INTERNATIONAL STANDARD



First edition 2014-10-01

Graphic notations for concept modelling in terminology work and its relationship with UML —

Part 1: Guidelines for using UML notation in terminology work iTeh STANDARD PREVIEW

S Notations graphiques pour la modélisation des concepts en terminologie et ses relations avec UML —

Partie 1: Lignes directrices pour l'application de la notation UML dans https://standards.iteh.ac.traygil.terminologique94-44a3-4740-81d2d652163fd276/iso-24156-1-2014



Reference number ISO 24156-1:2014(E)

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 24156-1:2014</u> https://standards.iteh.ai/catalog/standards/sist/38519e94-44a3-4740-81d2d652163fd276/iso-24156-1-2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office Case postale 56 • CH-1211 Geneva 20 Tel. + 41 22 749 01 11 Fax + 41 22 749 09 47 E-mail copyright@iso.org Web www.iso.org

Published in Switzerland

Page

Contents

Forew	ord	iv
Introd	luction	v
1	Scope	
2	Normative references	
3	Terms and definitions	
4	Abbreviated terms	
5	Mapping UML symbols to terminological concepts5.1General5.2Concept5.3Concept system5.4Attributes (generalization) and characteristics (generic relation)5.5Type of characteristics and criterion of subdivision5.6Concept relations	3 3 3 3 3 4 5 9
6	Common features of UML used to extend concept modelling. 6.1 General. 6.2 Multiplicity. 6.3 Constraint.	
Annex Biblio	A (informative) Table of correspondence between ISO 1087-1 concepts and their adopted symbols in the ISO 24156-1 user-defined UML profile graphy (standards.iteh.ai)	21

<u>ISO 24156-1:2014</u> https://standards.iteh.ai/catalog/standards/sist/38519e94-44a3-4740-81d2d652163fd276/iso-24156-1-2014

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 37, *Terminology and other language and content resources*, Subcommittee SC 1, *Principles and methods*. ISO 24156-1:2014

 $This first edition of ISO 24156 \pm cancels and replaces ISO/TR-24156:2008, which has been technically revised. \\ d652163 fd276/iso-24156-1-2014$

ISO 24156 consists of the following parts, under the general title *Graphic notations for concept modelling in terminology work and its relationship with UML*:

— Part 1: Guidelines for using UML notation in terminology work

Introduction

Terminology work combines elements from many theoretical approaches which concern the processing, ordering, and presentation of knowledge. The basic method of terminology work is concept analysis, which aims to achieve a comprehensive description and presentation of concepts in a subject field. Traditionally, the results of concept analysis in terminology are presented in the form of one or more concept diagrams and a set of terms with textual definitions.

In object-oriented programming, graphic techniques are used to describe entity types which are characterized by certain properties and behaviour. The Unified Modeling Language (UML) is a widely used formal language which can be used for all kinds of object modelling (information modelling, data modelling, etc.).

This part of ISO 24156 describes the application of UML symbols by providing a user-defined UML profile for presenting the results of concept analysis. This UML profile re-uses UML symbols independent of their normal UML semantics to represent terminological concept diagrams in accordance with the principles of ISO 1087-1 and ISO 704. The use of UML symbols is not meant to become a replacement for traditional concept diagrams, but is intended to be an alternative and supplementary notation. This part of ISO 24156 is meant to promote the use of concept analysis when developing concept diagrams (including concept models), information models, and data models.

The core text describes in which way a user-defined UML profile represents concept diagrams. <u>Annex A</u> contains a table of correspondence between concepts of ISO 1087-1 and suggested representations in UML.

ISO/IEC 19505-1 and ISO/IEC 19505-2 are referenced in this part of ISO 24156. In ISO/IEC 19505-1 and ISO/IEC 19505-2, there is no "Terms and definitions" clause. Instead, every UML concept is described in the normative text. When a reference to ISO/IEC 19505-2 is given in the "Terms and definitions" clause, the definition given in this part of ISO 24156 is adapted from the descriptive text in ISO/IEC 19505-2. Therefore, the definition is noted "Adapted from ISO/IEC 19505-2".

https://standards.iteh.ai/catalog/standards/sist/38519e94-44a3-4740-81d2d652163fd276/iso-24156-1-2014

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>ISO 24156-1:2014</u> https://standards.iteh.ai/catalog/standards/sist/38519e94-44a3-4740-81d2d652163fd276/iso-24156-1-2014

Graphic notations for concept modelling in terminology work and its relationship with UML —

Part 1: Guidelines for using UML notation in terminology work

1 Scope

This part of ISO 24156 gives guidelines for using a subset of UML symbols independent of their normal UML meaning, to represent concepts in concept models that result from concept analysis. It describes how UML symbols can be used for that. A UML profile designed for this purpose is used to represent concepts and concept relations in terminology work.

This part of ISO 24156 does not describe UML and its general use in depth. These matters are covered in ISO/IEC 19505-1 and ISO/IEC 19505-2.

This part of ISO 24156 does not describe the principles and methods of terminology work. This is covered in ISO 704.

This part of ISO 24156 does not define the fundamental concepts of terminology work. This is covered in ISO 1087-1. (standards.iteh.ai)

2 Normative references ISO 24156-1:2014

https://standards.iteh.ai/catalog/standards/sist/38519e94-44a3-4740-81d2-The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 704:2009, Terminology work — Principles and methods

ISO 1087-1:2000, Terminology work — Vocabulary — Part 1: Theory and application

ISO 10241-1, Terminological entries in standards — Part 1: General requirements and examples of presentation

ISO/IEC 19505-1:2012, Information technology — Object Management Group Unified Modeling Language (OMG UML) — Part 1: Infrastructure

ISO/IEC 19505-2:2012, Information technology — Object Management Group Unified Modeling Language (OMG UML) — Part 2: Superstructure

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1087-1 and the following apply.

3.1

concept diagram

graphic representation of a concept system

[SOURCE: ISO 1087-1:2000, 3.2.12]

3.2

concept model

concept diagram (ISO 1087-1:2000, 3.2.12) formed by means of a formal language (3.6)

3.3

concept model view

image of a defined part of a *concept model* (3.2)

3.4

concept system

set of concepts structured according to the relations among them

[SOURCE: ISO 1087-1:2000, 3.2.11]

3.5

constraint

semantic restriction of model elements

Note 1 to entry: Adapted from ISO/IEC 19505-2:2012, 7.3.10.

Note 2 to entry: A constraint is used to restrict the possible options for a class or a relationship. In concept modelling, constraints can be used to show how concepts/relationships interact and how they are delimited.

EXAMPLE In a generic relation, no more specific concepts than those depicted are possible [constraint {complete}].

3.6

formal language

language whose rules are explicitly established before its use

Note 1 to entry: A formal language is not meant to be spoken. Its purpose is to assure exact communication of information, e.g. between computer systems and between man and computer view.

EXAMPLE Web Ontology Language (OWL) and ards.iteh.ai)

3.7

multiplicity

<u>ISO 24156-1:2014</u>

when used in class diagrams constraint (315) on the range of allowed instances of an object or an attribute d652163fd276/iso-24156-1-2014 [SOURCE: ISO/IEC 14776-151:2010, modified — By replacing "indication of" with "constraint on", this

[SOURCE: ISO/IEC 14776-151:2010, modified — By replacing "indication of" with "constraint on", this terminological entry is made consistent with the other terms and definitions in this part of ISO 24156.]

Note 1 to entry: In concept modelling, a multiplicity constraint specifies how many objects depicted by a certain concept can be related to the objects depicted by another concept, i.e. in an associative or in a partitive relation.

EXAMPLE 1 A characteristic of a month is that it is a period of 28 to 31 days (28..31). Thus, the multiplicity of day with respect to month is "28..31".

EXAMPLE 2 A mouse (pointing device) can or cannot have a ball, depending on whether it is a mechanical or optical mouse. Thus, it has zero balls or one ball (0..1). In that case, the multiplicity itself is a criterion of subdivision, as a mechanical mouse has exactly one ball (1).

Note 2 to entry: Multiplicity applies to attributes as well.

3.8

notation

set of symbols, and the rules for their use, for the representation of data

[SOURCE: ISO/IEC 2382-5:1999, 05.01.01]

3.9

symbol

graphic representation of a concept that has meaning in a specific context

[SOURCE: ISO/IEC 2382-1:1993, 01.02.07]

4 Abbreviated terms

UML Unified Modeling Language

5 Mapping UML symbols to terminological concepts

5.1 General

This clause describes how concepts defined in ISO 1087-1 can be represented in concept modelling by means of a limited set of UML symbols. Features which are not described in this clause are outside the scope of this part of ISO 24156.

Each paragraph describes the principles according to which UML symbols can be used in concept modelling. In this part of ISO 24156, UML symbols are only used as graphic representations, hence are not used to equate UML semantics with ISO 1087-1 semantics.

Table A.1 visualizes ISO 1087-1 concepts and their corresponding UML symbols.

5.2 Concept

For the modelling of a concept, the UML class symbol (ISO/IEC 19505-2:2012, 7.3.7) can be adopted, which is a solid-outline rectangle displaying the class name. The UML class name is centred in boldface and with an initial uppercase character. (If the class name consists of more than one word, the words are joined together and the initial character of every word is capitalized; for designations, please refer to ISO 10241-1.) The designation (ISO 1087-1) of the concept in the user-defined UML profile is centred, in boldface, and in lowercase, except for uppercase characters that constitute part of the normal spelling of the term in a running text (ISO 10241-1). This applies both to individual concepts (ISO 1087-1) and to general concepts (ISO 1087-1).



Figure 1 — Class (class name) and concept (designation)

5.3 Concept system

A concept model (see 3.2) is meant to depict and represent a concept system (see 3.4). A graphic tool can store the concept model in a formal language (see 3.6), making it possible to transform, using a machine-readable format, the concept model to data modelling, information modelling, and software development systems.

EXAMPLE Concept model for pointing devices (see Figure 2).



Figure 2 — Concept model that depicts generic relations for pointing devices

5.4 Attributes (generalization) and characteristics (generic relation)

For concept modelling using UML symbols, the UML class symbol is used (see Figure 1), which is a rectangle. In it, the top compartment displays the class name (centred, in boldface, and capitalized), and the middle one a list of attribute names (left justified, plain face, and lowercase) and attribute types (left justified, plain face, and capitalized). The bottom compartment in the UML class symbol, used to show class operations in ISO/IEC 19505-2:2012, is not used to represent ISO 1087-1 concepts, and is therefore not shown in this International Standard. To convert the class symbol to an ISO-compatible modelling template, a concept is modelled by a rectangle which has equally two compartments, with the top one displaying the designation (in accordance with ISO 10241-1) and the bottom one displaying the characteristics.



Figure 3 — Attributes and characteristics in UML and in the ISO 24156-1 user-defined UML profile

An ellipsis indicates that there are elements which are not shown in the concept model (see Figure 4).



Figure 4 — Attributes and characteristics in UML and in the ISO 24156-1 user-defined UML profile

5.5 Type of characteristics and criterion of subdivision

A type of characteristics is defined as a category of characteristics which serves as the criterion of subdivision when establishing concept systems. The criterion of subdivision is defined as a criterion according to which a superordinate concept is divided into subordinate concepts. With UML notation, a criterion of subdivision can be represented using two generalization set notations (ISO/IEC 19505-2:2012, 7.3.20) (see Figures 5 and 6).

To visualize classes and their relationships in a class diagram, together with their criteria of subdivision, UML uses two different notations that can be considered equivalent to the criterion of subdivision in ISO terminology (ISO 1087-1; ISO 704). Either a common generalization arrowhead is used in combination with the name of the relevant generalization set, or a dashed line is drawn across those lines with separate arrowheads that belong to the same generalization set (ISO/IEC 19505-2:2012, 7.3.20). To represent the above UML notation with an equivalent ISO notation (ISO 704:2009, 5:5:2:2!1), the criterion of subdivision is displayed in full wording, either in combination with a common generalization arrowhead or with a dashed line across separate generalization arrowheads (see Figures 5, 6 and 7).

The ISO notation adopts the UML notation in the following mode: the criterion of subdivision is displayed by placing its name next to the relevant generic relation arrow(s), using a dashed line where more than one generic relation arrows are involved. The arrow(s) in turn link(s) the generic concept to its specific concepts by the UML generalization symbol.



Figure 5 — Criterion of subdivision: ISO 704 > ISO 24156-1 user-defined UML profile

ISO 24156-1:2014(E)

In this ISO 24156-1 user-defined UML profile, the types of characteristics (criteria of subdivision) are the equivalent of the UML generalization sets which refer to the attributes of the superclass. In UML subclasses, attributes are complemented by attribute types and by values. For the concept model, the UML attribute-value strings of subclasses are kept to visualize the characteristics in the user-defined UML profile at hand (see Figures 8 and 9). Figures 8 and 9 adopt the UML template, superpose the corresponding rectangles (classes versus concepts), and propose a user-defined UML profile to represent the terminological principles of ISO 704.



Figure 6 — Modelling of classes with "attribute = value" strings in UML