



SLOVENSKI STANDARD SIST ISO/IEC 2022:1995

01-junij-1995

Information technology - Character code structure and extension techniques

Information technology -- Character code structure and extension techniques

Technologies de l'information -- Structure de code de caractères et techniques d'extension

ITeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **ISO/IEC 2022:1994**

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8afl-5a35a623e5c0/sist-iso-iec-2022-1995>

ICS:

35.040

Nabori znakov in kodiranje
informacij

Character sets and
information coding

SIST ISO/IEC 2022:1995

en

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST ISO/IEC 2022:1995

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8af1-5a35a623e5c0/sist-iso-iec-2022-1995>

INTERNATIONAL STANDARD

ISO/IEC
2022

Fourth edition
1994-12-01

Information technology — Character code structure and extension techniques

iTeh STANDARD PREVIEW
(standards.iteh.ai)

*Technologies de l'information — Structure de code de caractères et
techniques d'extension*

SIST ISO/IEC 2022:1995

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8af1-5a35a623e5c0/sist-iso-iec-2022-1995>



Reference number
ISO/IEC 2022:1994(E)

Contents

	Page
Section 1 - General	1
1 Scope	1
2 Conformance	2
2.1 Types of conformance	2
2.2 Conformance of information interchange	2
2.3 Conformance of devices	2
2.3.1 Device description	2
2.3.2 Originating devices	2
2.3.3 Receiving devices	2
3 Normative references	3
4 Definitions	3
4.1 bit combination	3
4.2 byte	3
4.3 character	3
4.4 coded-character-data-element (CC-data-element)	3
4.5 coded character set; code	3
4.6 code extension	3
4.7 code table	3
4.8 combining character	3
4.9 control character	3
4.10 control function	3
4.11 to designate	3
4.12 device	4
4.13 escape sequence	4
4.14 Final Byte	4
4.15 graphic character	4
4.16 graphic symbol	4
4.17 Intermediate Byte	4
4.18 to invoke	4
4.19 repertoire	4
4.20 to represent	4
4.21 user	4
5 Notation, code tables and names	4
5.1 Notation	4
5.2 Code tables	5
5.3 Names of characters	5
Section 2 - Character sets and codes	6
6 Characters and character sets	6

© ISO/IEC 1994

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher

ISO/IEC Copyright Office * Case Postale 56 * CH-1211 Genève 20 * Switzerland
Printed in Switzerland

6.1 Types of characters and character sets	6
6.2 Fixed coded characters	6
6.2.1 Character DELETE	6
6.2.2 Character ESCAPE	6
6.2.3 Character SPACE	6
6.3 Sets of coded graphic characters	6
6.3.1 Types of coded graphic character set	6
6.3.2 Contents of a coded graphic character set	9
6.3.3 Combination of graphic characters	9
6.3.4 Sources of coded graphic character sets	9
6.4 Sets of coded control functions	9
6.4.1 Types of coded control function set	9
6.4.2 Primary sets of coded control functions	10
6.4.3 Supplementary sets of coded control functions	10
6.4.4 Sources of coded control function sets	10
6.5 Coded single additional control functions	11
6.5.1 Standardized single control functions	11
6.5.2 Registered single control functions	11
6.5.3 Private control functions	11
6.5.4 Sources of coded single control functions	11
7 The elements of 8-bit and 7-bit codes	11
7.1 Summary of the elements	11
7.2 Character-set code elements	12
7.3 Invocation of character-set code elements	13
7.4 Coded code-identification functions	13
7.5 Unique coding of graphic characters	14
8 Structure of 8-bit codes	14
8.1 Code table layout for 8-bit codes	14
8.2 Elements and structure of the code	15
8.3 Invocation of graphic character sets by means of shift functions	15
8.3.1 LOCKING-SHIFT ZERO, .. ONE, .. TWO, and .. THREE	15
8.3.2 LOCKING SHIFT ONE RIGHT, .. TWO RIGHT , and .. THREE RIGHT	16
8.3.3 Shift status	16
8.3.4 Interactions of locking-shift functions	18
8.4 Invocation of single graphic characters by means of shift functions	18
8.5 Invocation of sets of control functions	18
8.5.1 Invocation of the C0 code element	18
8.5.2 Invocation of the C1 code element	18
9 Structure of 7-bit codes	19
9.1 Code table layout for 7-bit codes	19
9.2 Elements and structure of the code	19
9.3 Invocation of graphic character sets by means of shift functions	22
9.3.1 SHIFT-IN, SHIFT-OUT, LOCKING-SHIFT TWO, and LOCKING-SHIFT THREE	22
9.3.2 LOCKING SHIFT ONE RIGHT, TWO RIGHT, and THREE RIGHT	22
9.3.3 Shift status	22
9.3.4 Interactions of locking-shift functions	22

9.4	Invocation of single graphic characters by means of shift functions	22
9.5	Invocation of sets of control functions	23
9.5.1	Invocation of the C0 code element	23
9.5.2	Invocation of the C1 code element	23
10	Versions and levels of implementation	23
10.1	Versions	23
10.2	Identification of code structure facilities and character sets	23
10.3	Levels of implementation	24
10.3.1	8-bit codes	24
10.3.2	Qualification of levels for 8-bit codes	24
10.3.3	7-bit codes	25
11	Transformation between 8-bit and 7-bit codes	25
11.1	Transformation from 8-bit to 7-bit codes	25
11.2	Transformation from 7-bit to 8-bit codes	26
Section 3	Code identification and escape sequences	27
12	Code-identification functions	27
12.1	Purposes of code-identification functions	27
12.2	Relationship to escape sequences	27
13	Structure and use of escape sequences	27
13.1	Structure of escape sequences	27
13.2	Types of escape sequences	27
13.2.1	Indication of type	27
13.2.2	Escape Sequences of types nF	28
13.2.3	Escape Sequences of type 4F	29
13.2.4	Summary	30
13.2.5	Notation of escape sequences	30
13.3	Specific meanings of escape sequences	31
13.3.1	Registration of Final Bytes	31
13.3.2	Final Bytes specified in this International Standard	32
13.3.3	Private use	32
14	Designation of sets of graphic characters and control functions	32
14.1	Designation functions	32
14.2	Designation of sets of control functions (CZD, C1D)	33
14.2.1	Purpose	33
14.2.2	Designation of C0	33
14.2.3	Designation of C1	33
14.3	Designation of sets of graphic characters (GnDm and GnDMm)	33
14.3.1	Purpose	33
14.3.2	Specifications	34
14.3.3	Size indication for multiple-byte sets	35
14.4	Dynamically redefinable character sets (DRCS)	35
14.4.1	Purpose	35
14.4.2	Specification	35

14.5 Identification of revisions of registered character sets (IRR)	35
14.5.1 Purpose	35
14.5.2 Specification	35
15 Code announcement and switching	36
15.1 Summary of functions provided	36
15.2 Announcement of code structure facilities (ACS)	36
15.2.1 Purpose	36
15.2.2 Specification	36
15.3 Data Delimiter for this Coding Method (CMD)	40
15.3.1 Purpose	40
15.3.2 Specification	40
15.4 Designation of Other Coding Systems (DOCS)	40
15.4.1 Purpose	40
15.4.2 Specification	40
ANNEXES	
A - External references to character repertoires and their coding	42
B - The ISO International register of coded character sets to be used with escape sequences	45
C - Main differences between the 3rd edition (1986) and the present edition of this International Standard	46
D - Bibliography	47

(standards.iteh.ai)

SIST ISO/IEC 2022:1995

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8af1-5a35a623e5c0/sist-iso-iec-2022-1995>

Foreword

ISO (the International Organisation for Standardisation) and IEC (the International Electrical Commission) form the specialised system for world-wide standardisation. National Bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organisation to deal with particular fields of mutual interest. Other international organisations, 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. 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 2022 was prepared by the European Association for the Standardization of Information and Communication Systems, ECMA, (as ECMA-35) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This fourth edition cancels and replaces the third edition (ISO 2022:1986), of which it constitutes a technical revision (see also the introduction).

Annex A forms an integral part of this International Standard. Annexes B, C and D are for information only.

SIST ISO/IEC 2022:1995

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8af1-5a35a623e5c0/sist-iso-iec-2022-1995>

Introduction

ECMA/TC1 participates very actively in the work of JTC1/SC2 (previously ISO/TC97/SC2) on code structure and code extension, and contributed numerous technical papers to SC2/WG1, the group entrusted with the preparation of ISO 2022, the International Standard for code extension techniques. ECMA published its first Standard ECMA-35 on the same subject in 1971. Three further editions in 1980, 1982 and 1985 reflected the progress achieved internationally, and the text of the 1985 edition was identical with that of the 1986 edition of ISO 2022.

The present edition of ISO/IEC 2022 is technically almost identical with the 1986 edition but is completely rearranged and rewritten to make it more convenient to use as a reference document.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST ISO/IEC 2022:1995

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8afl-5a35a623e5c0/sist-iso-iec-2022-1995>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This page intentionally left blank

SIST ISO/IEC 2022:1995

<https://standards.iteh.ai/catalog/standards/sist/9b99120f-247c-4dc2-8af1-5a35a623e5c0/sist-iso-iec-2022-1995>

Information technology - Character code structure and extension techniques

Section 1 - General

1 Scope

This International Standard specifies the structure of 8-bit codes and 7-bit codes which provide for the coding of character sets. The code elements used in the structure are common to both the 8-bit and 7-bit codes. The codes use a variety of techniques for extending the capabilities of elementary 8-bit and 7-bit codes. Greater emphasis is given to 8-bit codes in this edition of the Standard than in previous editions because they are now more widely used.

The use of common elements in the 8-bit and 7-bit code structure enables any specific conforming 8-bit code to be transformed into an equivalent 7-bit code, and vice versa, in a simple and direct fashion.

ISO/IEC 4873 conforms to the 8-bit code structure specified here, and ISO/IEC 646 conforms to the 7-bit code structure specified here.

Note - The coded character set specified in ISO/IEC 10646-1 has a different structure not in accordance with this International Standard.

The code structure facilities specified here include various means of extending the number of control functions and graphic characters available in a code. They also include techniques to construct and formalize the definition of specific codes, and to provide a coded identification of the structure and of the constituent elements of such specific codes.

Specific codes may also be identified by means of object identifiers in accordance with ISO 8824, Abstract Syntax Notation One (ASN.1). The form of such object identifiers is specified in annex A.

Individual character sets and control functions intended for use with these 8-bit and 7-bit codes are assumed to be registered in the ISO International Register of Coded Character Sets to be Used with Escape Sequences, in accordance with ISO 2375 (see annex B). The register includes details to relate individual character sets and control functions with their coded representations, and also with the associated coded identifications of such character sets.

The principles established in this International Standard may be utilized to form supplementary code structure facilities. For example ISO/IEC 6429 has followed such a procedure to formulate some parameterized control functions.

The use of uniform code structure techniques for the 8-bit and 7-bit codes specified here has the advantage of:

- permitting uniform provision for code structure in the design of information processing systems,
- providing standardized methods of calling into use agreed sets of characters,
- allowing the interchange of data between environments that utilise 8-bit and 7-bit codes respectively,
- reducing the risk of conflict between systems required to inter-operate.

When two systems with different levels of implementation of code structure facilities are required to communicate with one another, they may do so using the code structure facilities that they have in common.

The codes specified here are designed to be used for data that is processed sequentially in a forward direction. Use of these codes in strings of data which are processed in some other way, or which are included in data formatted for fixed-length record processing, may have undesirable results or may require additional special treatment to ensure correct interpretation.

Note - Since the previous edition (1986) of this International Standard the text has been completely rearranged and rewritten to make the Standard more convenient to use as a reference document. It is now arranged in three main sections as follows:

- 1 General
- 2 Character Sets and Codes
- 3 Code Identification and Escape Sequences

2 Conformance

2.1 Types of conformance

Full conformance to a standard means that all of its requirements are met. Conformance will only have a unique meaning if the standard contains no options. If there are options within the standard they must be clearly identified, and any claim of conformance must include a statement that identifies those options that have been adopted.

This International Standard is of a different nature since it specifies a large number of facilities from which different selections may be made to suit individual applications. These selections are not identified in this International Standard, but must be identified at the time that a claim of conformance is made. Conformance to such an identified selection is known as limited conformance.

The selection of facilities from this International Standard that are to be used in a particular application will generally be included in a specification document, which states the adopted facilities and gives other details necessary to define fully one or more specific codes. Such a specification is said to be in accordance with this International Standard (see 10.1).

2.2 Conformance of information interchange

A CC-data-element within coded information for interchange is in conformance with this International Standard if the coded representations within that CC-data-element satisfy the following conditions:

- a) they shall represent graphic characters, control functions, and code-identification functions in accordance with an identified selection of the facilities specified in this International Standard (i.e. a version of this Standard, see 10.1);
- b) when the code extension techniques specified in this International Standard are used, they shall be implemented by the control functions and code-identification functions defined in this Standard with the meaning and coded representation specified in this Standard;
- c) no coded representation that is either reserved for registration and not assigned, or reserved for future use, shall be used;
- d) no registered escape sequence shall be used with a meaning different from that defined by the registration.

2.3 Conformance of devices

A device is in conformance with this International Standard if it conforms to the requirements of 2.3.1, and either or both of 2.3.2 and 2.3.3 below. Any claim of conformance shall identify the document which contains the description specified in 2.3.1.

2.3.1 Device description

A device that conforms to this International Standard shall be the subject of a description that

- a) identifies either directly, or by reference to a specification that is in accordance with this International Standard, the selection of facilities from this Standard that it can utilize when originating or when receiving CC-data-elements;
- b) identifies the means by which the user may supply the corresponding characters and functions, or may recognize them when they are made available to the user, as specified in 2.3.2 and 2.3.3 respectively.

2.3.2 Originating devices

An originating device shall be capable of transmitting within a CC-data-element the coded representations of graphic characters from one or more graphic character sets, and of an identified selection of control functions and code-identification functions conforming to this International Standard.

Such a device shall allow the user to supply, from an appropriate set, characters or other indications which will implicitly or explicitly determine the graphic characters, control functions, and code-identification functions whose coded representations are to be transmitted.

2.3.3 Receiving devices

A receiving device shall be capable of receiving within a CC-data-element and interpreting the coded representations of graphic characters from one or more graphic character sets, and an identified selection of control functions and code-identification functions conforming to this International Standard.

Such a device shall make available to the user, from an appropriate set, characters or other indications which are implicitly or explicitly determined by the graphic characters, control functions, and code-identification functions whose coded representations are received.

3 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 listed below. Members of IEC and ISO maintain registers of currently valid standards.

ISO 2375:1985, *Data processing - Procedure for registration of escape sequences*.

ISO/IEC 6429:1992, *Information technology - Control functions for coded character sets*.

ISO 8824:1990, *Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)*.

ISO 8825:1990, *Information technology - Open Systems Interconnection - Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)*.

ISO International Register of Coded Character Sets to be Used with Escape Sequences.

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 bit combination: An ordered set of bits used for the representation of characters.

4.2 byte: A bit string that is operated upon as a unit.

Note - Each bit has the value either ZERO or ONE.

4.3 character: A member of a set of elements used for the organization, control or representation of data.

4.4 coded-character-data-element (CC-data-element): An element of interchanged information that is specified to consist of a sequence of coded representations of characters, in accordance with one or more identified standards for coded character sets.

Notes

1 - In a communication environment in accordance with the Reference Model for Open Systems Interconnection of ISO 7498, a CC-data-element will form all or part of the information that corresponds to the Presentation-Protocol-Data-Unit (PPDU) defined in that International Standard.

2 - When information interchange is accomplished by means of interchangeable media, a CC-data-element will form all or part of the information that corresponds to the user data, and not that recorded during formatting and initialization.

4.5 coded character set; code: A set of unambiguous rules that establishes a character set and the one-to-one relationship between the characters of the set and their bit combinations.

4.6 code extension: The techniques for the encoding of characters that are not included in the character set of a given code.

4.7 code table: A table showing the character allocated to each bit combination in a code.

4.8 combining character: A member of an identified subset of a coded character set, intended for combination with the preceding or following graphic character, or with a sequence of combining characters preceded or followed by a non-combining character.

4.9 control character: A control function the coded representation of which consists of a single bit combination.

4.10 control function: An action that affects the recording, processing, transmission or interpretation of data, and that has a coded representation consisting of one or more bit combinations.

4.11 to designate: To identify a set of characters that are to be represented, in some cases immediately and in others on the occurrence of a further control function, in a prescribed manner.

4.12 device: A component of information processing equipment which can transmit, and/or can receive, coded information within CC-data-elements.

Note - It may be an input/output device in the conventional sense, or a process such as an application program or a gateway function.

4.13 escape sequence: A string of bit combinations that is used for control purposes in code extension procedures. The first of these bit combinations represents the control function ESCAPE.

Note - In this International Standard ESCAPE is always referred to as a control character.

4.14 Final Byte: The bit combination that terminates an escape sequence or a control sequence.

4.15 graphic character: A character, other than a control function, that has a visual representation normally handwritten, printed or displayed, and that has a coded representation consisting of one or more bit combinations.

4.16 graphic symbol: A visual representation of a graphic character or of a control function.

4.17 Intermediate Byte: A bit combination which may occur between that of the control character ESCAPE and the Final Byte in an escape sequence.

4.18 to invoke: To cause a designated set of characters to be represented by the prescribed bit combinations whenever those bit combinations occur.

4.19 repertoire: A specified set of characters that are each represented by one or more bit combinations of a coded character set.

4.20 to represent:

- a) To use a prescribed bit combination with the meaning of a character in a set of characters that has been designated and invoked; or
- b) To use an escape sequence with the meaning of an additional control function.

4.21 user: A person or other entity that invokes the services provided by a device.

Notes

- 1 - This entity may be a process such as an application program if the "device" is a code convertor or a gateway function, for example.
- 2 - The characters, as supplied by the user or made available to the user, may be in the form of codes local to the device, or of non-conventional visible representations, provided that 2.3 above is satisfied.

5 Notation, code tables and names

5.1 Notation

The bits of the bit combinations of the 8-bit code are identified by b_8 , b_7 , b_6 , b_5 , b_4 , b_3 , b_2 and b_1 , where b_8 is the highest order, or most-significant, bit and b_1 is the lowest-order, or least-significant, bit.

The bits of the bit combinations of the 7-bit code are identified by b_7 , b_6 , b_5 , b_4 , b_3 , b_2 and b_1 , where b_7 is the highest order, or most-significant, bit and b_1 is the lowest-order, or least-significant, bit.

The bit combinations may be interpreted to represent integers in binary notation, in the range 0 to 255 for the 8-bit code, and in the range 0 to 127 for the 7-bit code, by attributing the following weights to the individual bits:

Bit:	b_8	b_7	b_6	b_5	b_4	b_3	b_2	b_1
Weight:	128	64	32	16	8	4	2	1

In this International Standard, the bit combinations are identified by notations of the form x/y , where x and y are numbers in the range 00 to 15.

The correspondence between the notations of the form x/y and the bit combinations consisting of the bits b_8 or b_7 to b_1 is as follows:

- x for the 8-bit code is the number represented by b_8 , b_7 , b_6 , and b_5 where these bits are given the weights 8, 4, 2 and 1 respectively;

- x for the 7-bit code is the number represented by b_7 , b_6 , and b_5 where these bits are given the weights 4, 2 and 1 respectively;
- y is the number represented by b_4 , b_3 , b_2 and b_1 where these bits are given the weights 8, 4, 2 and 1 respectively.

The notations of the form x/y are the same as those used to identify code table positions, where x is the column number and y is the row number (see 5.2).

5.2 Code tables

An 8-bit code table consists of 256 positions arranged in 16 columns and 16 rows. The columns and rows are numbered 00 to 15 (see figure 1).

A 7-bit code table consists of 128 positions arranged in 8 columns and 16 rows. The columns are numbered 00 to 07 and the rows 00 to 15 (see figure 1).

The code table positions are identified by notations of the form x/y , where x is the column number and y is the row number. By convention, leading zeroes are included in the column and row numbers (e.g. 02/01).

The positions of the code table are in one-to-one correspondence with the bit combinations of the code. The notation of a code table position, of the form x/y , is the same as that of the corresponding bit combination.

	00	01	02	03	04	05	06	07		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
00										00															
01										01															
02										02															
03										03															
04										04															
05										05															
06										06															
07										07															
08										08															
09										09															
10										10															
11										11															
12										12															
13										13															
14										14															
15										15															

7-bit

8-bit

Figure 1 - Code tables

5.3 Names of characters

This International Standard assigns one name to each character. In addition, it specifies an acronym for each control character and for the characters SPACE and DELETE. By convention, only capital letters, space and hyphen are used for writing the names of the characters. For acronyms only capital letters and digits are used. It is intended that the acronyms and this convention be retained in all translations of the text.