

OWL

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OWL

<https://github.com/mikel-egana-aranguren/ABD>



OWL

OWL: Web Ontology Language

[W3C-ren estandar ofiziala](#) web-ean ontologiak sortzeko, semantika zehatz eta formal batekin

[Web Semantikoa](#) garatzeko ekimenaren parte gisa sortu zen

OWL

Logika Deskriptiboan (DL) oinarritzen da

Ezagutza-arlo baten adierazpen konputazionala:

- Arrazonamendu automatikoa: "berria" (*) den ezagutza ondorioztatu, kontsultak, koherentzia, ontologiaren arabera entitateak sailkatu, ...
- Informazio sakabanatua integratu

RDF/XML sintaxia

```
<owl:Class rdf:about="#arm">  
  <rdfs:subClassOf>  
    <owl:Restriction>  
      <owl:onProperty rdf:resource="#part_of"/>  
      <owl:someValuesFrom rdf:resource="#body"/>  
    </owl:Restriction>  
  </rdfs:subClassOf>  
</owl:Class>
```

Manchester OWL Syntax sintaxia

Manchester OWL Syntax: `arm` subClassOf `art_of` some `body`

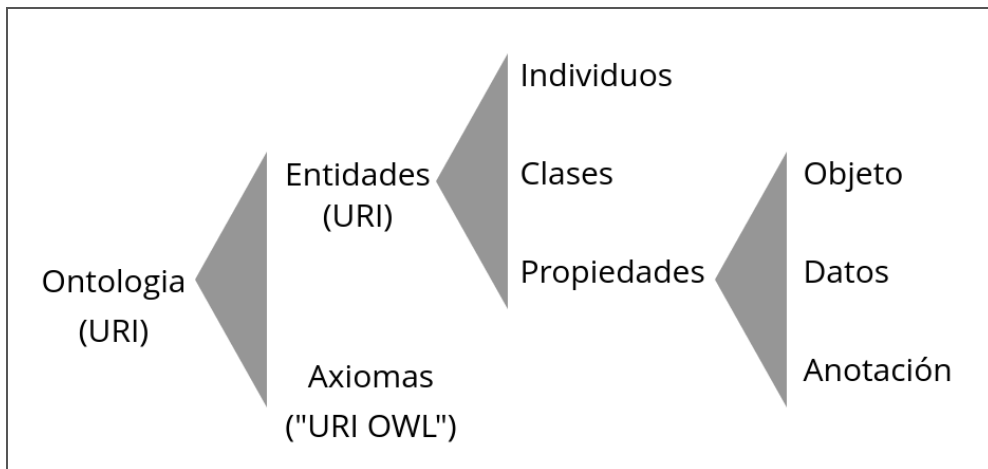
OWL semantika

Entidades: las entidades del dominio de conocimiento, identificadas con URIs, introducidas por el desarrollador ("Mikel", "participa_en", ...)

Axiomas: relacionan las entidades mediante el vocabulario lógico que ofrece OWL (namespace OWL)

Una ontología puede importar otra (owl:import) y hacer referencia a sus entidades mediante axiomas

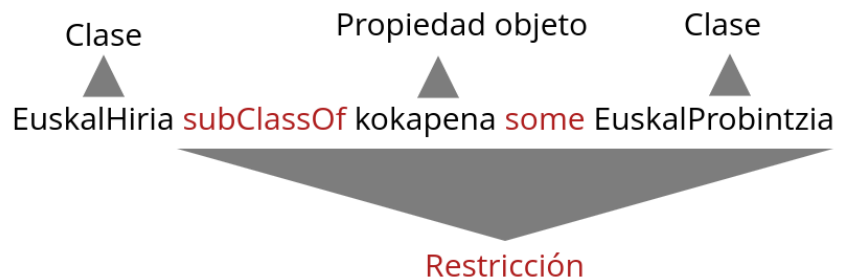
Semántica OWL



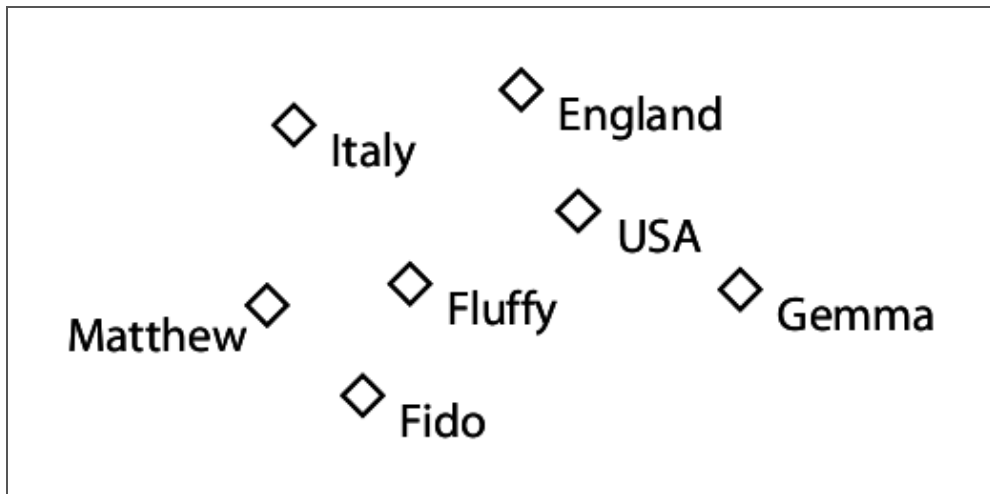
Semántica OWL

Axioma

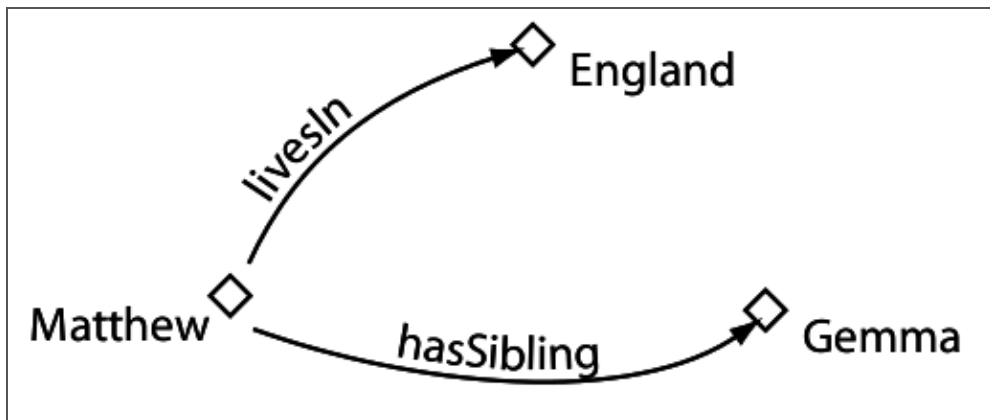
Entidad



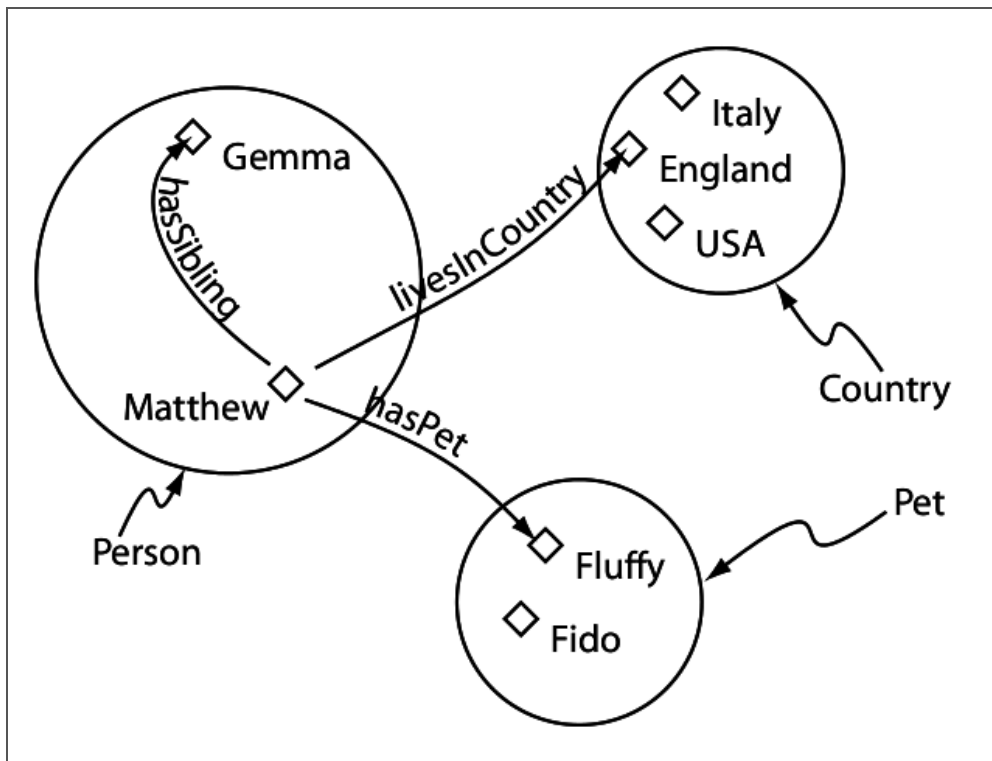
Individuos



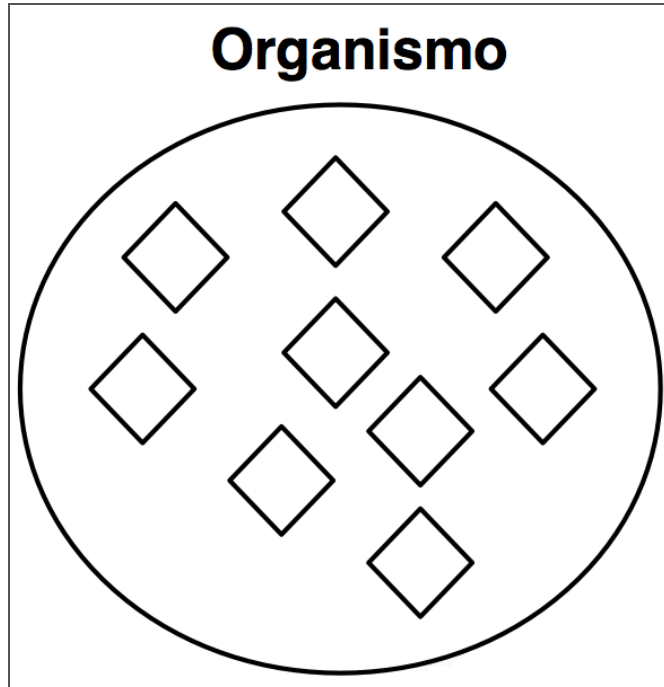
Propiedades



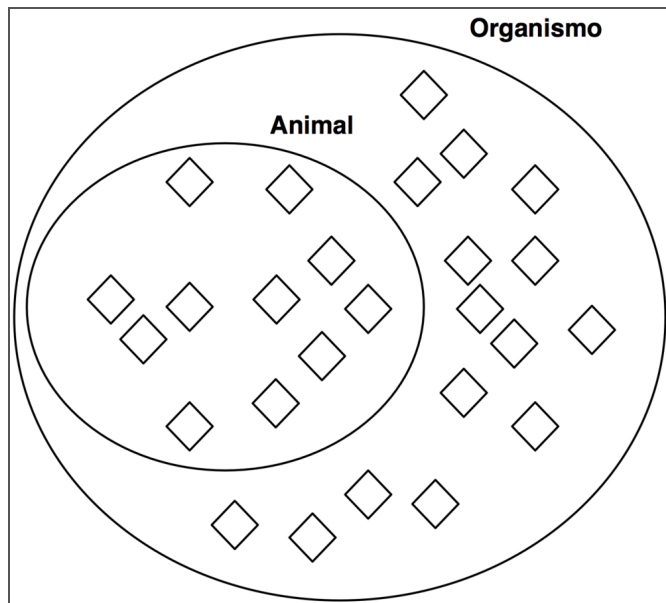
Classes



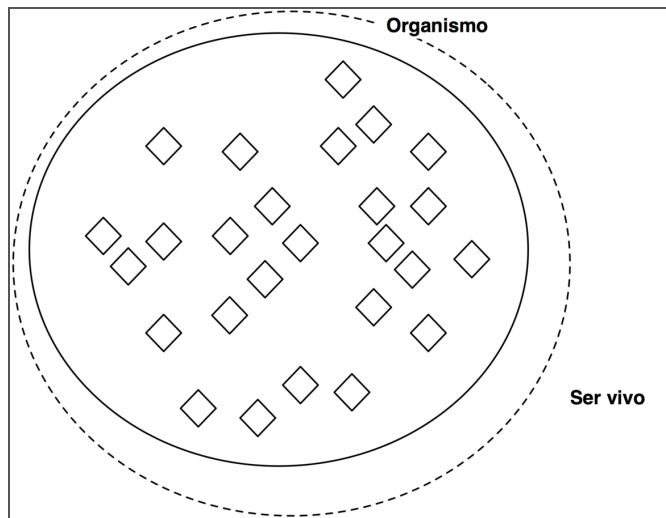
Classes



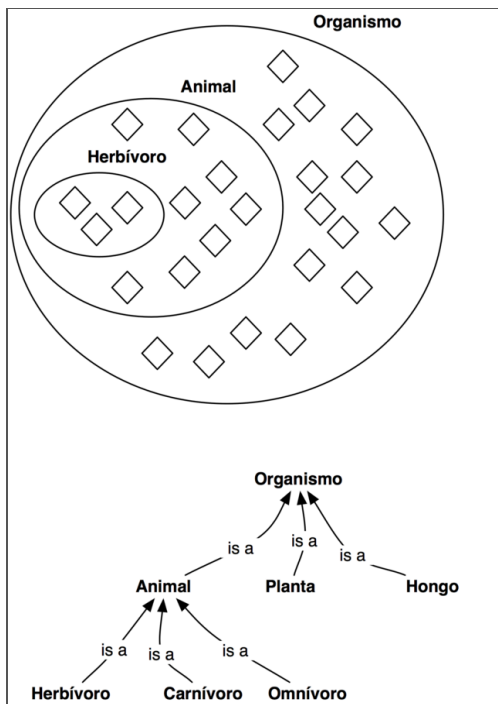
Classes subclasse



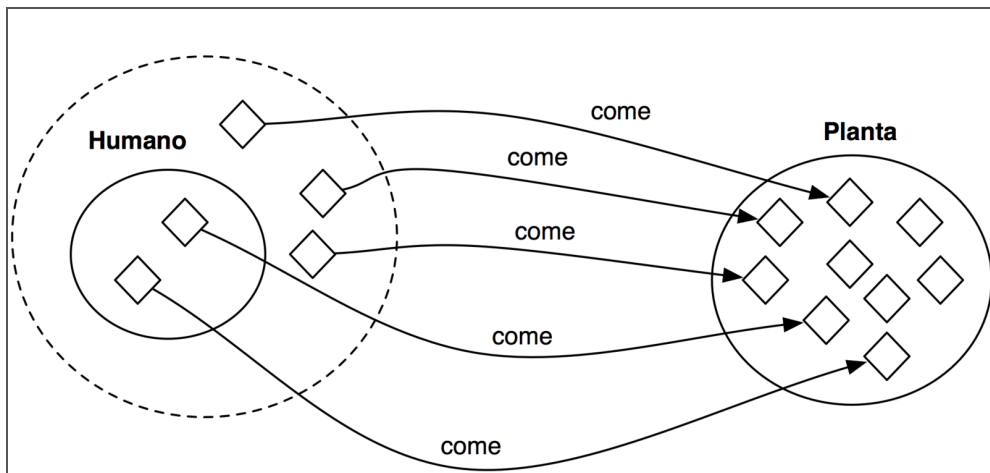
Clases equivalentes



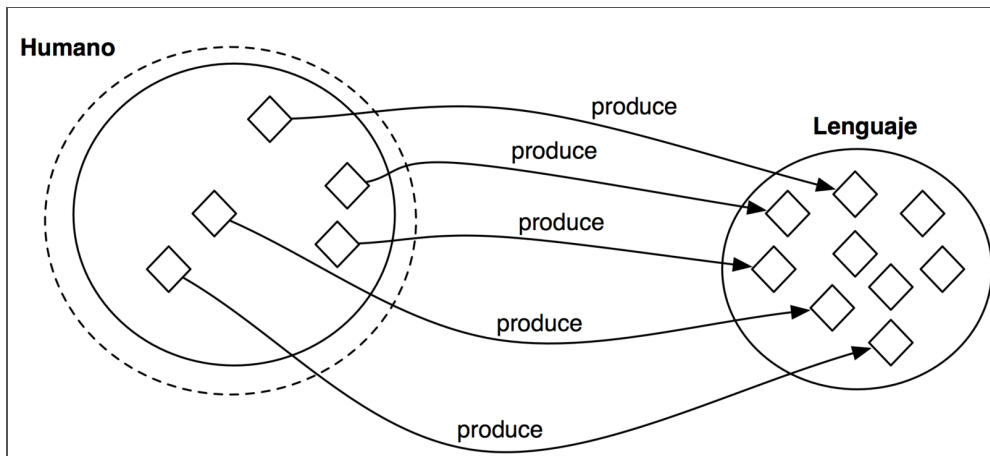
Jerarquía de clases (Taxonomía)



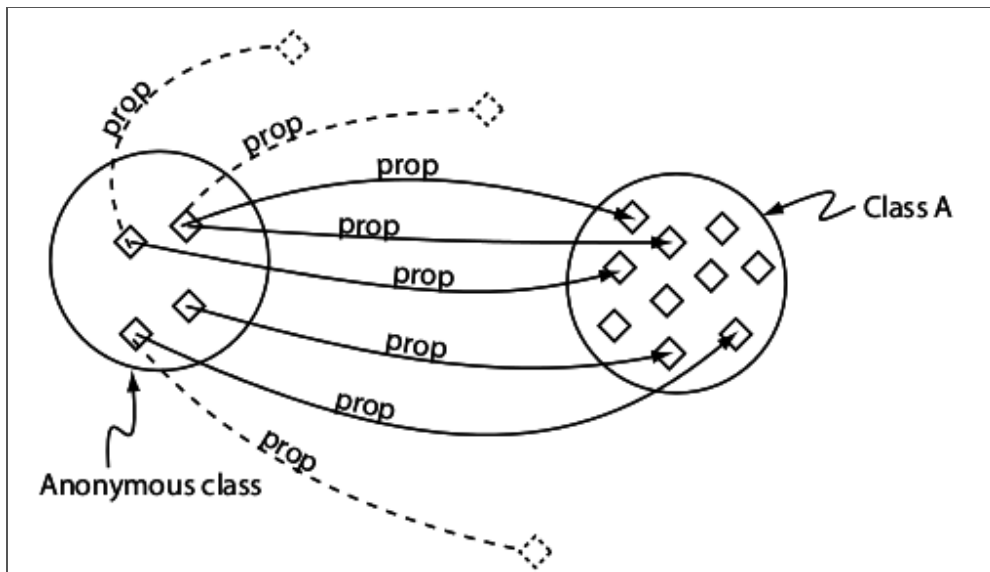
Condiciones necesarias



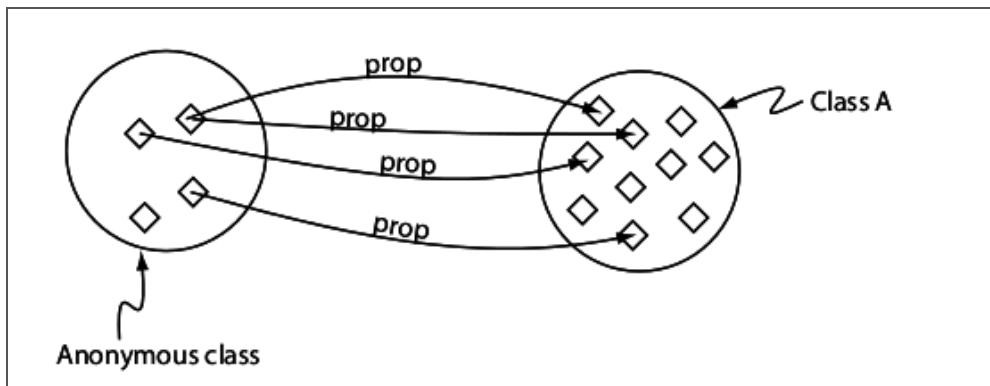
Condiciones necesarias y suficientes



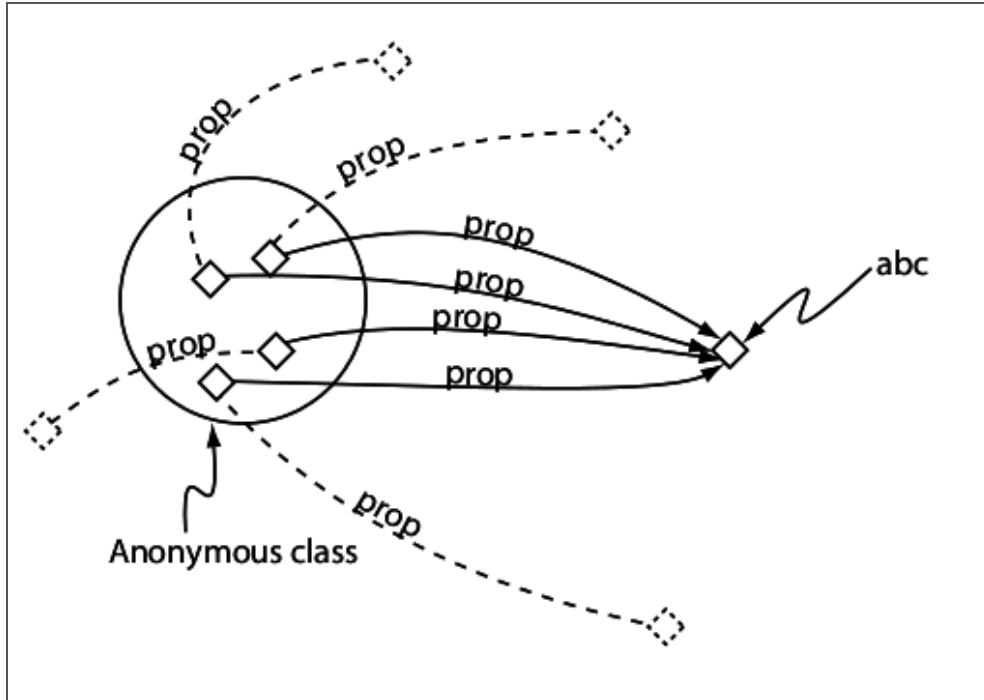
Restricción existencial



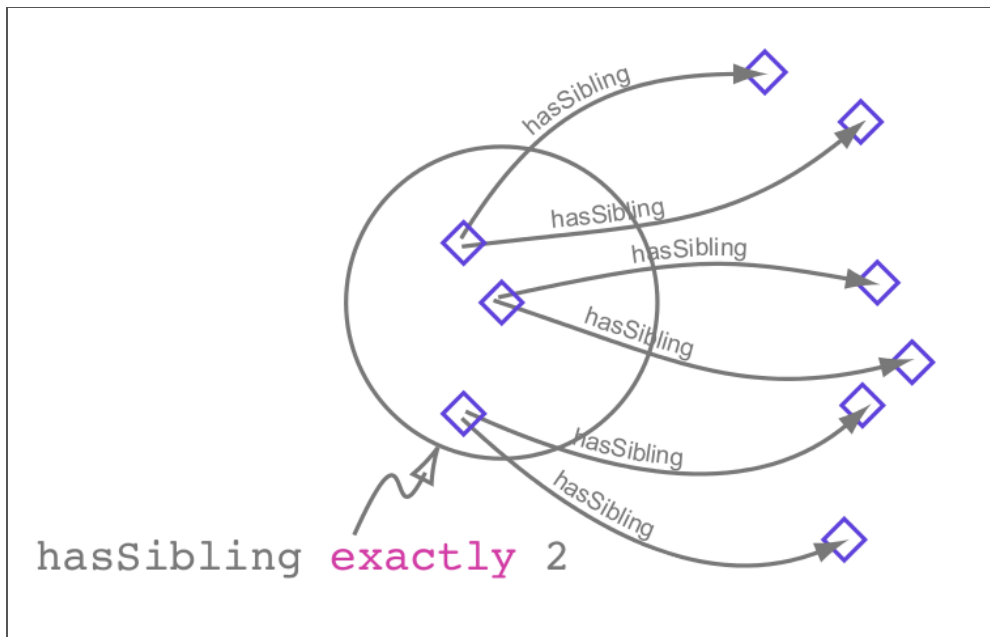
Restricción universal



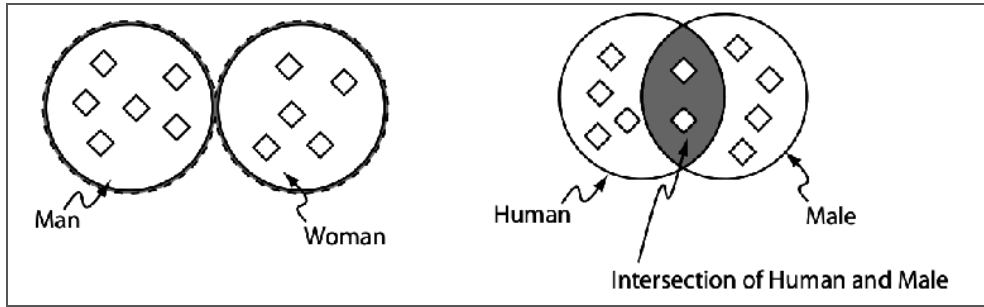
Restricción un individuo (value)



Restricciones cardinales



disjointFrom, not, or, and



Expresiones complejas

The screenshot displays a web-based interface for viewing Gene Ontology (GO) terms. On the left, a 'Class hierarchy' panel shows a tree structure starting from 'Thing' and descending through various GO terms, with 'Hypothesis_MYB_AP1_UP' selected. The main panel on the right shows the 'Annotations' and 'Usage' tabs, with the 'Description' tab active. The description for 'Hypothesis_MYB_AP1_UP' is displayed, showing a complex logical expression involving several GO terms and their relationships.

Class hierarchy: Hypothesis_MYB_AP1_UP

Annotations: Hypothesis_MYB_AP1_UP

Description: Hypothesis_MYB_AP1_UP

Equivalent classes:

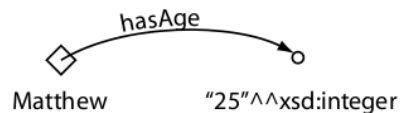
- transcription_factor exactly 1 (PRO_000009232 and (located_in_cellular_component some ((ECO_0000033 and GO_0005654) or (GO_0000790 and (evidence_code some ECO_0000203)))))
- target_gene exactly 1 (PRO_000010799 and (participates_in some (MI_0931 and (detected_by some MI_0438) and (has_participant only PRO_000009232))))
- hypothesis_entity only (PRO_000009232 or PRO_000010799)
- regulation some UP

Propiedades

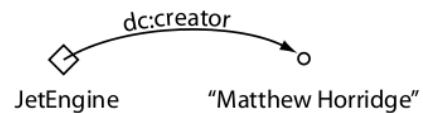
Propiedades objeto



Propiedades datos

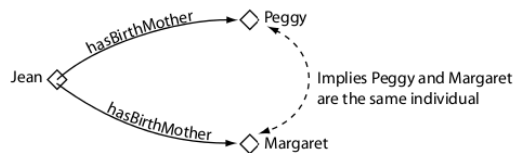


Propiedades anotacion

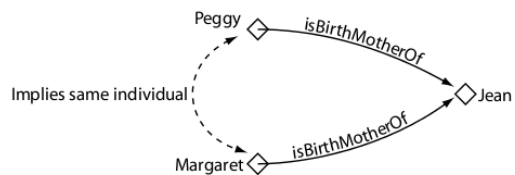


Propiedades

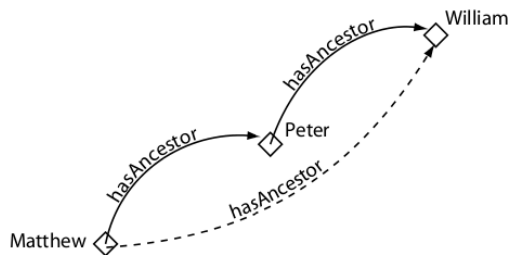
Funcional



Inversa funcional

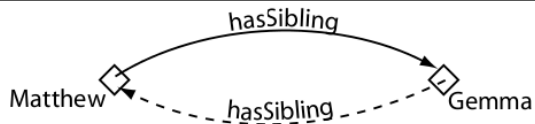


Transitiva

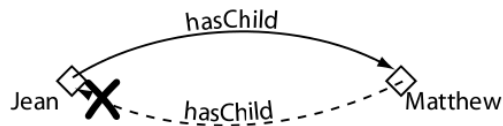


Propiedades

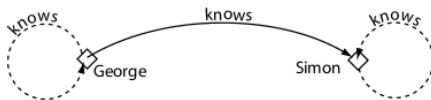
Simetrica



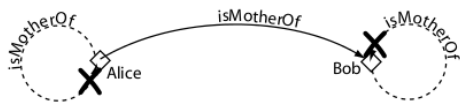
Antisimetrica*



Reflexiva

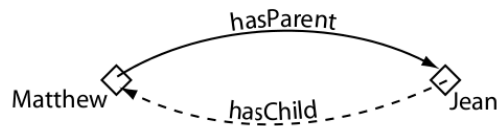


Irreflexiva*

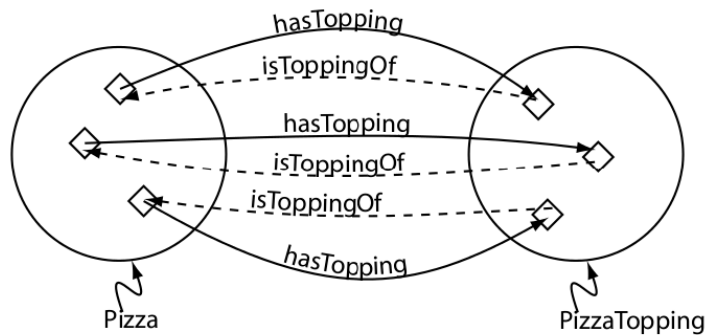


Propiedades

Propiedades inversas



Dominio y rango



Individuos

Miembro de una o más clases (Types)

Igual (SameAs) o diferente (DifferentFrom) a otro individuo

Relaciones binarias con otros individuos o datos (triples), positivas o negativas

Razonamiento automático

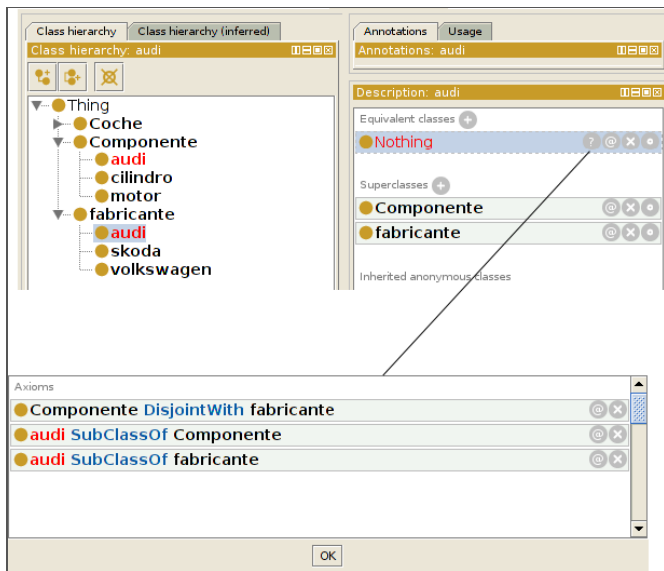
Un razonador infiere los "nuevos" axiomas que implican los axiomas que hemos introducido en la ontología

El razonador infiere todos los axiomas; es útil para tratar con conocimiento complejo

Open World Assumption

No Unique Name Assumption

Razonamiento automático: Consistencia

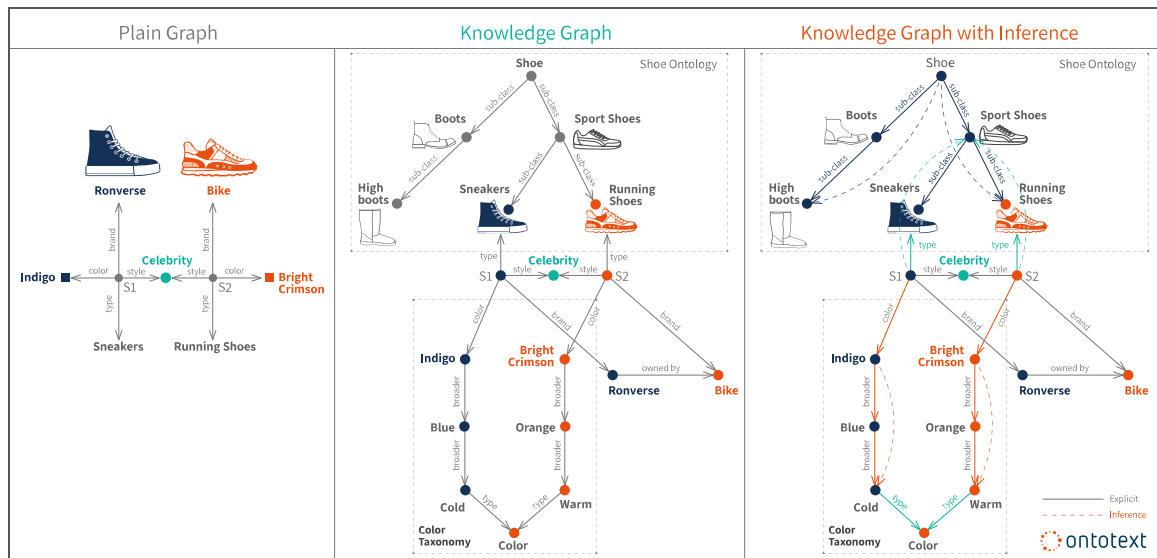


Razonamiento automático: Clasificar

Clasificar entidades: dada una entidad nueva, como se relaciona con las demás entidades (types, equivalentTo, subClassOf, triples)

Una consulta es una clase anónima que clasificamos contra la ontología como si fuese una entidad

Knowledge Graphs



Knowledge Graphs

WikiData: <https://www.wikidata.org/>

DBPedia: <https://www.dbpedia.org/about/>

Uniprot: <https://sparql.uniprot.org/>

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