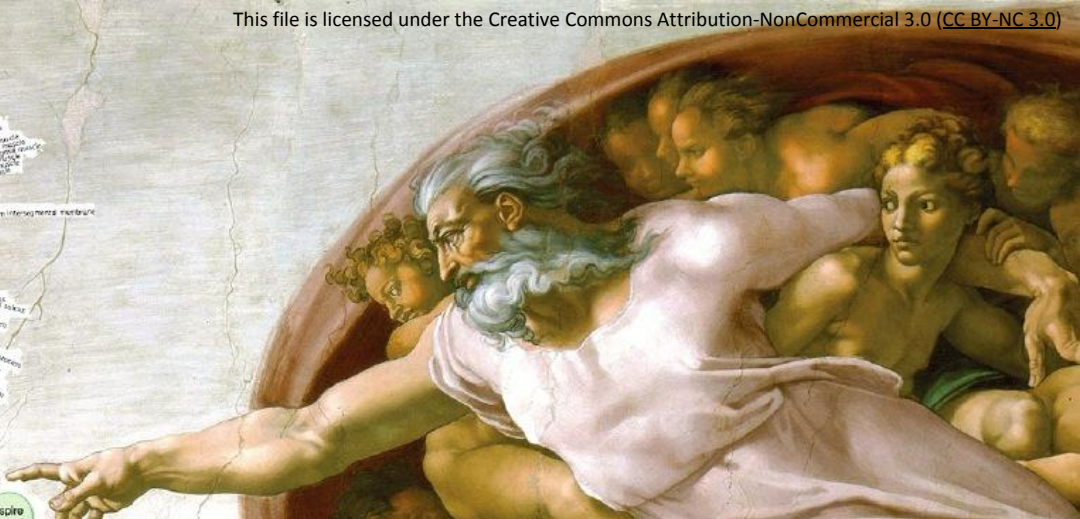


[illegible]

Leibniz Institute for Information Infrastructure



KIT
Karlsruher Institut für Technologie

Leibniz Institute for Information Infrastructure
Karlsruhe Institute of Technology
Spring 2018

Information Service Engineering

Lecture 3: Linked Data Engineering I

3.1 Understanding Data on the Web

3.2 Towards a Universal Data Representation

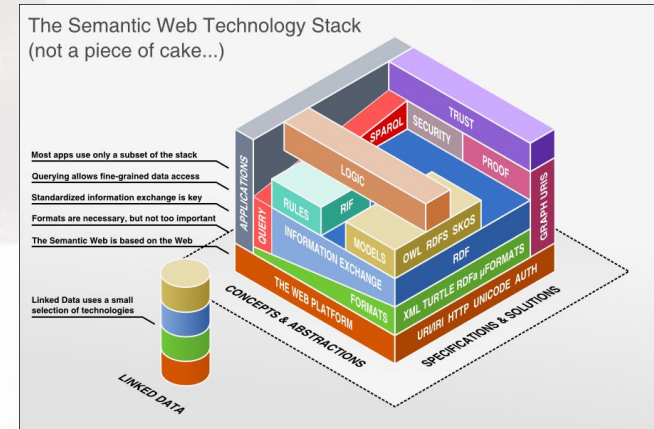
3.3 How to Identify and Access Linked Data

3.4 Representing Facts with RDF

3.5 RDF Turtle Serialization

3.6 Model Building with RDFS

3.7 Logical Inference with RDF(S)



Understanding Information

PLUTO

Never Forget!

(1930–2006)



PLUTO
Never Forget!
(1930-2006)

Understanding Information

Information Service Engineering - Lecture 3 Linked Data Engineering I - 3.1 Understanding Data on the Web



Text: "Pluto"

Entity Resolution /
Disambiguation

Pluto

a Disney cartoon character

Pluto

a Roman god

Pluto

a song by Björk

HMS Pluto

a ship

...

Pluto

a dwarf planet

Disambiguation

- solution of linguistic ambiguities

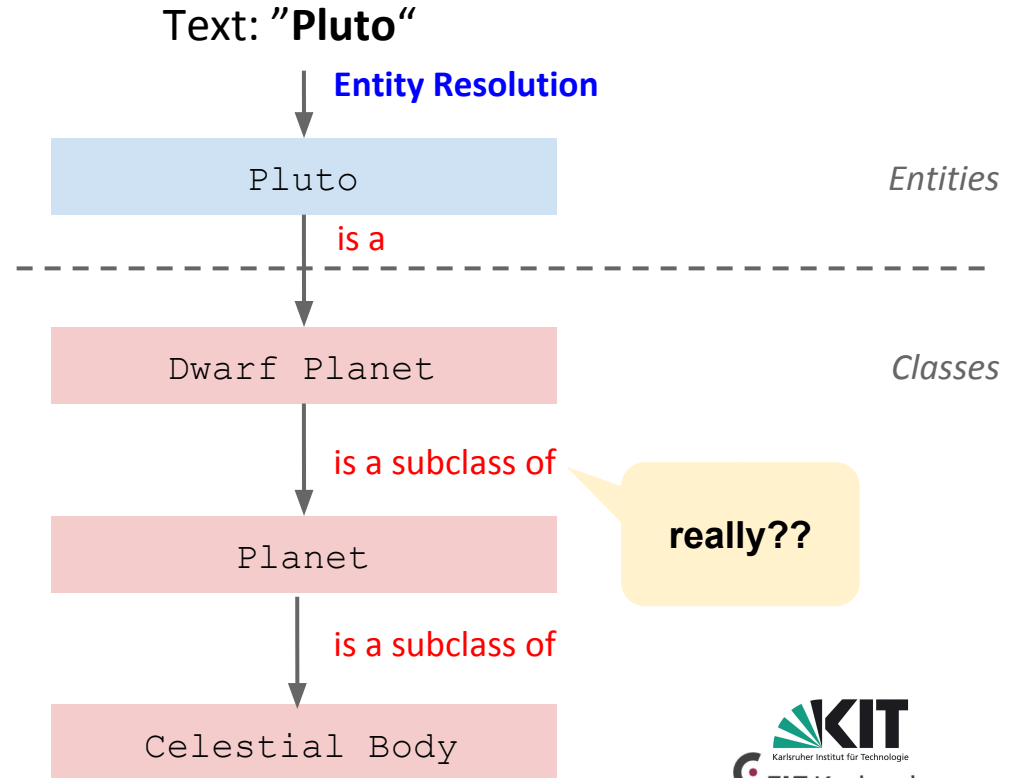


Understanding Information

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- The **Meaning (Semantics)** of entities and classes must be defined explicitly.

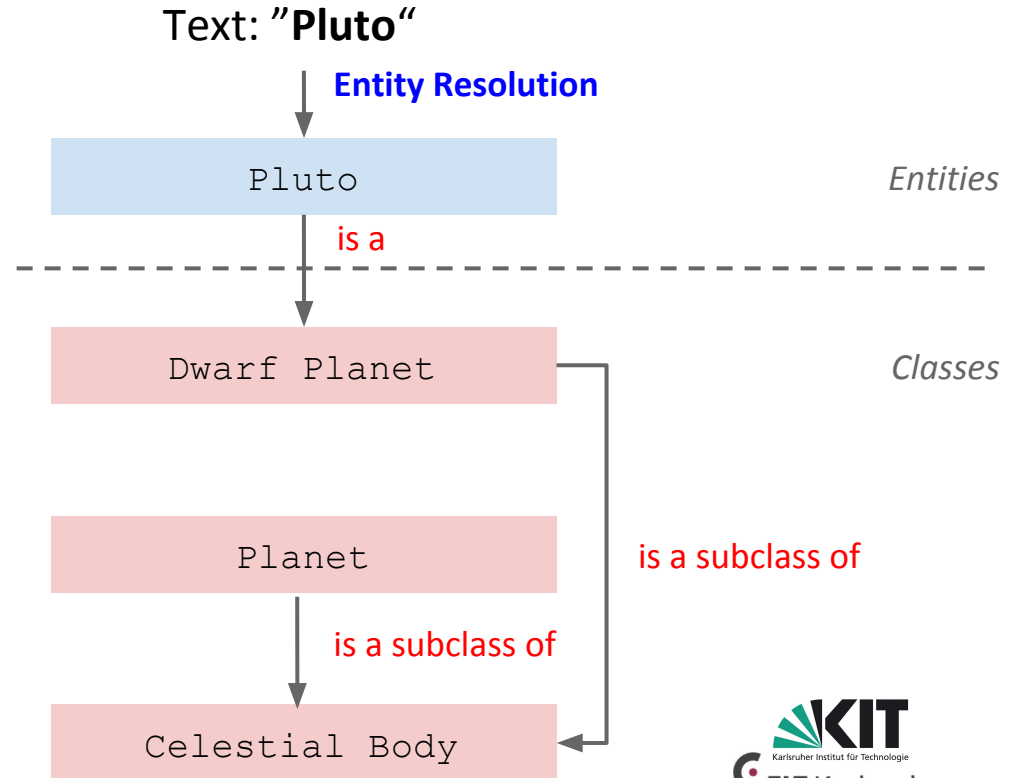


Understanding Information

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A **dwarf planet** is a planetary-mass object that is neither a planet nor a natural satellite. That is, it is **in direct orbit of a star**, and is massive enough for its gravity to crush it into a hydrostatically equilibrious shape (usually a **spheroid**), but has **not cleared the neighborhood of other material** around its orbit



Understanding Information

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Text: "Pluto"

Entity Resolution

Pluto

Entity

is a

Dwarf Planet

Class

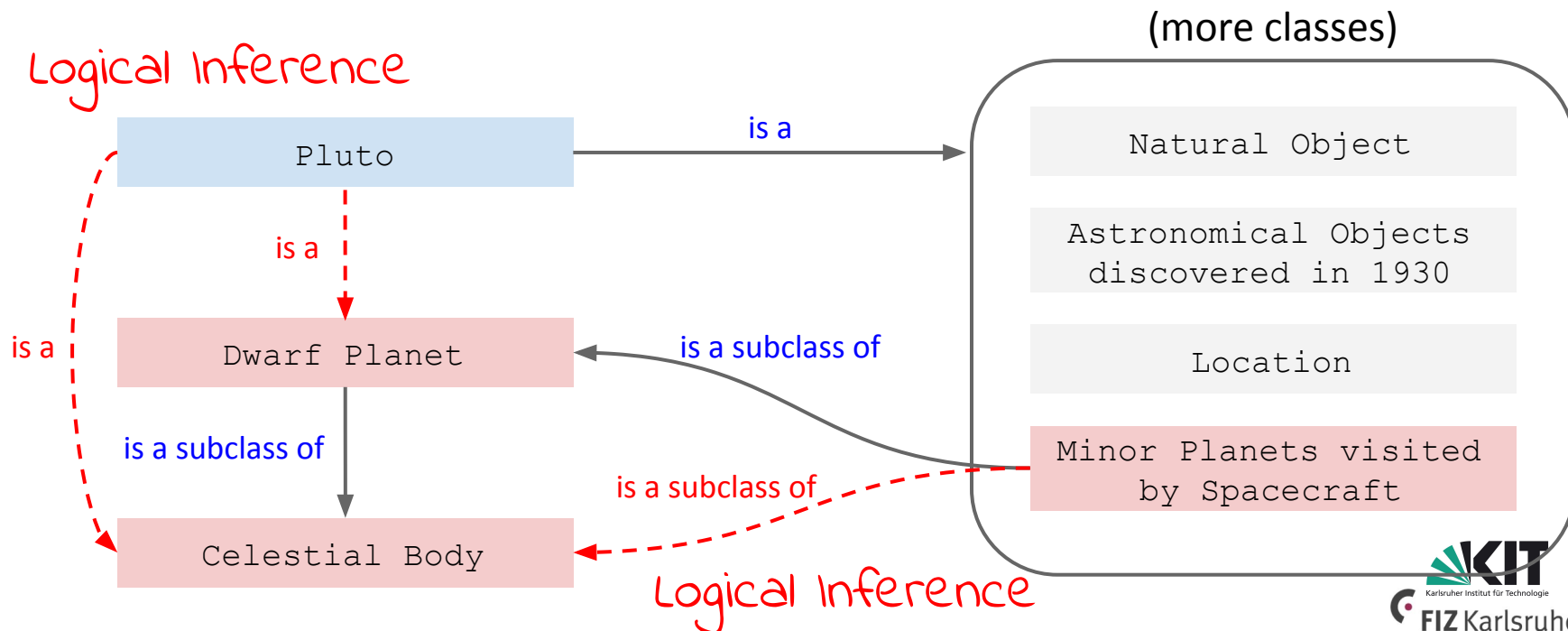
is a subclass of

Planet

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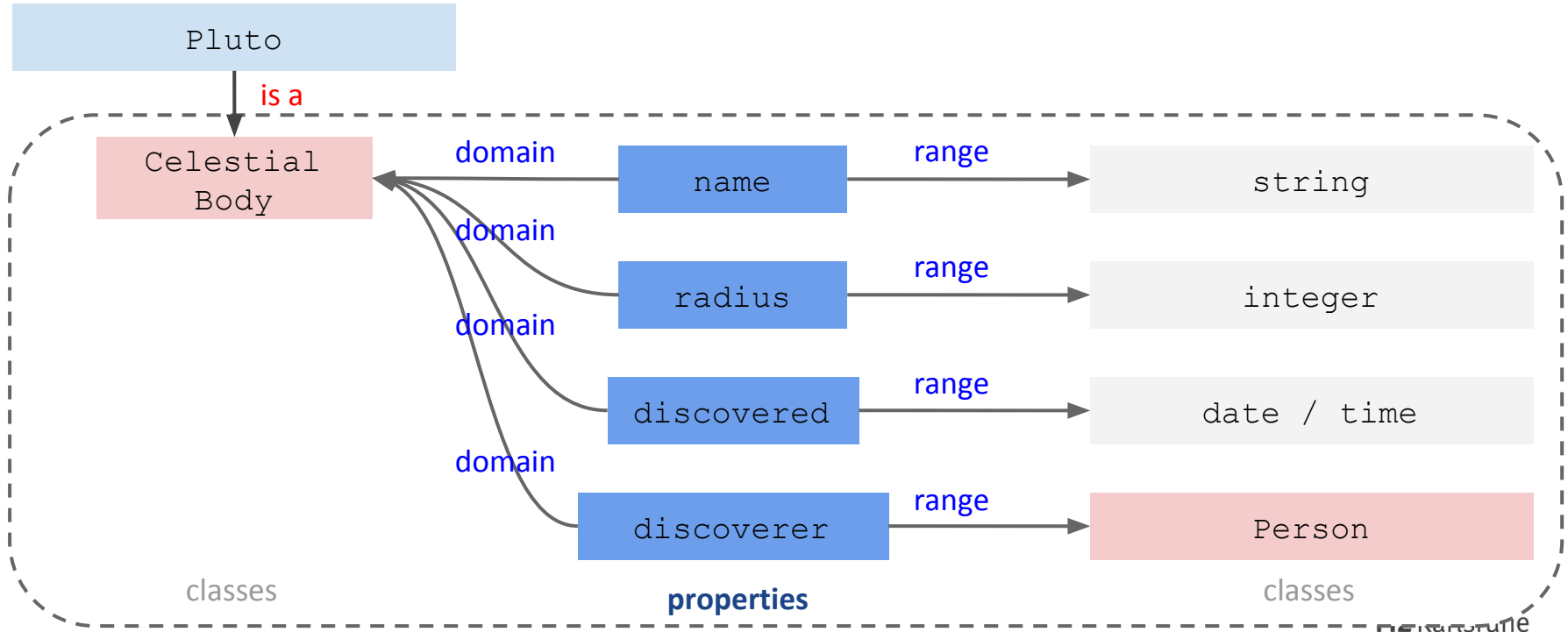
- The Meaning (Semantics) is expressed with the help of knowledge representations (**Ontologies**)



Understanding Information

Information Service Engineering - Lecture 3 Linked Data Engineering I - 3.1 Understanding Data on the Web

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P A R E N T A L

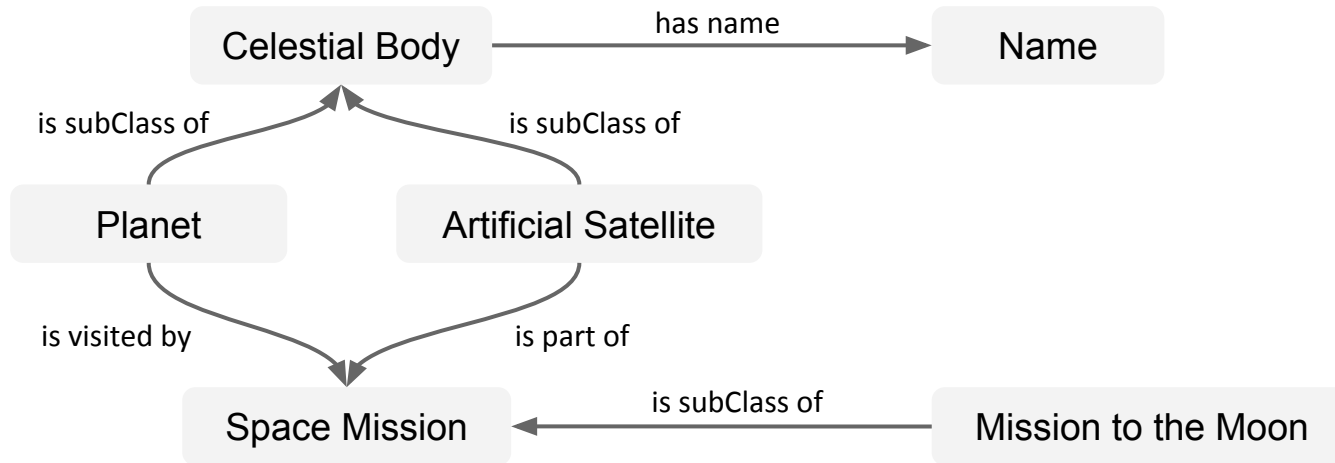
ADVISORY

EXPLICIT SEMANTICS

How to Represent Ontologies?

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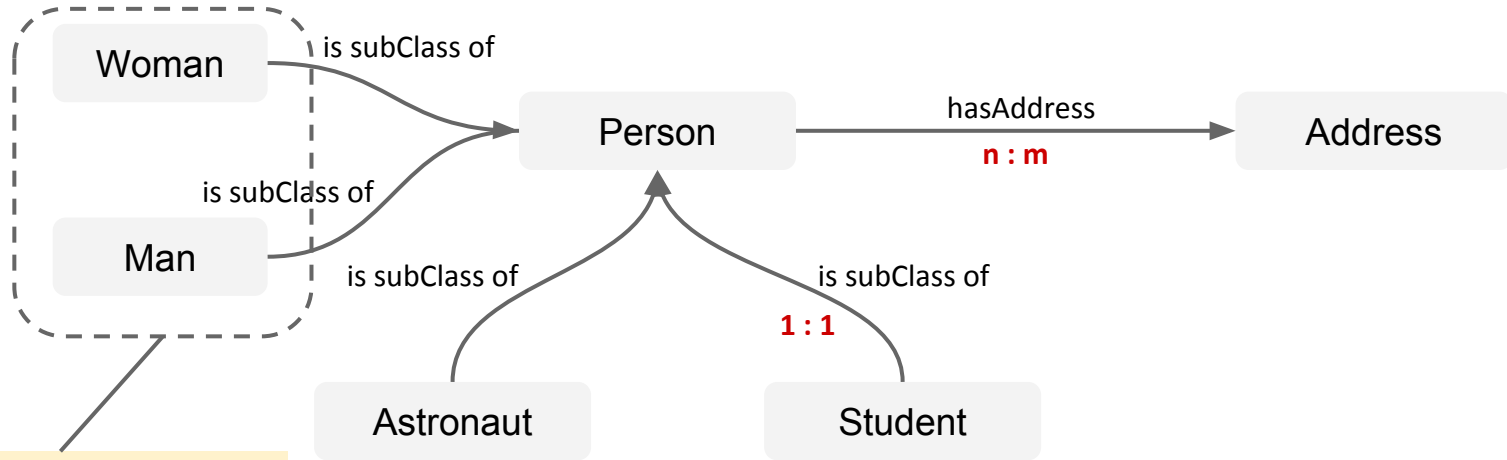
- Classes can be **related** to other classes
- **Relations** are special attributes, whose values are objects of (other) classes



How to Represent Ontologies?

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- For Relations and Attributes **Rules (Constraints)** can be defined that determine allowed/valid values



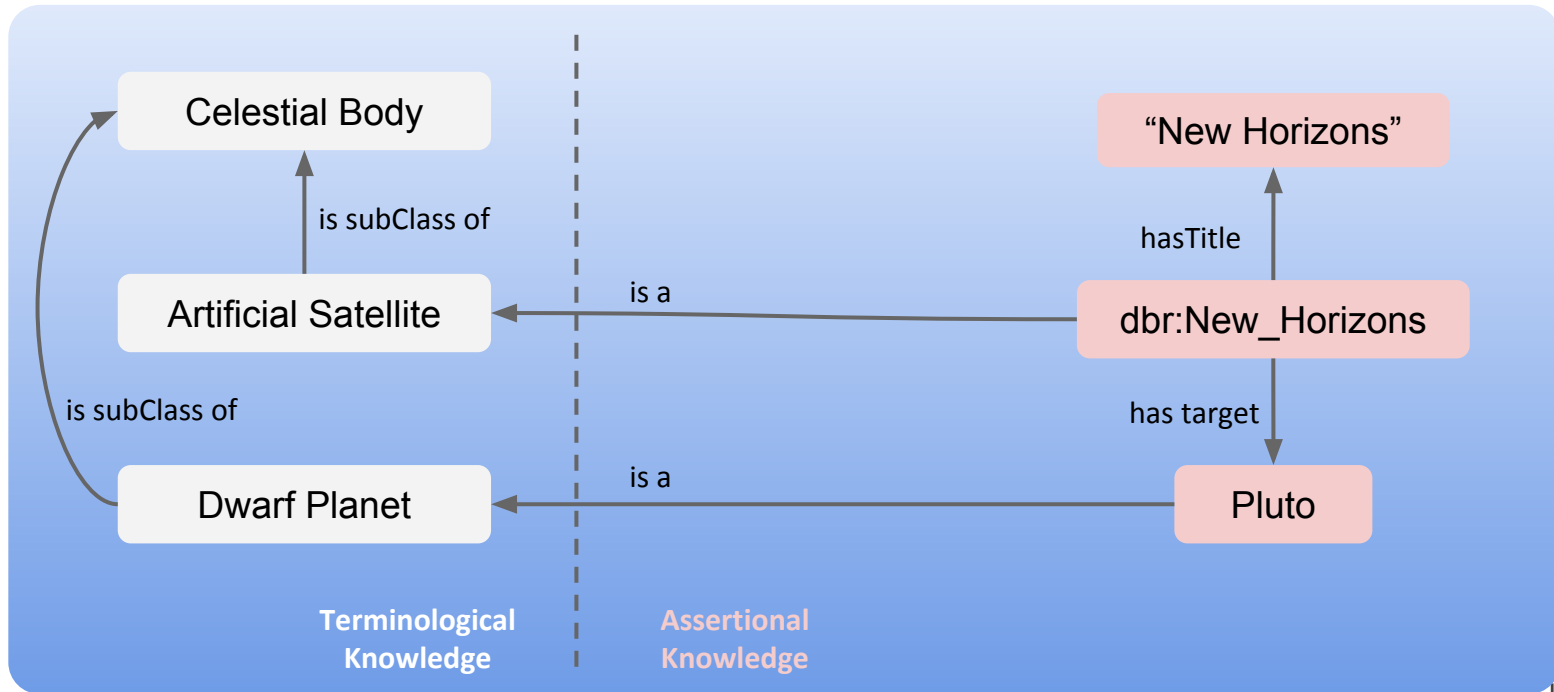
$$\text{Woman} \cap \text{Man} = \emptyset$$

constraint

How to Represent Ontologies?

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- **Instances** describe individuals of an ontology



Picture References:

- P.4: Four images from New Horizons' Long Range Reconnaissance Imager (LORRI) were combined with color data from the Ralph instrument to create this enhanced color global view of Pluto, NASA/JHUAPL/SwRI
https://solarsystem.nasa.gov/multimedia/gallery/01_Stern_03_Pluto_Color_TXT.jpg
- P.15: Heinrich Bünting, Stylized world map in the shape of a clover-leaf (the three classical continents of Europe, Asia, Africa), with Jerusalem at the center, with additional indication of Great Britain, Scandinavia and America / the New World. Page 4f. of Die eigentliche und warhafftige gestalt der Erden und des Meers (1581), printed in Magdeburg.
https://commons.wikimedia.org/wiki/File:1581_Bunting_clover_leaf_map.jpg