

# Terminology in ontologies and other lexicographic resources

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# Outline

- What is terminology?
- Terminology in scientific domains
- Object of study of terminology
- Concepts and their relations
- Terms and their formation
- Linguistic resources and ontologies
- Final remarks

# What is terminology?

The term terminology is polysemic:

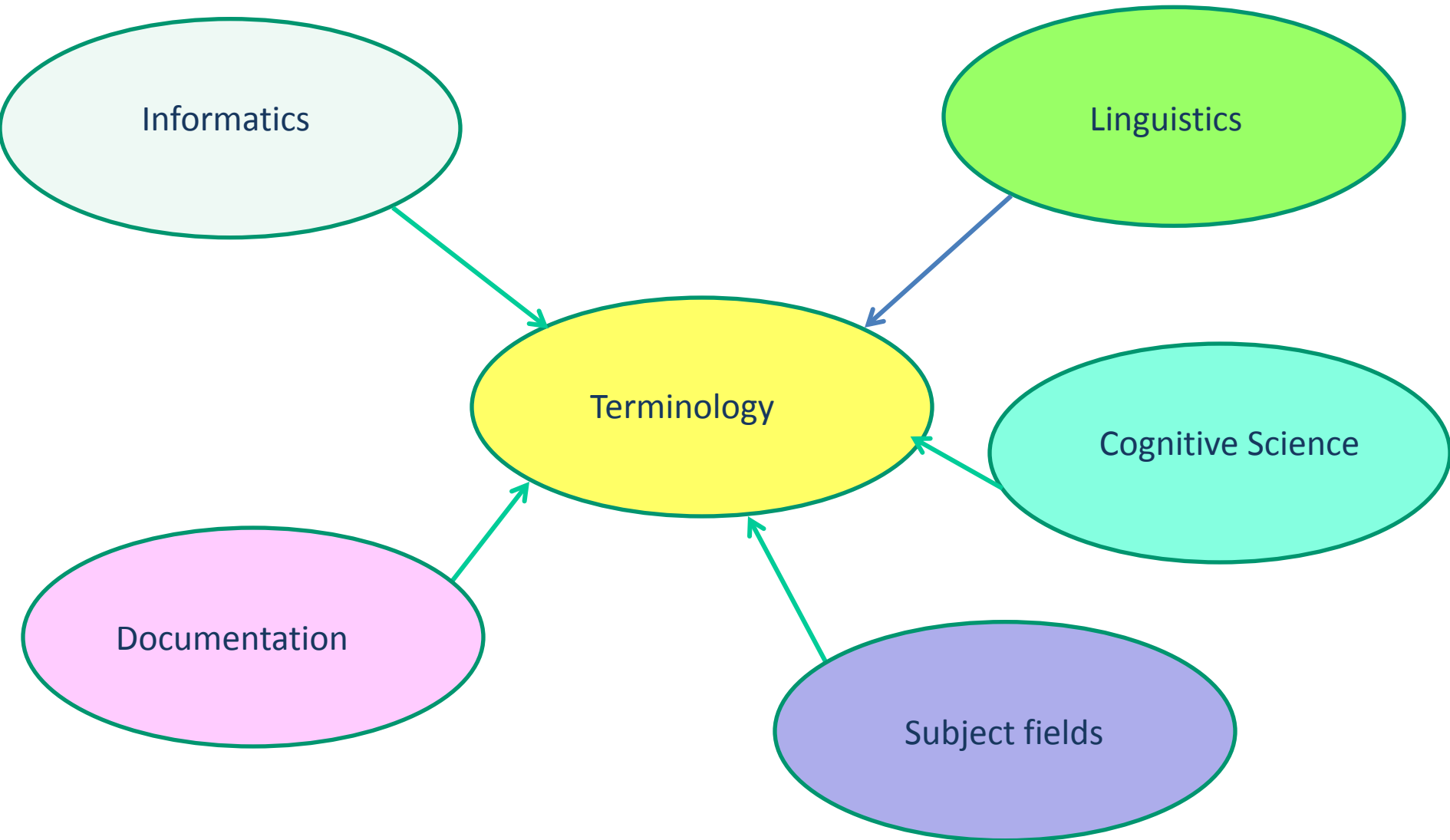
- As a **product**: set of terms from a given subject field.
- As a **discipline**: set of fundamental principles and conceptual bases that govern the study of specialized terms, their description, analysis and relations.
- As a **practice**: set of principles oriented towards term compilation

# Terminology in technical & scientific domains

- No **professional communication** can exist without terminology
- No **knowledge transfer** can exist without terminology
- Without terminology there is not
  - Intellectual and material **development**
  - Professional **research and training**
- As a **consequence**,
  - no further development would take place
  - A country would isolate from the rest of developed countries

(Picht, 1979)

# Terminology: interdisciplinary subject field



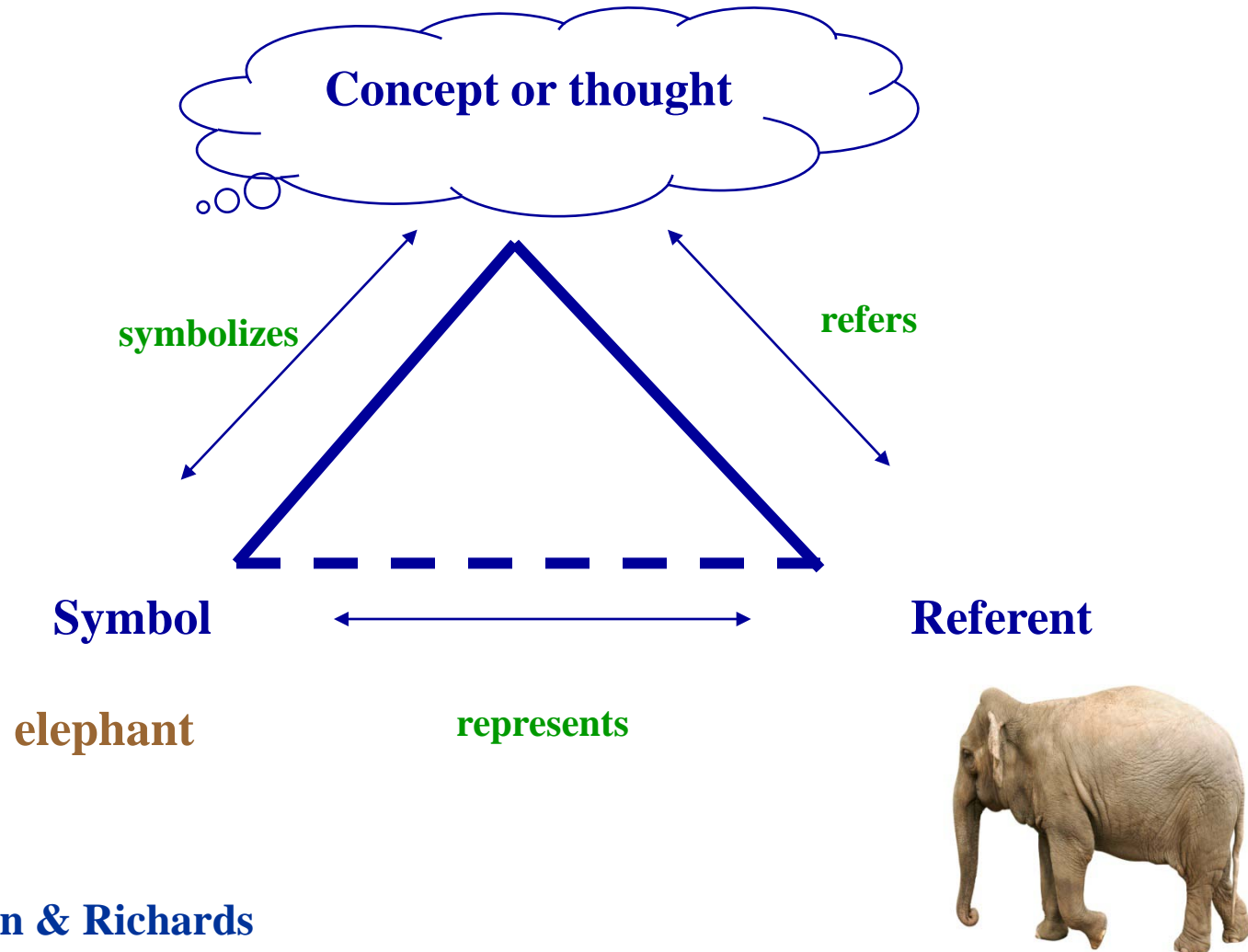
# Object of study in terminology

- Concepts
- Terms
- Relation between terms and concepts
- Definitions (not included in this lesson)

## NOWADAYS

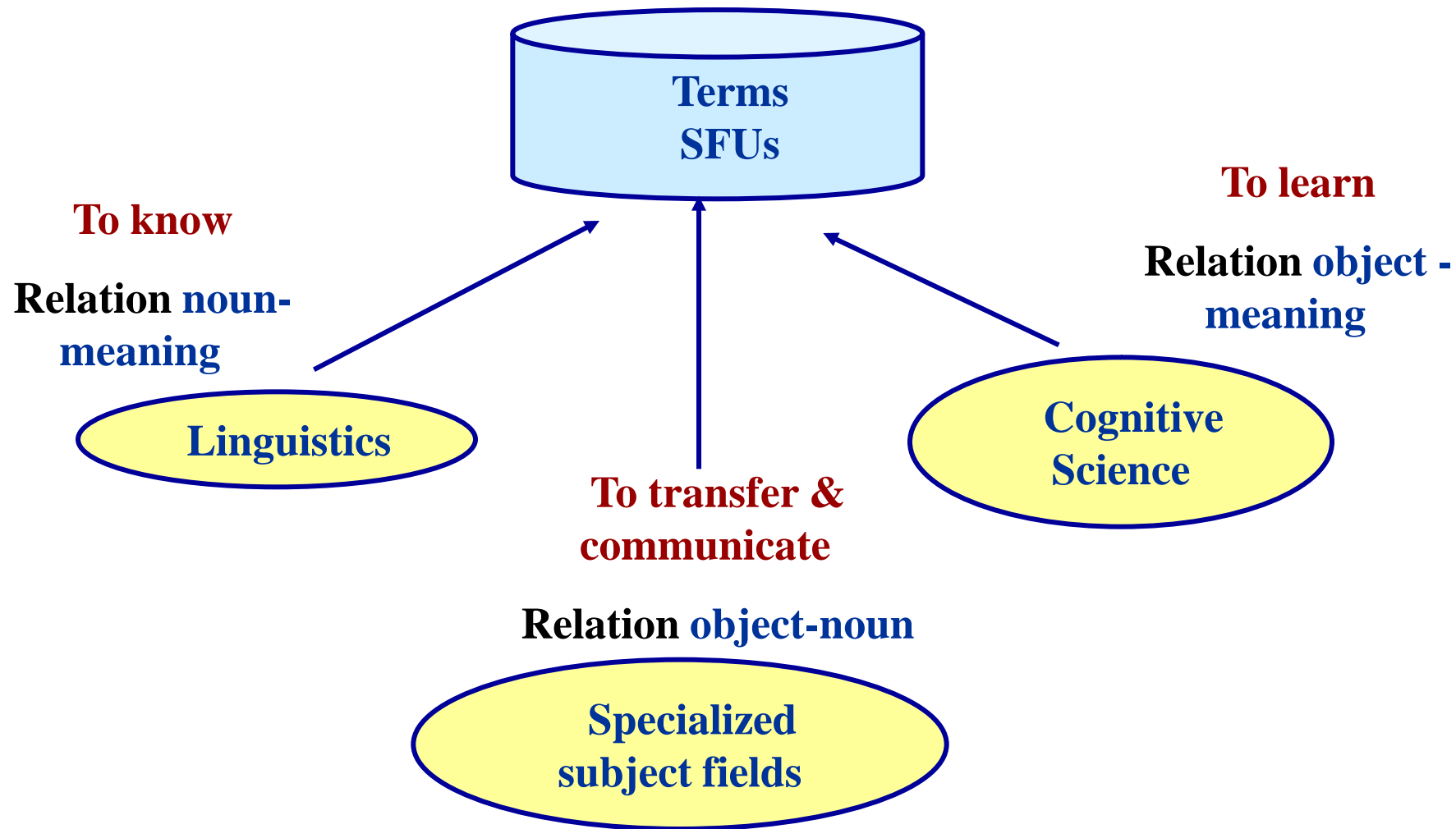
- Emphasis on terminology management:
  - products, tools and applications

# How do we relate terms and concepts?



Ogden & Richards

# The object of study of terminology





# Definition of a concept

- *In general*: Unit of knowledge created by a unique combination of characteristics. ISO 1087- 1 (2000)
- *In terminology*: Concepts shall be considered mental representation of objects within a *specialized context or field* ISO/DIS 704 (2009)
- **BUT** concepts are influenced by social and cultural circumstances given at a certain moment
  - **SO** this can lead to different classifications in the conceptual system
- **Concepts** can be seen as:
  - Units of **thought**: represent and recognize the object mentally
  - Units of **knowledge**: represent knowledge in each subject field
  - Units of **communication**: transmit knowledge by means of linguistic symbols

# Description of a concept

- Concepts are described according to their common **features**, **properties** or **characteristics**, either by **intension** or **extension**
- **Intension**
  - Set of characteristics which makes up the concept (ISO 1087-1: 2000)
  - The bigger the number of common characteristics, the more restricted is the intension.
  - The intension of the concept **winter** in polar countries includes: low temperatures, ice, wind, snow, etc.
- **Extension**
  - Totality of objects to which a concept corresponds (ISO 1087-1: 2000)
  - A general concept has a wide extension as it includes two or more objects by reason of common properties.
  - The extension of the concept **planet** includes: *Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and Pluto.*

# Characteristics of a concept

- “Abstraction of a property of an object or of a set of objects” (ISO 1087-1:2000)
- According to the **importance** in forming a concept
  - **essential**: indispensable to understand and distinguish a concept
    - *The back of a seat distinguishes a stool and a chair.*
  - **complementary**: *colour, material, shape, ...*
- According to the **relation** with the object represented
  - **intrinsic**, which are observable properties:
    - **Shape**: oval, round, narrow, wide, ...
    - **Material**: wooden, stone, metallic, ...
    - **Colour**: red, blue, green, orange...
    - **Position**: vertical, hanging, slanting
  - **extrinsic**, relation of the object with others
    - **Parts** that make up the object: *ball, wire...*
    - **Mode of employment** or application: *analogic, digital, hybrid.*
    - **Origin** or how an object comes into existence: producer, inventor, provider, the place of its production, (town, country), ...



**Concept:** abstraction based on the set of all the characteristics  
of mechanical mice

**Term:** mechanical mouse



- a device;
- ivory-coloured;
- hand-manoeuvred along a firm, flat surface;
- has a ball on its underside;
- has three buttons;
- has a wire for connecting to a computer;
- rollers detect the movement of the ball;
- the ball controls the movement of a cursor on a computer display screen.



- a device;
- blue and grey;
- hand-manoeuvred along a firm, flat surface;
- has a ball on its underside;
- has two buttons;
- has a wire for connecting to a computer;
- without rollers;
- the ball controls the movement of a cursor on a computer display screen.



- a device;
- black-grey;
- hand-manoeuvred along a firm, flat surface;
- has a ball on its underside;
- has two buttons;
- has a wire for connecting to a computer;
- rollers detect the movement of the ball;
- the ball controls the movement of a cursor on a computer display screen.

ISO FDIS 704:2009

# Relations between concepts: hierarchical relations

Close relation between a concept and its characteristics

## A. **GENERIC RELATIONS** (**genus-species** relation) **IS\_A**

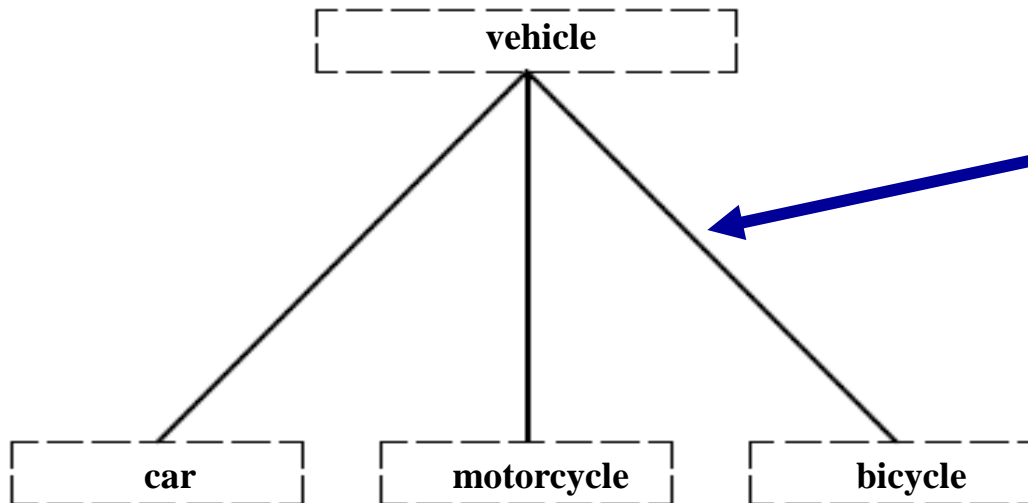
- One of the concepts includes another concept
  - **vertical:** hypernym- hyponym; superordinate –subordinate
  - **horizontal:** two specific ideas of the same generic concept with some distinguishing characteristics
- In thesaurus
  - *Broader than* (BT)
  - *Narrower than* (NT)
  - *Associated to* (AT)



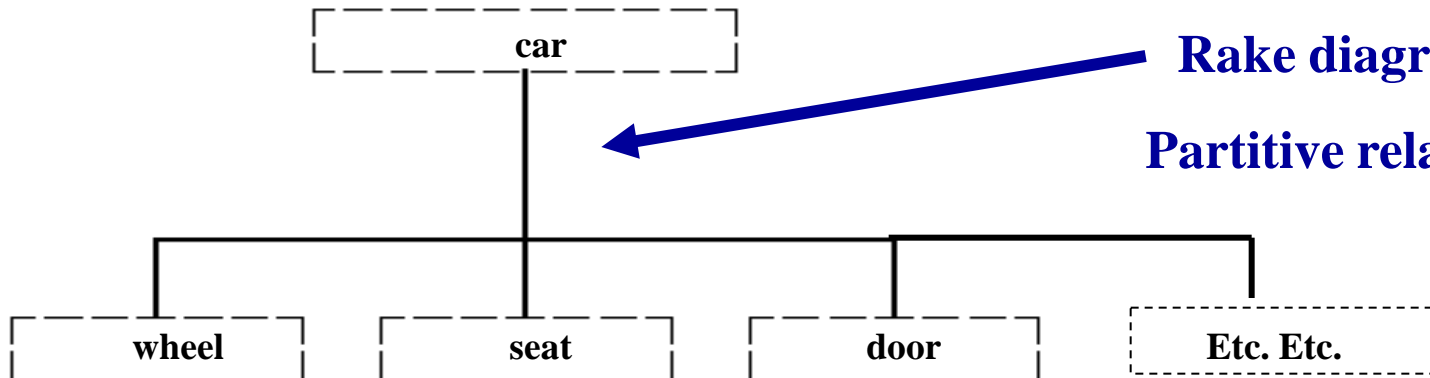
## B. **PARTITIVE RELATIONS** (**part-whole** relation) **PART\_OF**

- These relations are also called **meronimic** (**HAS\_PART**)
  - *Car: wheels, seats, doors, boot, steering wheel, gearbox...*
- Different types of meronimic relations

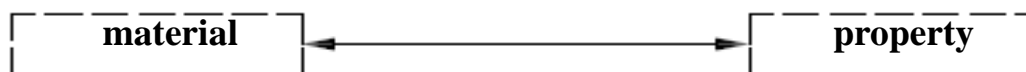




**Tree diagram**  
**Generic concept relations**



**Rake diagrams**  
**Partitive relations**

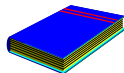


**Line with arrowheads**  
**Associative relations**

# Other Meronymic Relations

Relation	Example
component-object	pedal-bicycle
member-collection	ship-fleet
count-mass	slice (of bread)-bread
material-object	steel-car
phase-activity	pay-buy
place-area	oasis-desert

Winston et al. 1987



Climont, S. 1999 *Individuación e información parte-todo.*  
*Representación para el procesamiento computacional del lenguaje*

# Non-hierarchical relations (associative relations)

- *Caused by* : (acid rain- nuclear explosion)
- *Product of*: (paper- wood pulp)
- *Property of* (compressibility -gas)
- *Quantitative measure* (temperature-heat)
- *Instrument for* (computer- data processing)
- *Counter-agent for* (insecticide- insects)
- *Container of* (toolbox- tools)
- *Method of* (diamond drilling- drilling)
- *Material for* (iron-bridge building)
- *Place for* (coal mine- coal exploitation)
- *Associated with* (production-consumption)

An *associative relation* exists when a thematic connection can be established between *concepts* by virtue of experience.



# How do we express concepts?

- In **natural language** :
  - Terms (one-word or multi-word terms) that denote or refer to a concept in a subject field
  - Definitions
  - Glosses, etc.
- In **artificial language**
  - Codes
  - Formulas
- In a **multimedia resource**:
  - Icons
  - Photos
  - Diagrams
  - Graphs
  - Video-clips
  - Audio-clips
  - Other multimedia representations

# Water in different concept systems

## Chemistry

- molecule-composed compound of two atoms of hydrogen and one atom of oxygen (H<sub>2</sub>O), considered the universal solvent

## Physics

- fluid which is colourless, odourless and tasteless used as the standard of specific gravity and of specific heat which freezes at 0 °C and boils at 100 °C

## Physics

- chemical compound which is colourless, odourless, and tasteless and whose formula is H<sub>2</sub>O and which is naturally found in solid state at temperatures at and below 0 °C, in liquid state at temperatures between 0 °C and 100 °C, and as vapour at temperatures above 100 °C

## Biology

- chemical substance that is essential to all known forms of life

## Metrology

- chemical compound whose freezing and boiling points are the basis for the Celsius temperature scale, where freezing point equals 0 °C and boiling point equals 100 °C at standard atmospheric pressure

## Astrology

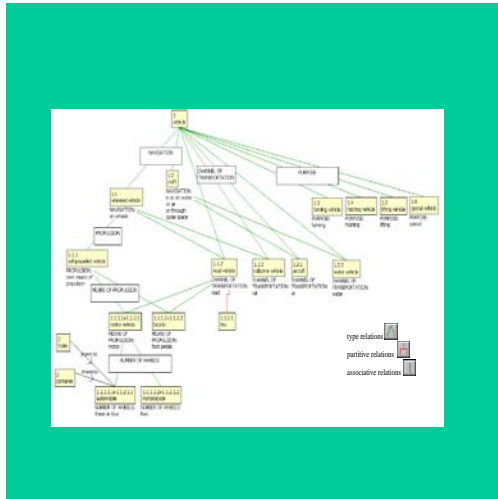
- one of the four elements of life that is associated with the emotional and intuitive processes

# Concept systems

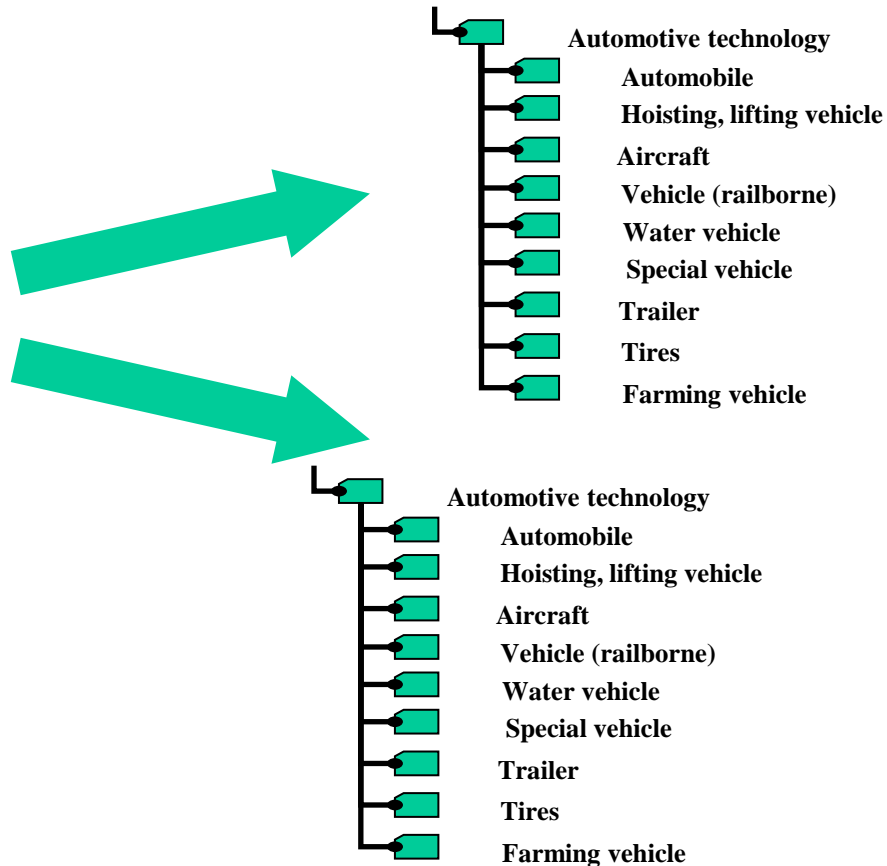
- **Model** *concepts and relations between them based on specialized knowledge of a subject field;*
- **clarify** the relations between *concepts*;
- **form** the basis for a uniform and standardized *terminology*;
- **facilitate** the comparative analysis of *concepts and designations across languages and across subject fields*;
- **facilitate** the writing of *definitions*;
- **facilitate** the inclusion of all relevant *concepts while developing a terminological resource*.

# Classification & concepts

## Concept system



## Classification system(s)

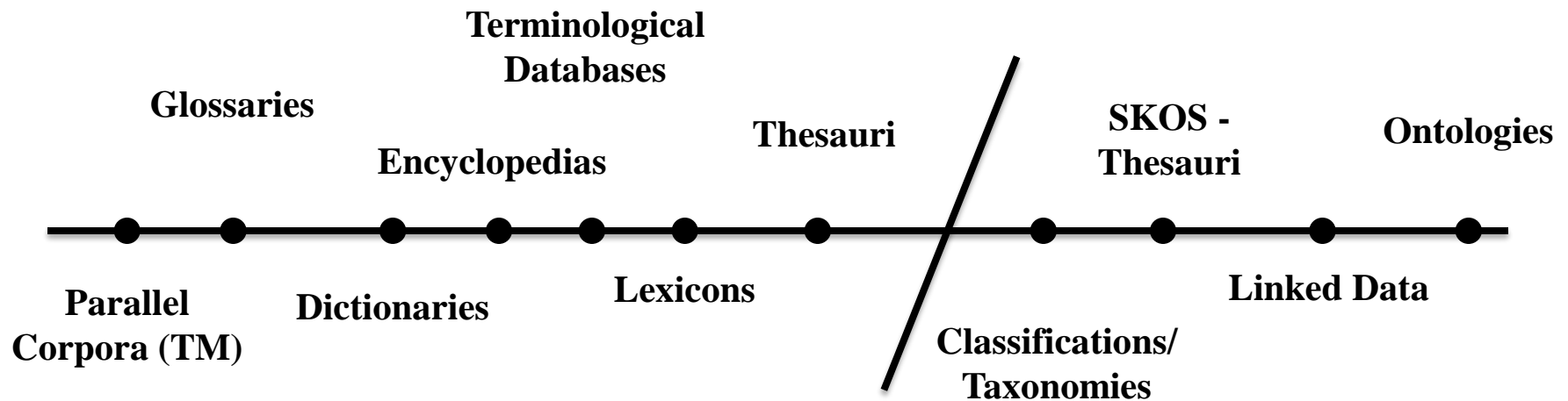


Taken from Reinhard Nerke  
ISO TC SC3, 22274

# Linguistic and conceptual resources

## (a) Linguistic, lexical and terminological resources

## (b) Semantic resources



(inspired by Lassila & McGuinness' Ontology Spectrum)

# (a) Linguistic, lexical and terminological resources

- **Parallel Corpora (Translation Memories – TM):** texts that are translations of each other (as opposed to *comparable corpora*, texts in two languages that are similar in content). Parallel corpora can be better exploited by TM, which align translation equivalents.
- **Glossary:** alphabetical list of terms in a particular domain of knowledge with the definitions for those terms.
- **(Machine-Readable) Dictionary:** alphabetically arranged words along with information about their forms, pronunciations, functions, etymologies, meanings, and syntactical and idiomatic uses.
- **(On-line) Encyclopedia:** like dictionaries, but with the focus on factual information
- **(Computational) Lexicon or lexical database:** a resource that organizes lexical units in lexical domains making use of lexico-semantic relations (hyponymy-hyperonymy, meronymy, synonymy, antonymy...)
- **Terminological Database:** collection of terms in a domain

## (b) Semantic resources

- **(SKOS) Thesaurus:** a controlled list of descriptors (preferred terms) and non-descriptors (non-preferred terms) related by hierarchical, associative or equivalence links
- **Classification/taxonomy:** systematic arrangement of concepts in groups or categories according to established criteria
- **Linked Data (RDFS):** method of exposing, sharing, and connecting data via dereferenceable URIs on the Web
- **Ontology (OWL):** formal specification of a conceptualization

# Examples of Glossaries

## SAP Library - Glossary

http://help.sap.com/saphelp\_46c/helpdata/en/35/2cd77bd7705394e10000009b387c12/frame:

Últimas noticias

cacahuete - Dic... Diccionario de l... rtve Radio Clásica - ... OmegaT - Docu...

SAP Library Getting Started Release notes IMG Glossary

Area:

ABCDEFGHIJKLMNOPQRSTUVWXYZ

negative goodwill (EC-CS)

negative inventory

negative list

negative posting

negative stock

negotiable document

negotiating bank

nesting

nesting of HUs

net actual cost

net change planning

net inflation rate

net present value

net present value concept

net price

net rate

net realizable-value method

net rent

net requirements calculation

net target cost

net unit of measure

net value

net vote

net voting

net worth tax

net/net purchase price

netting (TR-TM)

netting (TR-TM)

**net value**

**Sales and Distribution (SD)**

Value that the system determines by subtracting...

<http://www.duke.edu/~charvey/Classes/wpg/bfglosa.htm>

## Hypertextual Finance Glossary

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#)

**A**

Fifth letter of a [Nasdaq](#) stock symbol specifying Class A shares.

**AAII**

See: [American Association of Individual Investors](#)

**ABO**

See: [Accumulated Benefit Obligation](#)

**ABS**

See: [Automated Bond System](#)

**ADP index**

<http://www.finance-glossary.com/>

financeglossary

The online dictionary of financial terms

Search

### Lease

A contract in which the legal owner of property or other asset agrees to another person using that property or asset in return for a regular specified payment (known as rent) over a set term. In addition to buildings, other items such as cars and computers are often leased in order to avoid capital costs in the running of a business.

### Related Terms...

[Rent](#)



# Example of On-line Dictionaries

**Wiktionary**  
[ˈwɪkʃənɹɪ] *n.*,  
a wiki-based Open  
Content dictionary

- Definitions
- **Disambiguation according to PoS**
- **PoS**
- **Translations (+ domain info)**
- Etimological information
- **Lexical relations (synonymy, antonymy...)**
- Derived terms
- **Related terms**
- **Illustrations**

## income statement

### Contents [hide]

- 1 English
  - 1.1 Noun
    - 1.1.1 Translations
    - 1.1.2 See also

## English

### Noun

[edit]



Wikipedia has an article or  
**Income statement**

**income statement** (*plural* **income statements**)

1. (*accounting*) A calculation which shows the profit or loss of an accounting unit (company, municipality, foundation etc.) in a specific period of time, providing a summary of how the profit or loss is calculated from **gross revenue** and **expenses**.

### Translations

[edit]

#### financial statement of net income

[hide ▲]

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Danish: <b>resultatopgørelse</b> <sup>(da)</sup> <i>c</i></li><li>• Finnish: <b>tuloslaskelma</b> <sup>(fi)</sup></li><li>• French: <b>compte de résultat</b> <sup>(fr)</sup> <i>m</i></li><li>• German: <b>Gewinn- und Verlustrechnung</b> <sup>(de)</sup> <i>f</i></li></ul> | <ul style="list-style-type: none"><li>• Italian: <b>conto economico</b> <sup>(it)</sup> <i>m</i></li><li>• Portuguese: <b>demonstração do resultado do exercício</b> <sup>(pt)</sup> <i>m</i></li><li>• Spanish: <b>estado de resultados</b> <sup>(es)</sup> <i>m</i></li><li>• Swedish: <b>resultaträkning</b> <sup>(sv)</sup> <i>c</i></li></ul> |
|--|--|

# Example of On-line Dictionaries

## Entry for Rice

### Etymology

Old French *ris* < Italian *riso* < Latin *oriza* < Ancient Greek ὀρυζα (*óruza*) < Old Persian; compare Sanskrit व्रीहि (*vṛīhi*), Tamil அரிசி (*arici*).

### Pronunciation

- IPA: /ˈaɪs/
- Audio (US)  (file)
- Audio (UK)  (file)
- Rhymes: -ais

### Noun

**rice** (*uncountable*)

1. Cereal plants (*Oryza sativa*) of the grass family whose seeds are used as food.
2. The seeds of this plant used as food.

### Translations

plants	<a href="#">[show ▼]</a>
seeds used as food	<a href="#">[show ▼]</a>

The translations below need to be checked and inserted above into the appropriate translation tables, removing any numbers. Numbers do not necessarily match those in definitions. See instructions at [Help:How to check translations](#).

- Hausa: àlbàrkà kumbe
- Sinhalese: බත් (*bat*)
- • Volapük: risat

[\[edit\]](#)



Wikipedia has an article on:  
**Rice**

[\[edit\]](#)



Unpolished rice (2)

[\[edit\]](#)

[\[edit\]](#)

[\[show ▼\]](#)

[\[show ▼\]](#)

# Example of On-line Dictionaries

## Entry for Rice

### Translations

[\[edit\]](#)

#### plants

[\[hide ▲\]](#)

- Afrikaans: **rys** <sup>(af)</sup>
- Albanian: **oriz** <sup>m</sup>
- Arabic: أرز <sup>(ar)</sup> ('arz, 'áruzz) <sup>m</sup>, رز <sup>(ar)</sup> (ruzz) <sup>m</sup>
- Armenian: բրինձ <sup>(hy)</sup> (brindz)
- Basque: **arroz**, **irris**
- Bengali: ভাত <sup>(bn)</sup>
- Bosnian: riža <sup>(bs)</sup> <sup>f</sup>, pirinač <sup>(bs)</sup> <sup>m</sup>
- Burmese:  <sup>(my)</sup> (htāmin:)
- Catalan: **arròs** <sup>(ca)</sup> <sup>m</sup>
- Chinese:
  - Mandarin: 稻 <sup>(cmn)</sup> (dào)
- Croatian: riža <sup>(hr)</sup> <sup>f</sup>
- Danish: **ris** <sup>(da)</sup>
- Dutch: **rijst** <sup>(nl)</sup> <sup>m</sup>
- Estonian: riis <sup>(et)</sup>
- Finnish: riisi <sup>(fi)</sup>, riisikasvi <sup>(fi)</sup>
- French: **riz** <sup>(fr)</sup> <sup>m</sup>
- Marathi: भात <sup>(bhāt)</sup>
- Mongolian: **тытара** <sup>(tutraga)</sup>
- Navajo: alóós
- Nepali: *please add this translation if you can*
- Norwegian: **ris** <sup>(no)</sup> <sup>m</sup>
- Oriya: *please add this translation if you can*
- Persian: برنج <sup>(fa)</sup>
- Polish: **ryż** <sup>(pl)</sup> <sup>m</sup>
- Portuguese: **arroz** <sup>(pt)</sup> <sup>m</sup>
- Punjabi: ਚਾਵਲ (cāval), ਚੌਲ (cāul)
- Rohingya: soil
- Romanian: **orez** <sup>(ro)</sup>
- Russian: рис <sup>(ru)</sup> (ris) <sup>m</sup>
- Sanskrit: ताण्डुल
- Serbian:
  - Cyrillic: рижa <sup>f</sup>, пиринач <sup>m</sup>
  - Roman: riža <sup>f</sup>, pirinač <sup>m</sup>
- Shan:  (khaw3)

# Example of On-line Dictionaries

## Entry for Rice

### Derived terms

[\[edit\]](#)

- arborio rice
- brown rice
- golden rice
- Indian rice
- jollof rice
- mealie rice
- Patna rice
- brewer's rice
- broken rice

- rice bowl
- rice grass
- rice leafhopper
- rice paper
- rice pudding
- rice rat
- rice weevil

- ricebird
- rice-paper plant
- ricer
- Spanish rice
- sticky rice
- white rice
- wild rice

### Related terms

[\[edit\]](#)

- Menominee
- rijsttafel
- risotto

### See also

[\[edit\]](#)

- basmati
- bhelpuri
- California roll
- dosa
- gumbo
- idli
- idli

- jambalaya
- khir
- mirin
- mochi
- nasi goreng
- onigiri
- pad thai


- paella
- pilaf, pilau
- rangoli
- risotto
- sake
- samshu
- sushi

# Example of On-line Dictionaries



4 ENTRIES FOUND:

- 1) **lease** (noun)
- 2) **lease** (transitive verb)
- lend-lease** (noun)

**1lease**  *noun* \ˈlēz\

## Definition of LEASE

- 1** : a contract by which one conveys real estate, equipment, or facilities for a specified term and for a specified rent; *also* : the act of such conveyance or the term for which it is made
- 2** : a piece of land or property that is leased
- 3** : a continuance or opportunity for continuance <a new *lease* on life>

## Examples of LEASE

- They took out a five-year *lease* on the house.
- We hold *leases* on both of our cars.

## Origin of LEASE

Middle English *les*, from Anglo-French, from *lessor*

- Disambiguation according to PoS
- **PoS**
- **Definitions**
- Etimological information
- **Illustrations**
- **Examples of use**

# Example of DBpedia (Encyclopaedia)



## •Definition

## •Comparable texts (not parallel!!)

### About: Finance lease

An Entity of Type : [unknown](#), from Named Graph : <http://dbpedia.org>, within Data Space : [dbpedia.org](#)

A finance lease or capital lease is a type of lease.

#### Property

dbpedia-owl:abstract

#### Value

DE

EN

Beim Finanzierungsleasing als typischem Leasing überwälzt der Leasinggeber das Investitionsrisiko. Der Geber trägt somit nur das Kreditrisiko und eventuell vereinbarte Dienstleistungen. Der Leasingnehmer ist während der Vertragslaufzeit nicht dinglicher Eigentümer des Vermögensgegenstandes, wenn ihm die Sache zugerechnet werden kann, da der Leasing-Geber kein Interesse an einem Rückerhalt des Barwerts des Vermögensgegenstandes während der Vertragslaufzeit steht dem Leasing-Nehmer üblicherweise eine vertraglich eingeräumte Möglichkeit zur Rückkauf des Vermögensgegenstandes zum Restwertes zu. Es handelt sich daher beim Finanzierungsleasing nach der Rechtsprechung (Ratenzahlung gegen Gebrauchsüberlassung) mit Überwälzung der Sach- und Preisgefahr an den Leasingnehmer in Verbindung mit einer späteren Kaufmöglichkeit zu dem geringeren Restwertkaufpreis. Kennzeichnend für das Finanzierungsleasing ist, dass die Vertragsdauer der Leasingdauer des Vermögensgegenstandes umfasst oder dass der Großteil des Barwerts des Leasing-Gegenstandes finanziert wird. Diese Merkmale unterscheiden das Finanzierungsleasing vom Operate-Leasing. Das Leasingnehmer hat das Kündigungsrecht über einen maßgeblichen Zeitraum der Nutzungsdauer. Das Investitionsrisiko trägt der Leasinggeber. Prinzipiell auf alle Güter anwendbar. Kapitalbeschaffung und Kreditrisiko trägt der Leasing-Geber. Nach Ablauf der Grundleasingzeit (Kauf, Rückgabe usw.), insbesondere, wenn der Übergang des Vermögensgegenstandes an den Leasing-Nehmer erfolgt, trägt der Leasing-Nehmer (Wartung, Versicherung) Leasing-Gegenstandes. Spezialanfertigung für den Leasing-Nehmer und kann nicht von Dritten genutzt werden. Vollständige Überwälzung der Vertragsgestaltung ist eine eindeutige Aussage über die Bilanzierung des Leasinggegenstandes. Nach den Grundsätzen der internationalen Rechnungslegung gilt hier aber häufig das "Substance over form"-Prinzip, dass immer die Geschäftspraxis gilt. Kann etwa de facto nur der Leasing-Nehmer den Gegenstand als Finanz-Lease zu klassifizieren, auch wenn im Vertrag etwas anderes dargestellt wird.

A finance lease or capital lease is a type of lease. It is a commercial arrangement where: the lessee selects an asset (equipment, vehicle, software); the lessor (finance company) will purchase that asset during the lease; the lessee will pay a series of rentals or installments for the use of the asset; the lessee will acquire a large part or all of the cost of the asset plus earn interest from the rentals paid by the lessee; the lessee will acquire ownership of the asset (e.g. paying the last rental, or bargain option purchase price); the lessor is the owner of the asset during duration of the lease. However the lessee has control over the asset and bears the risks of (economic) ownership.

# Examples of DBPedia (Encyclopaedia)



## •Semantic relations

## •Labels in different languages

## •Links to other resources

dbpprop:hasPhotoCollection	<ul style="list-style-type: none"> <li>■ <a href="http://www4.wiwi.fu-berlin.de/flickrwrappr/photos/Finance_lease">http://www4.wiwi.fu-berlin.de/flickrwrappr/photos/Finance_lease</a></li> </ul>
dbpprop:reference	<ul style="list-style-type: none"> <li>■ <a href="http://www.aasb.com.au/public_docs/aasb_standards_2005/compilations/AASB117_07-04">http://www.aasb.com.au/public_docs/aasb_standards_2005/compilations/AASB117_07-04</a></li> <li>■ <a href="http://www.fasb.org/pdf/fas13.pdf">http://www.fasb.org/pdf/fas13.pdf</a></li> <li>■ <a href="http://www.investorwords.com/722/capital_lease.html">http://www.investorwords.com/722/capital_lease.html</a></li> </ul>
rdfs:comment	<ul style="list-style-type: none"> <li>■ Finansielle leasing er en leasingform der det er leasingtakeren som har den finansielle risiko. I praksis et selskap muligheten til å finansiere en eiendel selv om man strengt tatt aldri kjøper leasingforhold gi leasingtakeren kontroll over eiendelen i store deler av dennes levetid. Leasing samme fordeler (og ulemper) som en eier. Se også operasjonell leasing.</li> <li>■ Operasjonell leasing er en leasingform der det er utleieren som har den finansielle risikoen. kontrakts løpetid, men påtar seg ingen forpliktelser utover å betale den avtalte leasingleie. føres som en kostnad og objektet vil ikke aktiveres i leasingtakerens regnskaper. Se også</li> <li>■ Beim Finanzierungsleasing als typischem Leasing überwälzt der Leasinggeber das Investitionsrisiko. Der Geber trägt somit nur das Kreditrisiko und eventuell vereinbarte Dienstleistungen. Der Leasingnehmer ist während der Vertragslaufzeit nicht dinglicher Eigentümer des Vermögensgegenstandes, wenn ihm die Sache zugerechnet werden kann, da der Leasing-Geber kein Interesse an einem Rückhalt des Leasinggegenstandes hat.</li> <li>■ A finance lease or capital lease is a type of lease.</li> </ul>
rdfs:label	<ul style="list-style-type: none"> <li>■ Finanzierungsleasing</li> <li>■ Finansiell leasing</li> <li>■ Operasjonell leasing</li> <li>■ Finance lease</li> </ul>
owl:sameAs	<ul style="list-style-type: none"> <li>■ <a href="#">fbase:Finance lease</a></li> </ul>
skos:subject	<ul style="list-style-type: none"> <li>■ <a href="#">category:Financial_terminology</a></li> <li>■ <a href="#">category:Business_law</a></li> </ul>
foaf:page	<ul style="list-style-type: none"> <li>■ <a href="http://en.wikipedia.org/wiki/Finance_lease">http://en.wikipedia.org/wiki/Finance_lease</a></li> </ul>
is dbpprop:redirect of	<ul style="list-style-type: none"> <li>■ <a href="#">dbpedia:Capital_lease</a></li> <li>■ <a href="#">dbpedia:Finance_leasing</a></li> </ul>
is foaf:primaryTopic of	<ul style="list-style-type: none"> <li>■ <a href="http://en.wikipedia.org/wiki/Finance_lease">http://en.wikipedia.org/wiki/Finance_lease</a></li> </ul>

# Example of Computational Lexicon

PRINCETON UNIVERSITY

WordNet

## •Diambiguation according to PoS

Noun

## •Definition

## •Synsets

## •Examples of use

## •Lexical relations (*hyperonymy- hyponymy, meronymy, synonymy, antonymy...*)

- S: (n) lease, rental, letting (property that is leased or rented out or let)
  - direct hyponym / full hyponym
    - S: (n) car rental, hire car, rent-a-car, self-drive, u-drive, you-drive (a rented car) "*she picked up a hire car*"
    - S: (n) sublease, sublet (a lease from one lessee to another)
  - direct hypernym / inherited hypernym / sister term
    - S: (n) property, belongings, holding (something owned; any tangible or intangible possession that is owned 'property'; "*he is a man of property*";
  - derivationally related form
    - W: (v) lease [Related to: lease] (grant use or occupation of under a term of contract) "*I am leasing my co.*"
    - W: (v) lease [Related to: lease] (let for money) "*We rented our apartment to friends while we were abr*"
    - W: (adj) rental [Related to: rental] (available to rent or lease) "*a rental car*"
- S: (n) lease (a contract granting use or occupation of property during a specified time for a specified payment)
- S: (n) lease, term of a contract (the period of time during which a contract conveying property to a person is in effect)



# WordNet 3.0 Vocabulary Helper

[Help for Eva Word Lookup Interfaces](#)

## Synonyms/Hypernyms (Ordered by Estimated Frequency) of noun pollution

3 senses of **pollution**

### Sense 1

**pollution** -- (undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities)

- environmental condition -- (the state of the environment)
- impurity, impureness -- (the condition of being impure)

### Sense 2

befoulment, defilement, **pollution** -- (the state of being polluted)

- dirtiness, uncleanness -- (the state of being unsanitary)

### Sense 3

contamination, **pollution** -- (the act of contaminating or polluting; including (either intentionally or accidentally) unwanted substances or factors)

- soiling, soilure, dirtying -- (the act of soiling something)
- 1. (1) **pollution** -- (undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities)
- 2. befoulment, defilement, **pollution** -- (the state of being polluted)
- 3. contamination, **pollution** -- (the act of contaminating or polluting; including (either intentionally or accidentally) unwanted substances or factors)

# Example of Terminological Database



- Domain

- Translations
- Synonyms

## FINANCE [COM]

[Full entry](#)

	theoretical <b>value</b>	★★★★★	@
EN	<b>fair value</b>	★★★★★	@
	mathematical <b>value</b>	★★★★★	@
DE	mathematischer Wert	★★★★★	@
ES	valor teórico	★★★★★	@

## ECONOMICS, Accounting [Council]

[Full entry](#)

EN	<b>fair value</b>	★★★★★	
DE	beizulegender Zeitwert	★★★★★	@
	valor razonable	★★★★★	@
ES	precio justo de mercado	★★★★★	@
	valor corriente en el mercado	★★★★★	@

## TRADE [EIB]

[Full entry](#)

EN	<b>fair market value</b>	★★★★★	
ES	justo valor de mercado	★★★★★	

# Example of Terminological Database



- Definitions

- Reliability ratio

- Date of inclusion in termbase

- Sources of reference for terms, definitions, etc.

<b>Domain</b>		ECONOMICS, Accounting
<b>en</b>		
<b>Definition</b>	"In International Accounting Standards, the amount for which an asset could be exchanged between a knowledgeable, willing buyer and a knowledgeable, willing seller in an arm's-length transaction."	
<i>Definition Ref.</i>	Dictionary of Accounting Terms, Derek French	
<b>Term</b>	<b>fair value</b>	
<i>Reliability</i>	2 (Minimum reliability)	
<i>Date</i>	03/11/1997	
<b>de</b>		
<b>Definition</b>	Betrag, zu dem ein Vermögenswert zwischen sachverständigen, vertragswilligen und voneinander unabhängigen Geschäftspartnern getauscht werden könnte.	
<i>Note</i>	CONTEXT: Rechnungswesen;MISC: Zentraler Begriff des International Accounting Standard (IAS) 39 und des RL-Vorschlags zur Änderung der RL 78/660/EWG und 83/349/EWG über die im Jahresabschluß bzw. im konsolidierten Abschluß von Gesellschaften bestimmter Rechtsformen zulässigen Wertansätze (KOM (2000) 80 endg.); der b.Z. soll insb. die korrekte Bewertung und Bilanzierung derivativer Finanzinstrumente sicherstellen; für diese Instrumente entspricht der b.Z. häufig dem Marktwert, nicht jedoch z.B. dem Anschaffungswert (= Kaufpreis);DIV: RSZ 16/01/2001	
<b>Term</b>	<b>beizulegender Zeitwert</b>	
<i>Reliability</i>	3 (Reliable)	
<i>Term Ref.</i>	International Accounting Standards 1999 (Deutsche Ausgabe) über: Deutsches Rechnungslegungs Standards Committee e.V. (DRSC)	
<i>Language Usage</i>	in anderen Kontexten als Rechnungswesen ist u.U. "angemessener Wert" auch korrekt; ggf. kann bei der ersten Nennung der EN Ausdruck "fair value" in Klammern hinzugesetzt werden	
<i>Date</i>	03/11/1997	

# Example of Thesaurus

## AGROVOC

### •Fuzzy relations:

*Broader than*  
*Narrower than*  
*Used for*  
*Related to*

### •Info about preferred terms

**Language:**  
English  
French  
Spanish  
Arabic  
Chinese

**Search In:**  
☒ Term  
☐ Comments  
☐ Definition  
☐ History Note  
☐ ISO country code (alpha-3-code)  
☐ Scope Note  
☐ Taxonomic code

**Sub-vocabularies**  
— All terms —  
Acronym  
Chemicals  
Common name for animals  
Common name for bacteria

**Show:**  
☐ Current terms  
☐ Deleted Terms  
☒ All Terms

☒ starting with ☐ end with ☐ containing text ☐ exact match ☐ exact word

Enter the word you are looking for:

OR

**Search by code:**

**Results from Term Description:**

Code	Term	Status	Scope
6599	Rice (EN)	Descriptor	
331295	rice (plant) (EN)	Alternative descriptor (with sameAs relations)	Common name for plants

• • • BT products (6211) +  
 • • • BT Plant products (8171) +  
 • • BT Cereals (1474) +  
**Rice (6599) +**  
 • NT Basmati rice (330606) +  
 • NT Broken rice (330653) +  
 • UF Paddy  
 • RT Oryza sativa

## An excerpt from INSPEC Thesaurus

Cellular radio	used for (UF): cellular communication cellular telephones Groupe Speciale Mobile (GSM) microcellular radio pan-european radio vodafone
Land mobile radio Radiotelephony	These twp terms are broader terms (BT) to "cellular radio". If you searched under these terms, you will retrieve a larger set of documents
Radio applications Telecommunication	These terms are top terms (TT) in the hierarchy
Channel allocation Land mobile radio Personal communication networks Radio access networking Space division multiple access	All these terms are related terms (RT) to "cellular radio"
DI January 1985	Date when "cellular radio" was added
mobile radio systems	previous term (PT) used before 1985
B6250F; D4045	class codes

**Table 1:** Inspec Thesaurus (1999) -- an excerpt on cellular phones

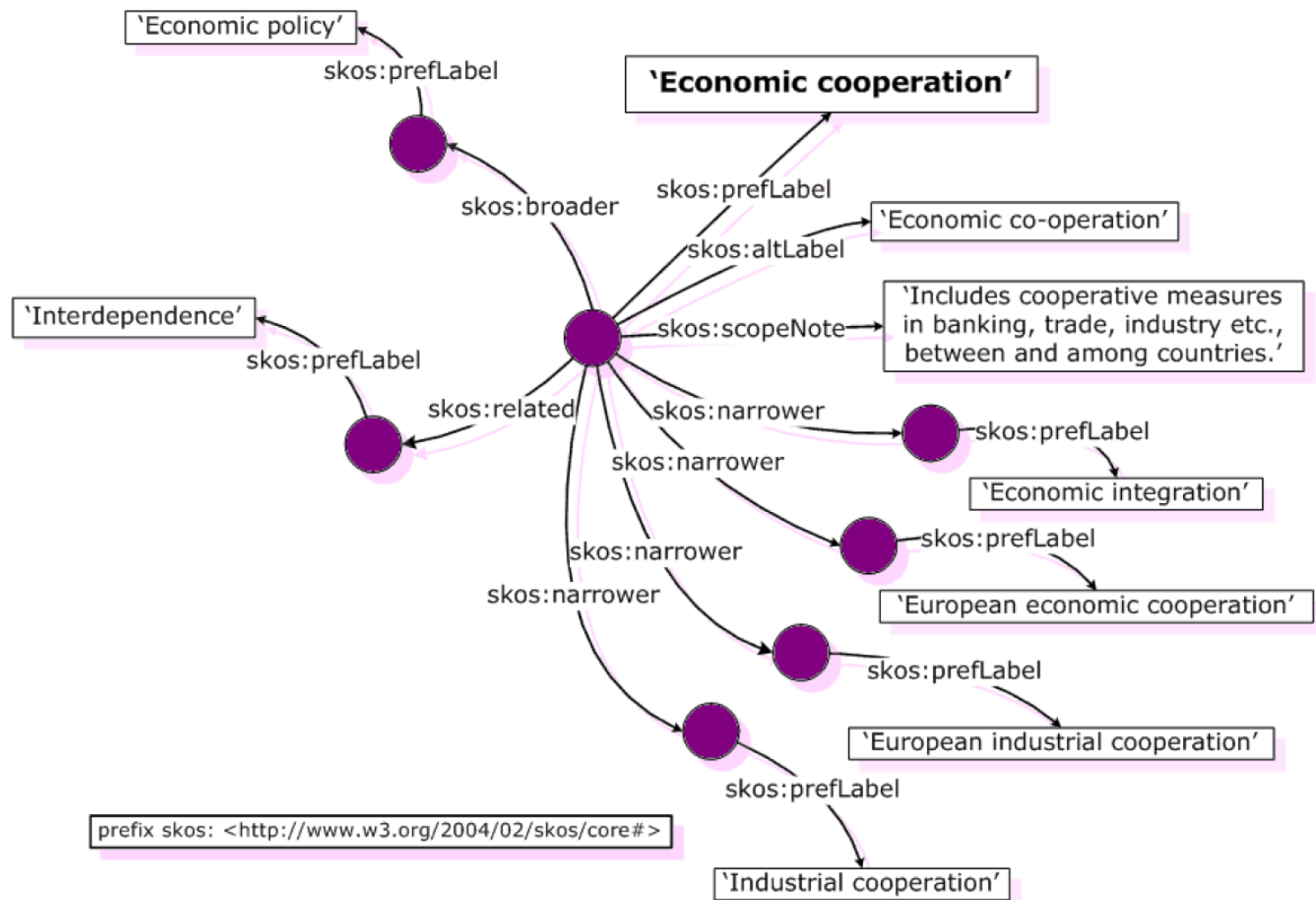
# Reusing and sharing KOS in the Semantic Web: SKOS

- Simple Knowledge Organization System
  - Simple, flexible, extensible, machine-understandable representation for sharing KOS
  - **Goal:** to enable easy publication of controlled structured vocabularies for the semantic web
    - Thesauri
    - Classification schemes
    - Subject heading systems
    - Taxonomies
    - Other ‘controlled language’
- **How:** by using a common data model for sharing and linking knowledge organization systems
- **BUT** SKOS is **not** a formal knowledge representation language.

Many exist and are in use in cultural heritage, medicine, libraries, ...

# Elements in SKOS

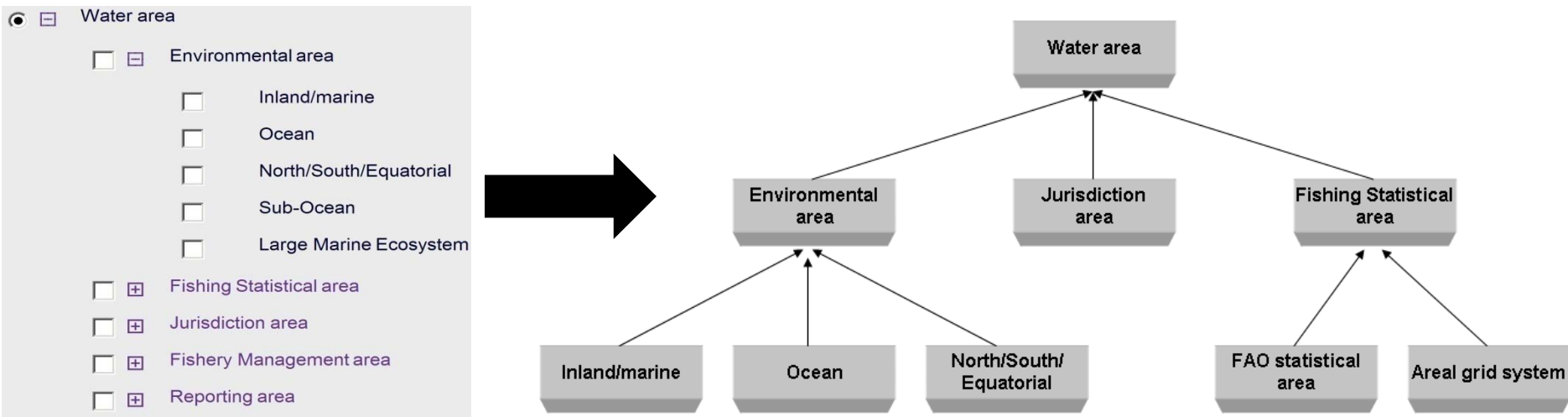
- **Semantic Relationships**
  - Broader/Narrower Terms
  - Related Terms
- **Lexical Labels**
  - Preferred, alternative and hidden labels
- **Additional documentation**
  - Notes, comments, descriptions



**SKOS concept schemes are not formal ontologies !!!!**

# Classification Scheme

- A classification scheme<sup>1</sup> is the descriptive information for an arrangement or division of objects into groups based on characteristics, which the objects have in common. E.g. water area classification scheme<sup>2</sup>.



1. International Standard Organization (ISO). Information technology - Metadata registries – Part 1: Framework, 2004. Report ISO/IEC FDIS 11179-1.
2. <http://www.fao.org/figis/servlet/RefServlet>



# Example of a Taxonomy

Taxonomy ▾ About Sign In

Network Browser

Network: Presentation ▾ Lang: en-US ▾

993500 - Disclosure - Schedule of Investments, Investment Holdings

- Investment Holdings [Text Block]
  - Investment Holdings [Table]
    - Investment Type [Axis]
      - Investment Type [Domain]
        - Securities Investment [Member]
          - Equity Securities [Member]
            - Common Stock [Member]
              - Preferred Stock [Member]
                - Preferred Non-Convertible Stock [Member]
                  - Convertible Preferred Stock [Member]
                    - Redeemable Preferred Stock [Member]
                      - Rights [Member]
                        - Warrants [Member]
                          - Fixed Income Investments [Member]
                            - Corporate Debt Securities [Member]
                              - Corporate Bond Securities [Member]
                                - Corporate Note Securities [Member]
                                  - Convertible Debt Securities [Member]
                                    - Short-term Debt [Member]

Details Relationships Tree Locations

Investment Holdings [Text Block]

Labels

| Type           | Lang  | Label  |
|----------------|-------|--|
| Standard Label | en-US | Investment Holdings [Text Block]   |
| Documentation  | en-US | A container for the investment holdings table and related concepts. The investment holdings table lists the long positions of investments for the entity. It contains investments in unaffiliated issuers. The investments include securities and non securities (i.e. commodities and futures contracts). |

References

| Type                   | Reference                |
|------------------------|--------------------------|
| Presentation Reference | Chapter 12               |
|                        | Name Regulation S-X (SX) |
|                        | Number 210               |
|                        | Publisher SEC            |
| Presentation Reference | Section 12C              |
|                        | Chapter 12               |
|                        | Name Regulation S-X (SX) |
|                        | Number 210               |
| Presentation Reference | Publisher SEC            |
|                        | Section 12               |
| Presentation Reference | Chapter 12               |

- US Treasury Securities [Member]
- US Treasury Notes Securities [Member]
- US Treasury Bond Securities [Member]
- US Treasury Bill Securities [Member]
- US Treasury and Government Short-term Debt Securities [Member]
- US Government Agencies Short-term Debt Securities [Member]
- Municipal Bonds [Member]
- Taxable Municipal Bonds [Member]
- Nontaxable Municipal Bonds [Member]
- Municipal Notes [Member]
- Taxable Municipal Notes [Member]
- Nontaxable Municipal Notes [Member]
- Foreign Government Debt Securities [Member]
- Foreign Government Short-term Debt Securities [Member]
- Commodity Index Linked Notes [Member]

## Properties

| Property           | Value                         |
|--------------------|-------------------------------|
| Name               | InvestmentHoldingsTextBlock   |
| Namespace          | http://xbrl.us/soi/2008-11-30 |
| Data Type          | us-types:textBlockItemType    |
| XBRL Type          | stringItemType                |
| Substitution Group | xbrli:item                    |
| Period Type        | duration                      |
| Abstract           | false                         |
| Nullable           | true                          |

# Example of Ontology

- Labels
- Comments (definitions)
- Semantic relations

