stored.

**number:**

In this Standard, **number** used without other qualification means **integer**. Similarly, **double number** means **double-cell integer**.

**parse:**

To select and exclude a character string from the parse area using a specified set of delimiting characters, called delimiters.

**parse area:**

The portion of the input buffer that has not yet been parsed, and is thus available to the system for subsequent processing by the text interpreter and other parsing operations.

**pictured-numeric output:**

A number display format in which the number is converted using Forth words that resemble a symbolic **picture** of the desired output.

**program:**

A complete specification of execution to achieve a specific function (application task) expressed in Forth source code form.

**receive:**

To obtain characters from the user input device.

**return stack:**

A stack that may be used for program execution nesting, do-loop execution, temporary storage, and other purposes.

**standard word:**

A named Forth procedure, formally specified in this Standard.

**user input device:**

The input device currently selected as the source of received data, typically a keyboard.

**user output device:**

The output device currently selected as the destination of display data.

**variable:**

A named region of data space located and accessed by its memory address.

**word:**

Depending on context, either 1) the name of a Forth definition; or 2) a parsed sequence of non-space characters, which could be the name of a Forth definition.

**word list:**

A list of associated Forth definition names that may be examined during a dictionary search.

**word set:**

A set of Forth definitions grouped together in this Standard under a name indicating some shared aspect, typically their common functional area.

See: [A.2.1](#) Definition of terms, [RFI 0005](#) Initiation semantics, [RFI 0007](#) Distinction between *immediacy* and *special compilation semantics*.

## 2.2 Notation

### 2.2.1 Numeric notation

Unless otherwise stated, all references to numbers apply to signed single-cell integers. The inclusive range of values is shown as {from...to}. The allowable range for the contents of an address is shown in double braces, particularly for the contents of variables, e.g., [BASE](#) {{2...36}}.

### 2.2.2 Stack notation

Stack parameters input to and output from a definition are described using the notation:

```
( stack-id before -- after )
```

where stack-id specifies which stack is being described, before represents the stack-parameter data types before execution of the definition and after represents them after execution. The symbols used in before and after are shown in [table 3.1](#).

The control-flow-stack stack-id is **C:**, the data-stack stack-id is **S:**, and the return-stack stack-id is **R:**. When there is no confusion, the data-stack stack-id may be omitted.

When there are alternate after representations, they are described by **after1 | after2**. The top of the stack is to the right. Only those stack items required for or provided by execution of the definition are shown.

See: [A.2.2.2](#) Stack notation

### 2.2.3 Parsed-text notation

If, in addition to using stack parameters, a definition parses text, that text is specified by an abbreviation from table 2.1, shown surrounded by double-quotes and placed between the before parameters and the -- separator in the first stack described, e.g.,

( S: before "**parsed-text-abbreviation**" -- after ).

Table 2.1 - Parsed text abbreviations

Abbreviation	Description
-----	-----
<char>	the delimiting character marking the end of the string being parsed
<chars>	zero or more consecutive occurrences of the character char
<space>	a delimiting space character
<spaces>	zero or more consecutive occurrences of the character space
<quote>	a delimiting double quote
<paren>	a delimiting right parenthesis
<eol>	an implied delimiter marking the end of a line
ccc	a parsed sequence of arbitrary characters, excluding the delimiter character
name	a token delimited by space, equivalent to ccc<space> or ccc<eol>

### 2.2.4 Glossary notation

The glossary entries for each word set are listed in the standard ASCII collating sequence. Each glossary entry specifies an ANS Forth word and consists of two parts: an index line and the semantic description of the definition.

#### 2.2.4.1 Glossary index line

The index line is a single-line entry containing, from left to right:

- Section number, the last four digits of which assign a unique sequential number to all words included in this Standard;
- DEFINITION-NAME in upper-case, mono-spaced, bold-face letters;
- Natural-language pronunciation in quotes if it differs from English;
- Word-set designator from table 2.2. The designation for extensions word sets includes **EXT**.

Table 2.2 - Word set designators

Word set	Designator
-----	-----
<a href="#">Core word set</a>	CORE
<a href="#">Block word set</a>	BLOCK
<a href="#">Double-Number word set</a>	DOUBLE
<a href="#">Exception word set</a>	EXCEPTION
<a href="#">Facility word set</a>	FACILITY
<a href="#">File-Access word set</a>	FILE
<a href="#">Floating-Point word set</a>	FLOATING
<a href="#">Locals word set</a>	LOCALS
<a href="#">Memory-Allocation word set</a>	MEMORY
<a href="#">Programming-Tools word set</a>	TOOLS
<a href="#">Search-Order word set</a>	SEARCH
<a href="#">String-Handling word set</a>	STRING

#### 2.2.4.2 Glossary semantic description

The first paragraph of the semantic description contains a stack notation for each stack affected by execution of the word. The remaining paragraphs contain a text description of the semantics. See [3.4.3 Semantics](#).

## 2.3 References

The following national and international standards are referenced in this Standard:

ANSI X3.172-1990, Dictionary for information systems ([2.1](#) Definition of terms);

ANSI X3.4-1974, American Standard Code for Information Interchange (ASCII) ([3.1.2.1](#) Graphic characters);

ISO 646-1983, ISO 7-bit coded character set for information interchange, International Reference Version (IRV) ([3.1.2.1](#) Graphic characters);

ANSI/IEEE 754-1985, Floating-point standard ([12.2.1](#) Definition of terms).

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