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**Terminology work — Principles and  
methods**

*Travail terminologique — Principes et méthodes*

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## 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.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 704 was prepared by Technical Committee ISO/TC 37, *Terminology and other language and content resources*, Subcommittee SC 1, *Principles and methods*.

This third edition cancels and replaces the second edition (ISO 704:2000), which has been technically revised.

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## 0 Introduction

### 0.1 Overview

The terminological principles and methods provided in this International Standard are based on current thinking and practices in terminology work.

Terminology work is multidisciplinary and draws support from a number of disciplines (e.g. logic, epistemology, philosophy of science, linguistics, translation studies, information science and cognitive sciences) in its study of concepts and their representations in special language and general language. It combines elements from many theoretical approaches that deal with the description, ordering and transfer of knowledge.

The terminology work dealt with in this International Standard is concerned with terminology used for unambiguous communication in natural, human language. The goal of terminology work as described in this International Standard is, thus, a clarification and standardization of concepts and terminology for communication between humans. Terminology work may be used as input for information modelling and data modelling, but this International Standard does not cover the relation with these fields.

In line with the current trend in standardization towards providing guiding principles, this International Standard is intended to standardize the essential elements for terminology work. The general purposes of this International Standard are to provide a common framework of thinking and to explain how this thinking should be implemented by an organization or group.

It is further intended to provide assistance to those involved in terminology management. The principles and methods should be observed not only for the manipulation of terminological information but also in the planning and decision-making involved in managing a stock of terminology. The main activities include, but are not limited to, the following:

- identifying concepts and concept relations;
- analysing and modelling concept systems on the basis of identified concepts and concept relations;
- establishing representations of concept systems through concept diagrams;
- defining concepts;
- attributing designations (predominantly terms) to each concept in one or more languages;
- recording and presenting terminological data, principally in print and electronic media (terminography).

Objects, concepts, designations and definitions are fundamental to terminology work and therefore form the basis of this International Standard. Objects are perceived or conceived and abstracted into concepts which, in special languages, are represented by designations and/or definitions. The set of designations belonging to one special language constitutes the terminology of a specific subject field.

### 0.2 Conventions and notation

In this International Standard and for the English language, 'terminology work' designates the discipline; 'terminology' used in the plural or preceded by an article refers to the set of designations of a particular subject field, such as legal terminology.

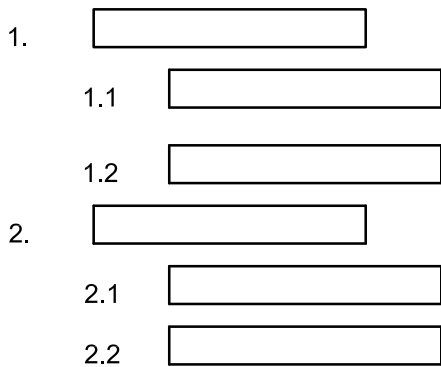
For the sake of consistency in reference to objects, concepts, definitions, and designations, the following wording conventions are used in this International Standard:

- objects
  - are **perceived** or **conceived**;
  - are **abstracted** or **conceptualized** into concepts;
- concepts
  - depict** or **correspond to** objects or sets of objects;
  - are **represented** or **expressed in language** by designations or by definitions;
  - are **organized** into **concept systems**;
- designations (terms, appellations or symbols)
  - designate** or **represent** a concept;
  - are **attributed** to a concept;
- definitions
  - define, represent** or **describe** the concept.

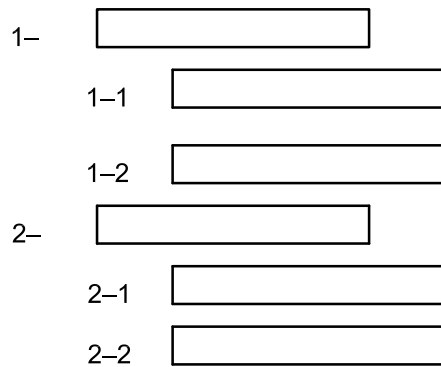
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The more complex a concept system is, the more useful it is to clarify relations among concepts by representing them formally or graphically. Concept relations can be represented formally in a list. The formal representations used in this International Standard are indented and numbered with a full stop (period) (.) for generic relations and numbered with a dash (–) for partitive relations as in the following models:

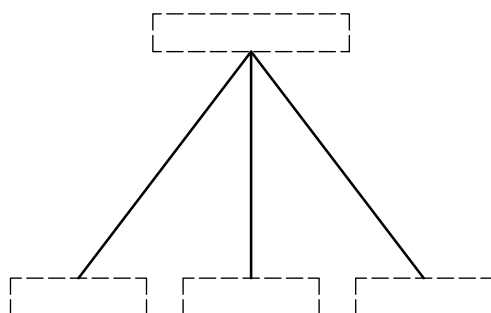
For generic relations:



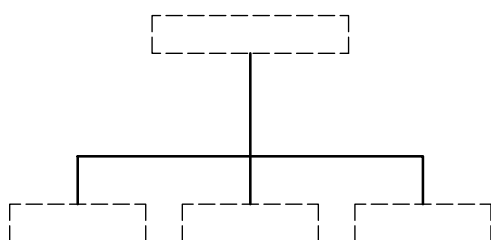
For partitive relations:



The graphic representations used in this International Standard are the most typical ones. The use of UML (Unified Modeling Language) notation for terminology work is described in ISO/TR 24156.



tree diagram to represent generic concept relations



rake diagram to represent partitive concept relations



line with arrowheads at each end to represent associative concept relations

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The notation used throughout this International Standard is as follows:

- terms designating concepts defined in ISO 1087-1:2000 are in italics;
- concepts are indicated by single quotes;
- designations (terms, appellations or symbols) are in boldface;
- characteristics are underlined;
- examples are boxed.

This International Standard follows the ISO/IEC Directives, Part 2, 2004 with regard to the use of “shall”, which indicates a requirement and the use of “should”, which indicates a recommendation.

It should be noted that the examples in this International Standard have been chosen and simplified for illustrative purposes. Translation into other languages may necessitate the selection of other examples to illustrate the points.

It should also be noted that the examples of term-formation methods, in Annex B, are specific to the English language in the English version and to the French language in the French version. Annex B should not be translated, but should be adapted to the needs of each language.

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# Terminology work — Principles and methods

## 1 Scope

This International Standard establishes the basic principles and methods for preparing and compiling terminologies both inside and outside the framework of standardization, and describes the links between objects, concepts, and their terminological representations. It also establishes general principles governing the formation of terms and appellations and the formulation of definitions. Full and complete understanding of these principles requires some background knowledge of terminology work. The principles are general in nature and this International Standard is applicable to terminology work in scientific, technological, industrial, administrative and other fields of knowledge.

This International Standard does not stipulate procedures for the layout of international terminology standards, which are treated in ISO 10241.

## 2 Normative references

The following referenced documents are indispensable for the application 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 1087-1, *Terminology work — Vocabulary — Part 1: Theory and application*

## 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

#### **stipulative definition**

definition which results from adapting a lexical definition to a unique situation for a given purpose and which is not standard usage

### 3.2

#### **ostensive definition**

demonstrative definition

definition which exhibits one or more representative object(s) in the extension of the concept

### 3.3

#### **specialized concept**

concept which reflects specific or technical knowledge within a given subject field

**3.4**  
**terminological resource**  
**terminological data collection**  
**TDC**

text or data resource consisting of terminological entries

NOTE Adapted from ISO 26162:—<sup>1</sup>).

**3.5**  
**terminology product**

product that supports special language use or the field of terminology

NOTE Products that support special language use refer to dictionaries, databases, and other products for the dissemination of specialized terminology while products that support the field of terminology refer to journals, training manuals, tools, etc.

[ISO 22128:2008, definition 3.13]

**3.6**  
**terminographical product**

terminology product consisting of a set of designations and terminological and/or linguistic information to support special language use

[ISO 22128:2008, definition 3.9]

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**4 Objects**

In *terminology work*, an *object* is defined as anything perceived or conceived. Some *objects*, such as a machine, a diamond, or a river, should be considered concrete or material; others, such as each manifestation of financial planning, gravity, fluidity, or a conversion ratio, should be considered immaterial or abstract; still others, for example, a unicorn, a philosopher's stone, or a literary character should be considered purely imaginary. In the course of producing a *terminology*, philosophical discussions on whether an object actually exists in reality are unproductive and should be avoided. Attention should be focused on how one deals with *objects* for the purposes of communication.

*Objects* are described and identified by their properties (see example in 5.4.1), but neither properties of specific *objects* nor the *objects* themselves are recorded in the terminological resource.

**5 Concepts**

**5.1 Nature of concepts for terminology work**

In communication, not every individual *object* in the world is differentiated and named. Instead, through observation and a process of abstraction called conceptualization, *objects* are categorized into classes, which correspond to units of knowledge called *concepts*, which are represented in various forms of communication (*object* → *concept* → communication). This International Standard does not deal with all *concepts* represented in language but only with those represented by the *terminology* of specialized fields. For *terminology work*, *concepts* shall be considered mental representations of *objects* within a specialized context or field.

*Concepts* are not to be confused with abstract or imagined *objects* (i.e. concrete, abstract or imagined *objects* in a given context are observed and conceptualized mentally and then a *designation* is attributed to the *concept* rather than to the *objects* themselves). The link between an *object* and its corresponding *designation* or *definition* is made through the *concept*, a higher level of abstraction.

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1) To be published.

Producing a *terminology* requires an understanding of the conceptualization that underpins human knowledge in a subject area. Because *terminology work* always deals with specialized language in a particular field of knowledge (i.e. a *subject field*), the *concept* should be viewed not only as a unit of thought but also as a unit of knowledge.

The *concepts* contextualized in the *special language* of the *subject field* can be represented in the various forms of human communication according to the system used. In natural language, *concepts* can be represented by *terms*, *appellations*, *definitions* or other linguistic forms; they may also be represented by symbols; in artificial language, they can be represented by codes or formulae, while in multimedia they can be represented by icons, pictures, diagrams, graphics, sound clips, video or other multimedia representations. *Concepts* may also be represented with the human body as they are in sign language, facial expressions or body movements. This International Standard does not deal with the representation of *concepts* by sign or body language.

*Concepts* are described and identified by their *characteristics* (see 5.4.2, Example 2).

## 5.2 General concepts

When a *concept* depicts or corresponds to a set of two or more *objects* which form a group by reason of common properties, it is called a *general concept* and, in *special languages*, the *designation* takes the form of a *term* (e.g. floppy disk, liquidity, money market fund, etc.) or a symbol (e.g. ©, W, \$).

## 5.3 Individual concepts

When the *concept* depicts or corresponds to a single *object* or when an *object* comprising a unique composition of entities is considered a single entity, it is called an *individual concept* and is represented in *special language* as an *appellation* (e.g. United Nations, Internet, World Wide Web) or a

symbol (e.g.  Africa,  Statue of Liberty). *Appellations* refer to individual concepts and comprise names, titles and other similar forms and shall be distinguished from *terms* that refer to *general concepts*.

It follows that any unique object shall be considered an *individual concept*. When an *individual concept* is designated by an *appellation* constructed by conjoined entities, it is still considered an *individual concept* even though conjoined words or *terms* usually signal more than one *concept*.

### EXAMPLE

A conjoined multi-name *appellation* in which there is elision of the headword can be viewed as a single *individual concept*. For example, a whole with X parts, as in the case of **North, Central, and South America** (a single region made up of the three parts) as opposed to the three *appellations* 'North America', 'Central America', and 'South America', which are viewed as three separate *individual concepts*.

A multi-word *appellation* with conjoined modifiers is to be interpreted as a single entity and it designates an *individual concept*, for example: The **Canadian Radio-television and Telecommunications Commission** is to be interpreted as one entity, not two, i.e. not as the 'Canadian Radio-television Commission' and the 'Canadian Telecommunications Commission'. Similarly, **Sunnybrook and Women's Colleges Health Sciences Centre** is one entity.

An *individual concept* in a generic *concept system* cannot be subdivided further, while an *individual concept* in a partitive *concept system* can be subdivided into its parts (see 5.5.2.2.2 and 5.5.2.3.2).

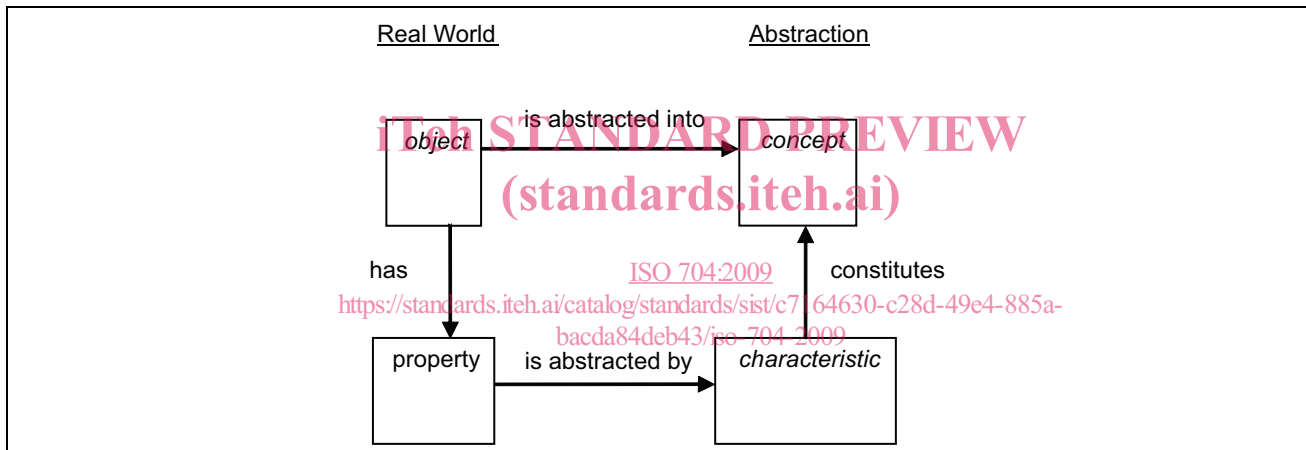
5.4 Characteristics

5.4.1 Nature of characteristics

Concept formation plays a pivotal role in organizing human knowledge because it provides the means for recognizing *objects* and for grouping them into meaningful units in a particular field. In order to categorize an *object* for the purposes of *concept* formation, it is necessary to identify its properties (see the example below). *Objects* perceived as sharing the same properties are grouped into units. Once similar *objects*, or occasionally a single *object*, are viewed as a meaningful unit of knowledge within a branch of human knowledge, the properties of an *object*, or those common to a set of *objects*, are abstracted as *characteristics* that are combined as a set in the formation of a *concept*.

Thus, *objects* in the real world are identified by their properties. The *objects* are then abstracted as *concepts* and the properties are abstracted as *characteristics* making up the *concepts*. Abstraction is the process of recognizing some set of common features in an individual set of *objects* and, on that basis, forming a *concept* of that set of *objects*. *Characteristics* are qualifiers and narrow the meaning of a *superordinate concept* (see 5.5.2.1). It should be noted that '*characteristic*' is a linguistic *concept* which should not be confused with the information technology (IT) *concept* 'property'.

EXAMPLE



The relations between these four *concepts* might be further elucidated by the following statements.

- Each *object* has one or multiple properties.
- Each property of a similar kind is abstracted into one *characteristic*.
- Each *characteristic* is part of one or multiple *concepts*.
- Each *concept* is constituted by one or multiple *characteristics*.
- Each *object* is abstracted into one or multiple *concepts*.

5.4.2 Terminological analysis

The coming together of a unique set of *characteristics* to make a *concept* is an everyday occurrence. The *concept* made up of this set of *characteristics* is represented by a *designation* (i.e. a *term*, *appellation* or symbol). Since a *designation* is not attributed to an *object* but to a *concept*, the latter depicting one or more *objects*, terminological analysis is based upon a representation of the *concept* in the form of a *designation* or a *definition*. Therefore, the methodology used in the analysis of *terminologies* requires:




- identifying the context or *subject field*;
- identifying the properties attributed to *objects* in the *subject field*;

- determining those properties which are abstracted into *characteristics*;
- combining the *characteristics* to form a *concept*;
- attributing a *designation*.

It should also be noted that the properties used to state properties that describe an *object* and the *characteristics* that make up a *concept* designate in themselves *concepts*, sometimes within the same specialized field, sometimes not. It may be useful to begin an analysis with those *concepts* corresponding to concrete *objects*, since the *characteristics* are more easily abstracted given that the properties of the *objects* can be physically observed or examined.

In an abstract way, terminological analysis should begin with the *objects* in question and the *subject field* contextualizing those *objects*. Properties shall be ascribed only to *objects*. A terminologist begins by analysing discourse texts which refer to *objects* to see how they are designated in language. By analysing a certain number of discourse texts, the terminologist can get an understanding of the properties of the various referents in the different discourse texts, so as to determine those properties that can be abstracted as *characteristics*, as opposed to those properties that are unique to an individual object and, therefore, cannot be seen as *characteristics*.

## EXAMPLE 1

The specific <i>objects</i> designated by the visual representations below have the following specific properties:		
		
<ul style="list-style-type: none"> <li>— a device;</li> <li>— ivory-coloured;</li> <li>— hand-manoeuvred along a firm, flat surface;</li> <li>— has a ball on its underside;</li> <li>— has three buttons;</li> <li>— has a wire for connecting to a computer;</li> <li>— rollers detect the movement of the ball;</li> <li>— the ball controls the movement of a cursor on a computer display screen.</li> </ul>	<ul style="list-style-type: none"> <li>— a device;</li> <li>— blue and grey;</li> <li>— hand-manoeuvred along a firm, flat surface;</li> <li>— has a ball on its underside;</li> <li>— has two buttons;</li> <li>— has a wire for connecting to a computer;</li> <li>— rollers detect the movement of the ball;</li> <li>— the ball controls the movement of a cursor on a computer display screen.</li> </ul>	<ul style="list-style-type: none"> <li>— a device;</li> <li>— black-grey;</li> <li>— hand-manoeuvred along a firm, flat surface;</li> <li>— has a ball on its underside;</li> <li>— has two buttons;</li> <li>— has a wire for connecting to a computer;</li> <li>— rollers detect the movement of the ball;</li> <li>— the ball controls the movement of a cursor on a computer display screen.</li> </ul>

If the *objects* in Example 1 are contextualized in the field of computer hardware, these particular *objects* are recognized as belonging to the set of *objects* that has been conceptualized as 'mechanical mouse'. In the process of conceptualization, the properties of all the *objects* in the category are abstracted into *characteristics*, that is, the properties of the *objects* are converted into generalizations applied to the entire set as opposed to the individual *objects*, as illustrated in Example 2.

To facilitate this analysis, the properties of *objects* may be grouped into categories such as part, function, composition, colour, shape, operation, location. Categories appropriate to the *subject field* can be found from reference works and encyclopedias, but any list has to be used flexibly, and it should be assumed that additional categories are likely to be needed to adequately represent all the properties. For practical purposes, beginning with one of the more typical *objects* is recommended. The identification of *characteristics* shall be based on specialized knowledge in the field and this often requires research. Experienced terminologists for whom the *concept* in question is clear and straightforward may move directly to identifying the *characteristics*.

The following example is a preliminary analysis of the *concept* 'mechanical mouse'. *Concepts* denoting non-physical *objects*, e.g. 'bankruptcy', shall be analysed along the same lines.

EXAMPLE 2

<b>Concept:</b> abstraction based on the set of all mechanical mice			
<b>Designation (term):</b> mechanical mouse			
Properties of Object 1	Properties of Object 2	Properties of Object 3	Characteristics
hand-manoeuvred along a firm, flat surface	hand-manoeuvred along a firm, flat surface	hand-manoeuvred along a firm, flat surface	<u>being hand-manoeuvred along a firm, flat surface</u>
has a ball on its underside	has a ball on its underside	has a ball on its underside	<u>having a ball on its underside</u>
has three buttons	has two buttons	has three buttons	<u>having at least one button</u>
has a wire for connecting to a computer	has a wire for connecting to a computer	has a wire for connecting to a computer	<u>having a wire for connecting to a computer</u>
rollers detect the movement of the ball	rollers detect the movement of the ball;	rollers detect the movement of the ball	<u>having rollers (mechanical sensors) for detecting ball-movement</u>
ivory-coloured	blue	black	<u>having colour</u> NOTE This <i>characteristic</i> is inherited from a <i>superordinate concept</i> at a very high level, e.g. 'physical object'.

*Characteristics* shall be used in the analysis of *concepts*, the modelling of *concept systems*, and in the formulation of *definitions* and, where appropriate, should have a bearing on the selection and formation of *designations*.

Note that in selecting properties and *characteristics*, these purposes need to be borne in mind, since the number of properties that distinguish one *object* from another is effectively infinite. So, for example, in the case of computer mice, one might observe that place of manufacture is a *characteristic* which need not be considered. Again, the experienced terminologist will be well-placed to anticipate what is likely to be required.

5.4.3 Intension and extension

The set of *characteristics* that come together to form the *concept* is called the *intension* of the *concept*. The set of *objects* conceptualized as a *concept* is known as the *extension* of the *concept*. The two, the *intension* and the *extension*, are interdependent. For example, the *characteristics* making up the *intension* of 'mechanical mouse' determine the *extension* or the *objects* that qualify as mechanical mice.

5.4.4 Shared vs. delimiting characteristics

After identifying the *characteristics* that make up the *intension* of a *concept*, the terminological analysis shall be taken a step further. Each *characteristic* of the *concept* under study shall be analysed in relation to the related *concepts* in the *concept system*. Similarities between *concepts* are indicated by shared *characteristics*; differences that set a *concept* apart are signalled by *delimiting characteristics* (see 5.5.2.2.1, Example 4). A *characteristic* is delimiting with respect to two *concepts* if it distinguishes these *concepts* from each other. The same *characteristic* of a *concept* may be delimiting in relation to one related *concept* but shared with another related *concept*. Analysing the similarities and differences between *concepts* will result in identifying

the unique set of *characteristics* that typify a given *concept*. Specification of this unique combination of *characteristics* will situate the *concept* within a network of related *concepts* with similar or different *characteristics*. The relations between the *concepts* shall be used to determine the basic structure of a *concept system* (see 5.6). The task of defining a *concept* requires knowledge of the *characteristics* used to develop the *concept system*.

#### 5.4.5 Necessary, sufficient, and essential characteristics

In some fields, e.g. IT and logic, a distinction is made between necessary, sufficient, and *essential characteristics* and, while they are not relevant to *terminology work*, they are described here for informative purposes.

Necessary *characteristics* hold for all *objects* in the *extension* of a *concept*, i.e. they correspond to properties that all *objects* in the *extension* must have.

##### EXAMPLE 1

Consider the *concept* of 'right-angled triangle with sides 3, 4 and 5 cm'. For all *objects* in the *extension* of this *concept*, all the *characteristics* below necessarily hold, i.e. all *objects* have the corresponding properties. These are necessary *characteristics* of the *concept*.

##### Characteristics

Length of one side of the right angle: 3 cm  
Length of the other side of the right angle: 4 cm  
Length of hypotenuse: 5 cm

##### Properties of any object in the extension

Length of one side of the right angle: 3 cm  
 Length of the other side of the right angle: 4 cm  
 Length of hypotenuse: 5 cm

NOTE For all right-angled triangles, it holds that

$$a^2 + b^2 = c^2$$

where  $a$ ,  $b$  and  $c$  are the lengths of three sides in the triangle. Therefore, the length of one side can always be calculated from the length of the other two, and hence any two of the *characteristics* will be enough to uniquely define the *concept*. Note that even though three different *definitions* can be given, the *concept* remains the unique combination of *characteristics* listed above.

A sufficient *characteristic* is one of a set of *characteristics* that determines whether a specific *object* belongs in the *extension* of a given *concept*. A sufficient *characteristic* is not necessarily true of all *objects* in the *extension* of the *concept*, but any *object* having the properties corresponding to the *characteristics* in this set belong to the *extension* of the *concept*.

##### EXAMPLE 2

Any *object* that has the properties corresponding to the *characteristics* having given birth and being human belongs in the *extension* of the *concept* 'woman', but not all women have given birth.

NOTE Since sufficient *characteristics* do not necessarily hold of all *objects* in the *extension* of a *concept*, they cannot be used to define that *concept*.

An *essential characteristic* is one of a set of *characteristics* that is both necessary and sufficient to determine the *extension* of a *concept*.

##### EXAMPLE 3

At present, the property of being the "fourth day of the month of July" is both necessary and sufficient for an *object* belonging to the *extension* of the *concept* 'Independence Day in the United States of America'.

The distinction between necessary, sufficient, and *essential characteristics* has to do with the identification of the *extension* of *concepts*. *Terminology work* is concerned with the *intension* and *designation* of *concepts*, and in this context necessary, sufficient, and *essential characteristics* are not used.