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Information technology — Criteria for concept systems

Technologies de l'information — Critères pour les systèmes de concept

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Foreword

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This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

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Introduction

A concept system is a “set of concepts structured in one or more related domains according to the concept relations among its concepts” according to ISO 1087:2019. A concept is defined as a unit of knowledge created by a unique combination of characteristics which are the abstraction of a property of an object or of a set of objects. Concept systems are used to support semantic interoperability and integration in domains, information classification and organization, indexing, retrieval, etc.

Concept systems are used in the description of semantics of data in the ISO/IEC 11179 series of standards. ISO/IEC 11179-1 introduces data element concept, object class, property, conceptual domain and value meaning as concepts. They can be organized through the use of relations among them into concept systems. A classification scheme is represented as a concept system in ISO/IEC TR 11179-2.

There are various types of concept systems, ranging from the simplest concept systems with simple relations among concepts to ontologies with rich formal semantics.

The construction of most controlled vocabularies is based on concept systems. On the basis of the relevant concept system, they add the relationships among terms and establish the relationships among terms and concepts on the basis of semantic characteristics. Concepts are mainly represented by terms. Therefore, the discussion of the types of concept systems is inseparable from the discussion of vocabularies.

Ontologies comprise an important kind of concept system. The goals of ontologies are to capture the knowledge of one or several subject fields and to provide a common understanding. Also, ontologies serve to determine the common terms in the subject field, and to provide a clear understanding of the relations among the relevant concepts based on various levels of formal patterns.

The development of artificial intelligence technology and ontology technology has expanded both the content and the application of the scope of concept systems. The issues regarding the structure, classification, description and application of concept systems are becoming more and more important.

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Information technology — Criteria for concept systems

1 Scope

This document provides the criteria for effective concept systems. It provides the requirements for components, formation, representations, structural levels and management of concept systems. Concept systems are used in the description of semantics of data in ISO/IEC 11179 standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 704, *Terminology work — Principles and methods*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
object
anything perceivable or conceivable

Note 1 to entry: Objects can be material (e.g. 'engine', 'sheet of paper', 'diamond'), immaterial (e.g. 'conversion ratio', 'project plan') or imagined (e.g. 'unicorn', 'scientific hypothesis').

[SOURCE: ISO 1087:2019, 3.1.1]

3.2
property
<terminology>feature of an *object* (3.1)

EXAMPLE 1 'Being made of wood' as a property of a given 'table'.

EXAMPLE 2 'Belonging to person A' as a property of a given 'pet'.

EXAMPLE 3 'Having been formulated by Einstein' as a property of a given '$E=mc^2$'.

EXAMPLE 4 'Being compassionate' as a property of a given 'person'.

EXAMPLE 5 'Having a given cable' as a property of a given 'computer mouse'.

Note 1 to entry: One or more objects can have the same property.

[SOURCE: ISO 1087:2019, 3.1.3, modified — added the domain <terminology>.]

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