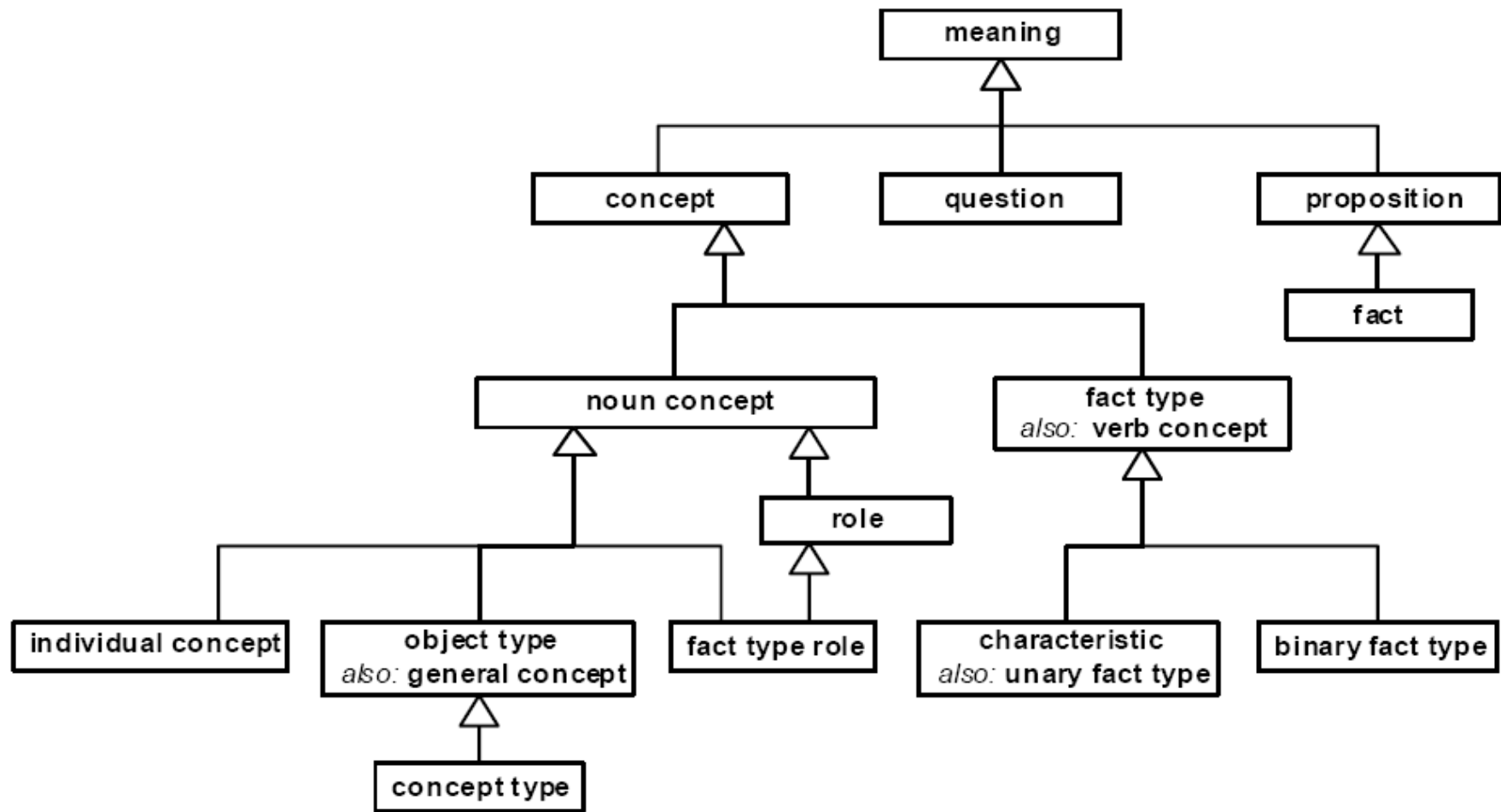


Clause 8: Meaning and Representation Vocabulary



Some important definitions

meaning

Definition: what is meant by a word, sign, statement, or description; what someone intends to express or what someone understands

concept

Source: ISO 1087-1 (English) (3.2.1) ['concept']

Definition: unit of knowledge created by a unique combination of characteristics

General Concept: meaning

Reference Scheme: a designation of the concept

noun concept

Definition: concept **that** is the meaning of a noun or noun phrase

Concept Type: concept type

Reference Scheme: a closed projection **that defines** the noun concept

fact type

Definition: concept **that** is the meaning of a verb phrase that involves one or more noun concepts and whose instances are all actualities

Synonym: verb concept

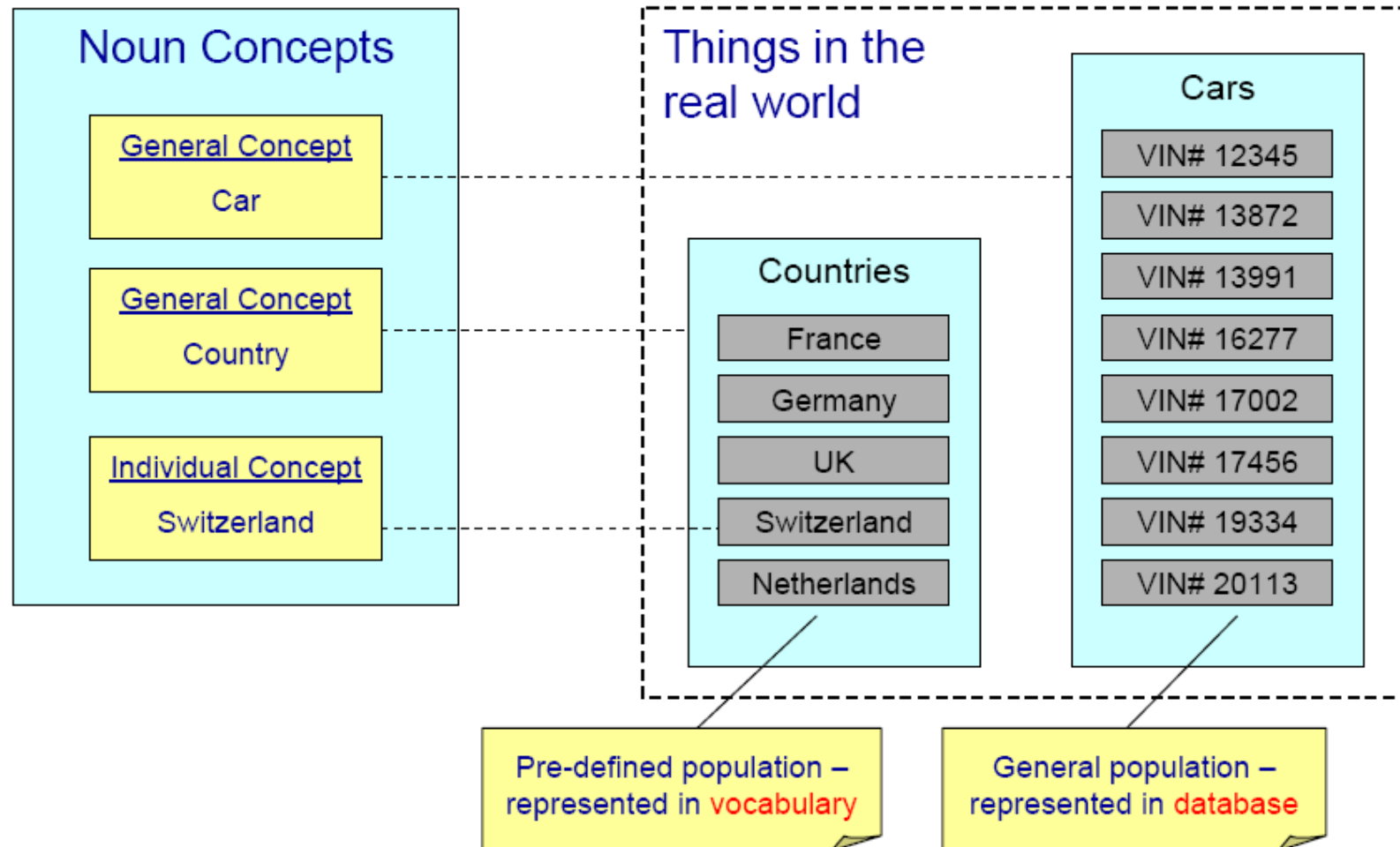
Note: For each instance of a fact type, each role of the fact type is one point of involvement of something in that instance.

Concept Type: concept type

Necessity: **Each** fact type **has at least one** role.



Noun Concepts: General and Individual



(Chapin & Hall 2006)

Noun Concepts

Examples:

- The '**general concept**' that denotes the set of countries in which EU-Rent does business

operating country

Concept Type:

role

Definition:

country in which EU-Rent does business

Necessity:

Each operating country has exactly one currency

- The '**individual concept**' that denotes the country Switzerland

Switzerland

Concept Type:

individual concept

General Concept:

country

Synonym:

CH



Object Type = General Concept

object type

Definition:	<u>noun concept</u> that classifies things on the basis of their common properties
Source:	based on <u>ISO 1087-1 (English)</u> (3.2.3) ['general concept']
Concept Type:	<u>concept type</u>
Synonym:	<u>general concept</u>
Necessity:	The <u>set of characteristics</u> that are incorporated by an <u>object type</u> is not the <u>set of characteristics</u> that are incorporated by another <u>object type</u> .
Note:	An object type incorporates a set of characteristics which are a unique combination that distinguishes that object type from all other object types. See ' <u>concept incorporates characteristic</u> '. If an object type A and an object type B have the very same incorporated characteristics, they are the same concept. If they have the very same necessary characteristics, they are logically equivalent and they denote the same things in all possible worlds.
Example:	the concept 'rental car' corresponding to cars that are rented
Example:	the concept 'car', the concept 'number', the concept 'person'

Individual Concept

individual concept

Source:	<u>ISO 1087-1 (English)</u> (3.2.2) ['individual concept']
Definition:	<u>concept</u> that corresponds to only one object [<u>thing</u>]
General Concept:	<u>noun concept</u>
Concept Type:	<u>concept type</u>
Necessity:	No <u>individual concept</u> is an <u>object type</u> .
Necessity:	No <u>individual concept</u> is a <u>fact type role</u> .
Note:	While each referring individual concept has exactly one and the same instance in all possible worlds, there can be multiple individual concepts that correspond to the same thing. Different definite descriptions of the same individual thing can represent different individual concepts that correspond to that thing.
Example:	The <u>individual concept</u> 'California' whose one <u>instance</u> is an individual state in the United States of America

Verb Concepts – Examples

■ Verb concepts

- ◆ Unary (characteristic): flight *is full*
 - 1 placeholder, filled by 'flight'
- ◆ Binary: aircraft *is assigned to* flight
 - two placeholders, filled by 'aircraft' and 'flight'
- ◆ N-ary: reassigned flight *replaces* missed flight *after* late arrival
 - three placeholders representing roles, filled by 'flight', 'flight' and 'late arrival'

Role and Fact Type Role

role

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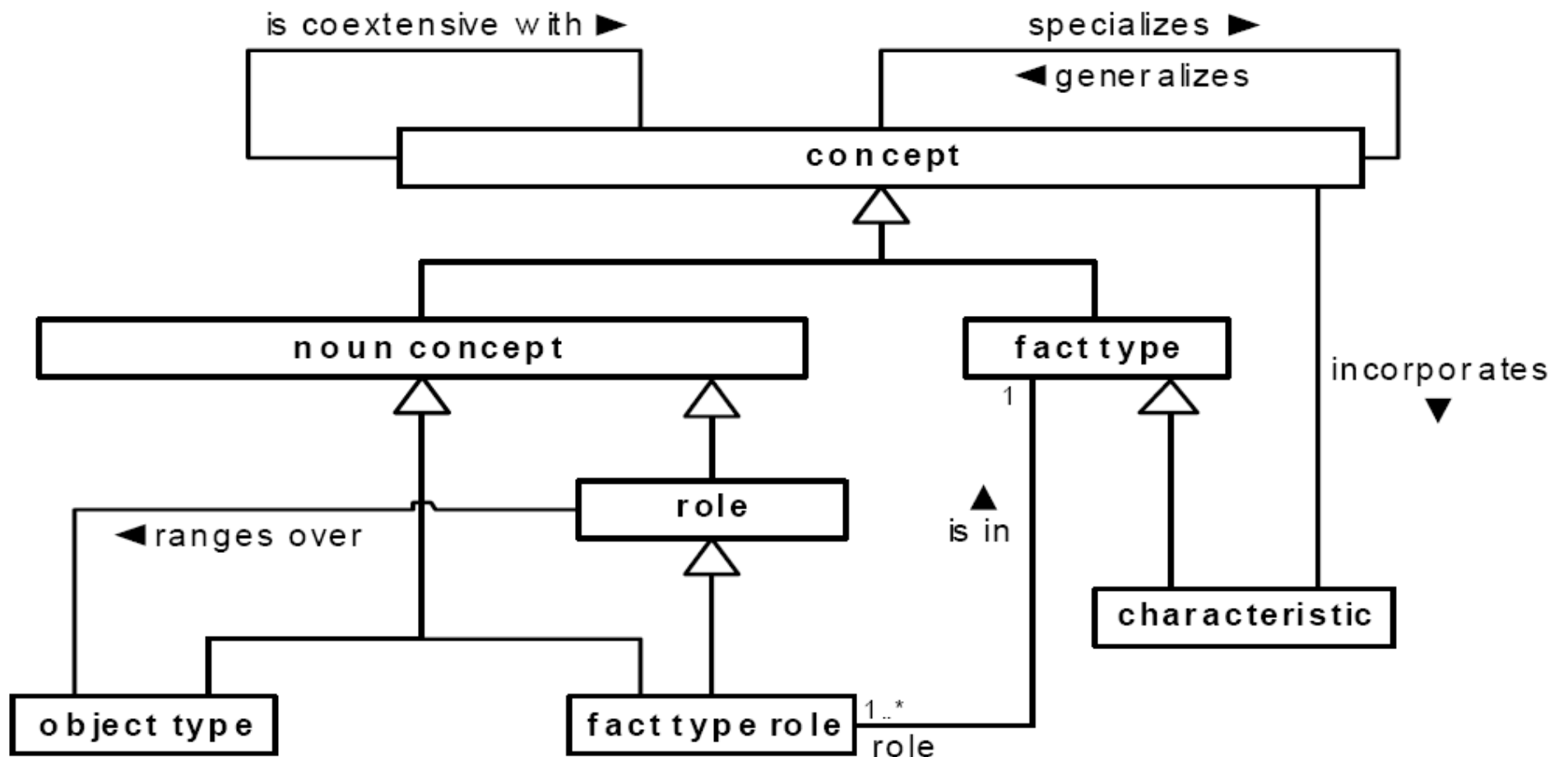
- Definition: noun concept **that** corresponds to things based on their playing a part, assuming a function or being used in some situation
- Concept Type: concept type
- Example: the role 'drop-off location' of the fact type 'shipment has drop-off location'
- Example: the role 'shipment' of the fact type 'shipment has drop-off location', which should not be confused with the general concept 'shipment' (which generalizes the role)
- Example: the role 'sum' – a role of a number in relation to a set of numbers
- Note: A role can be an object type or a fact type role. A role is always understood with respect to actualities of a particular fact type or to other particular situations.

fact type role

- Definition: role **that** specifically characterizes its instances by their involvement in an actuality that is an instance of a given fact type
- Concept Type: concept type
- Necessity: **Each** fact type role **is in exactly one** fact type.
- Necessity: **No** fact type role **is an** object type.
- Note: A fact type role is fundamentally understood as a point of involvement in actualities that correspond to a fact type. Its incorporated characteristics come from the fact type - what the fact type requires of instances of the role. It is possible that two fact type roles incorporate the same characteristics, such as when a binary fact type means the same thing when roles are reversed, as in 'person is married to person'.



Relations between Concepts



Examples of Relations

concept₁ specializes concept₂

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Definition: the concept₁ incorporates each characteristic that is incorporated by the concept₂ plus at least one differentiator

Synonymous Form: concept₂ generalizes concept₁

Example: The individual concept 'Los Angeles' specializes the concept 'city', the differentiator being that Los Angeles is one particular city in California.

concept₁ is coextensive with concept₂

Definition: the extension of the concept₁ is always the extension of the concept₂

Example: The individual concept defined as "the thirtieth president of the United States" is coextensive with an object type defined as "president of the United States in 1925." The two concepts have the same extension (which includes only Calvin Coolidge) but they are different concepts.

concept incorporates characteristic

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Definition: the characteristic is an abstraction of a property of each instance of the concept and is one of the characteristics that makes up the concept

Example: The concept 'qualified driver' incorporates the characteristic 'driver is licensed' because it is necessary (by the definition of 'qualified driver') that each qualified driver is licensed.

role ranges over object type

Definition: each characteristic that is incorporated by the object type is incorporated by the role

Example: The role 'company' of the fact type 'company employs person' ranges over the object type 'company'.



Basic Concepts for Vocabulary

Meaning – what is meant by a word (a concept) or by a statement (a proposition) – how we think about things.

Expression – things used to communicate (e.g., sounds, text, diagrams, gestures), but apart from their meaning — one expression can have many meanings.

Representation – the connection between expression and a meaning. Each representation ties one expression to one meaning.

Extension – the things to which meanings refer, which can be anything (even expressions, representations, and meanings when they are the subjects of our discourse).

Reference schemes – ways people use information about something to identify it. For example, a city in the United States is identified by a name combined with the state, which itself is identified by its name or by a two-letter state code.

Examples for Extension, Meaning, Representation and Expression

Extension	Meaning	Representation	Expression
The actual drivers of motor vehicles	Concept 'driver' — how we think of drivers, what characterizes them	Designation of the concept 'driver' by the signifier "driver"	The character sequence "driver"
		Definition of the concept 'driver' as "operator of a motor vehicle"	The character sequence "operator of a motor vehicle"
The actual City of Los Angeles, California – a real place	Individual concept 'Los Angeles' — how we think of that city, what distinguishes it from other places	'Los Angeles' as a designation for the individual concept of 'Los Angeles'	The character sequence "Los Angeles"
For each car that is out of service, its actually being out of service	Characteristic applicable to a car, what is meant by a car being out of service	Fact type form ' <u>car</u> is out of service' as a template for the characteristic with ' <u>car</u> ' being a placeholder	The text " <u>car</u> is out of service"
The actual state of affairs of it being obligatory in the EU-Rent business that it not rent to a barred driver	Proposition — the meaning of the statement "EU-Rent must not rent to a barred driver"	The statement, "EU-Rent must not rent to a barred driver," having the proposition as its meaning	The character sequence "EU-Rent must not rent to a barred driver"

