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Information technology — Cultural and linguistic interoperability — Definitions and relationship between symbols, icons, animated icons, pictograms, characters and glyphs

Technologies de l'information — Interopérabilité culturelle et linguistique — Définitions et relation entre symboles, icônes, icônes animées, pictogrammes, caractères et glyphes

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Foreword

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The committee responsible for this document is ISO/IEC/JTC 1, *Information technology*, Subcommittee SC 35, *User interfaces*.

Introduction

It seems that many people misunderstand the limits of standardizing each of the concepts covered in this Technical Report. As a case in point, ISO 7000 standardizes graphical symbols with precise shapes, where, for example, the proportions are strictly established, while ISO/IEC 10646 sometimes defines a coded character that maps an existing ISO 7000 symbol (which is practical for searching in technical documentation, for example). However, any single coded character can be represented by a variety of different glyphs, thus open to a variety of shapes and proportions, as long as symbols remain recognizable (a glyph is not standardized for a given coded character in this case, the coding element is standardized unambiguously alongside its name only). Some do not recognize that this is possible; nevertheless, both usages are internationally standardized and used with apparently contradicting requirements.

This Technical Report tries to harmonize the apparent limitations of use of the different concepts involved in the ISO and IEC context.

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1 Scope

This Technical Report clearly defines each term related to ISO and IEC symbology in a single document and harmonizes difference of use and possible correspondence between different objects covering these concepts.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
character
member of a set of elements used for the organization, control, or representation of textual data

Note 1 to entry: A character may be represented by a sequence of one or several coded characters

[SOURCE: ISO/IEC 10646:—, 4.5]

2.2
code point
DEPRECATED: code position
value in the Universal Character Set codespace

[SOURCE: ISO/IEC 10646:—, 4.10]

Note 1 to entry: Values of the Universal Character Set (UCS) codespace are integers (numbers) ranging from 0 to 10FFFF (hexadecimal [base 16] numeric representation)

2.3
coded character
association between a character and a code point

[SOURCE: ISO/IEC 10646:—, 4.8]

2.4
font
collection of glyph images having the same basic design, e.g. Courier Bold Oblique

[SOURCE: ISO/IEC 9541-1:1991]

2.5
glyph
recognizable abstract graphic symbol which is independent of any specific design

[SOURCE: ISO/IEC 9541-1:1991]

2.6
graphic character
character, other than a control function, that has a visual representation normally handwritten, printed, or displayed

[SOURCE: ISO/IEC 10646:—, 4.29]

2.7
graphic symbol
visual representation of a graphic character or of a composite sequence

[SOURCE: ISO/IEC 10646:—, 4.30]

2.8
graphical symbol
visually perceptible figure with a particular meaning used to transmit information independently of language

[SOURCE: IEC 80416-1:2008, 3.4, ISO 17724:2003, 31]

Note 1 to entry: The unique nature of graphical symbols is language independence. Therefore, the use of letters and punctuation marks as graphical symbol elements should be avoided.

Note 2 to entry: Graphical symbols are usually abstract representations that stand for something, but that require learning on the part of users to take on their meaning.

2.9.1
icon
user interface (symbol or object) representing an object or a function of the computer system

[SOURCE: ISO/IEC 11581-10:2010, 3.4, modified]

2.9.2
icon
symbol or combination of symbols in graphical user interfaces representing a function of the computer system

2.9.3
icon
object of manipulation of a function of the computer system through graphical user interfaces for computer applications

Note 1 to entry: Icons should be graphical representations that convey information with a minimum reliance on language.

Note 2 to entry: Icons have dynamic nature depending on the function of the computer system.

Note 3 to entry: Icons may be entirely abstract, such as graphical symbols, or pictorial, such as pictograms, or fall at some point between those extremes.

2.10
pictogram
simplified pictorial representation, used to guide people and tell them how to achieve a certain goal

[SOURCE: ITU-T Recommendation E.121, modified]

Note 1 to entry: Pictograms should be graphical representations that convey information with a minimum of reliance on language.

Note 2 to entry: Pictograms are, as far as possible, self-explanatory, and require little or no learning on the part of users.

Note 3 to entry: Pictorial representation can be two- or three-dimensional.

2.11
symbol
visual (audible or tactile) sign, single letter, numeral, punctuation mark each of which has a fixed meaning

Note 1 to entry: Symbols are usually graphical representations that convey information with little reliance on language.

Note 2 to entry: Symbols are usually abstract representations that stand for something, but that require learning on the part of users to take on their meaning.

Note 3 to entry: Examples of symbols are graphical symbols, graphic symbols, character symbols, chemical symbols, mathematical symbols, musical symbols, sex symbols, status symbols, tactile symbols and audible symbols.

3 Purpose of each different concept

The purpose of a symbol is to carry a meaning. A pictogram is a symbol as simple as possible whose purpose is to carry a symbolic meaning easy to understand for humans, ideally in an intuitive way, independently of language and culture. In ISO and IEC, standardized symbols are codified with strict forms. The purpose of a glyph is similar to that of a symbol, but goes beyond, in that it may also apply to a symbol that has become codified more abstractly over history, as for example glyphs representing letters of an alphabet (which, at the time of publication of this Technical Report, have no meaning by themselves, while a mere symbol is intended to have a meaning). Sets of glyphs usually grouped in a given style are called fonts. The purpose of a character is to group similar glyphs (even of different fonts) so that they all be recognizable as similar by humans, to carry all the same meaning, and to encompass all glyphs with the same meaning. Finally the purpose of a coded character is to codify a character for its transmission and processing (sorting, searching, matching, text structuring, etc.) by computers, independently of their presentation. The purpose of an icon is, on one hand, to codify the computerized visual representation of a symbol, and on the other hand, to represent an entity associated with an object or and action in computer applications.

4 Limits and strengths of each different concept

Symbols standardized under ISO 7000 or IEC 80416-1 are destined to be reproduced directly on equipment (they are typically silk-printed or engraved). Their main limitation is also their strength: they shall be reproduced in their strict proportions and hence cannot be confused with other symbols because no tolerance is allowed. The intent is that once learnt by humans, they are recognized without any doubt.

For computer applications, though, this strength might become a weakness: icons on computers are rendered using pixels, for example, and depending on screen resolution, the exact proportions might not be physically respected. Furthermore, the state of actions and objects (for example: a "trash bin" [metaphor for deleted objects] might be empty, full, available, in the process of being emptied or restored, etc.) are represented by icons that might change shade, colour, even shape, and icons themselves might become animated objects, something that does not happen when a symbol is silk-printed on equipment with exact proportions.

At the other end of the spectrum, in the world of coded characters (standardized under ISO/IEC 10646, the UCS), characters, which might occasionally correspond to ISO symbols (standardized under ISO 7000 or IEC 80416-1), may be represented by any even vaguely corresponding glyph, depending on font style, or on rendition engines, so that humans can recognize them depending on environment, on accessibility requirements, or simply on personal preferences. That said, coded characters have a major strength: they can be searched, sorted, processed, and transformed by machines, without confusion. They can also be interchanged within different coding schemes, provided their character names (the ultimate human identifiers that make two coded characters be considered the same) are shared in these two coding schemes. Because character names may vary between different human languages (and also