



Web Ontology Language (OWL)

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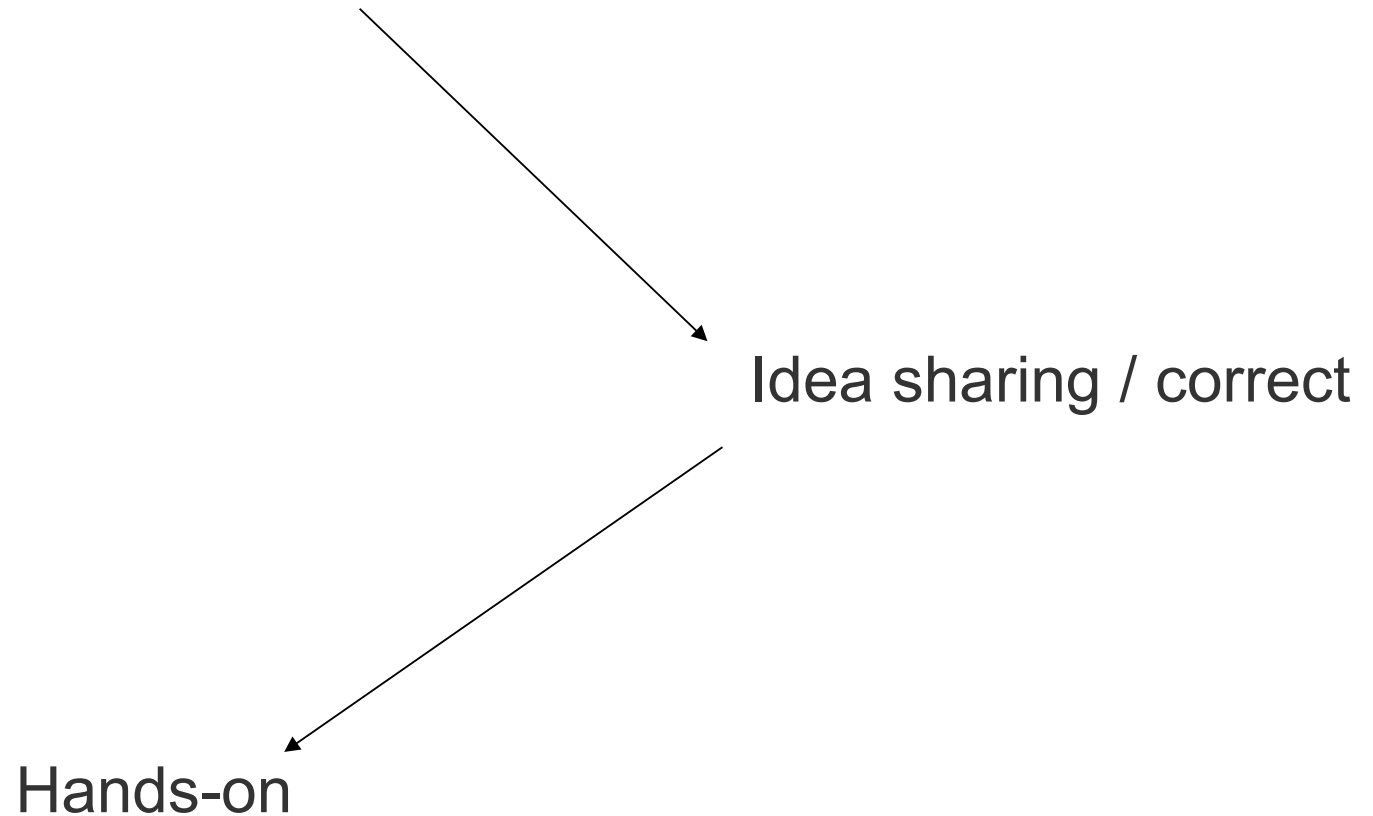
<http://www.oeg-upm.net>

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Research and fill the wiki
with content

<http://delicias.dia.fi.upm.es/athens2012/index.php/OWL>



Introduction to OWL and OWL entities (Me, ~ 30 min.)

OWL axioms

Theory content creation (You, ~ 30 min.)

Theory correction (All, ~ 15 min.)

Hands-on (You, ~ 15 min.)

Hands-on correction (All, ~ 15 min.)

OWL reasoning

Theory content creation (You, ~ 30 min.)

Theory correction (All, ~ 15 min.)

Hands-on (You, ~ 15 min.)

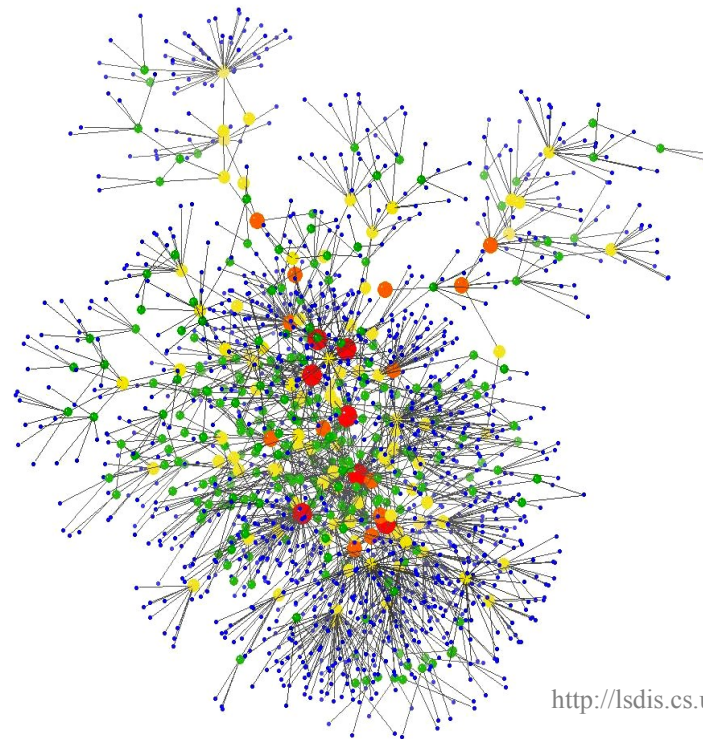
Hands-on correction (All, ~ 15 min.)

Introduction to OWL

Ontologies are computational models of knowledge

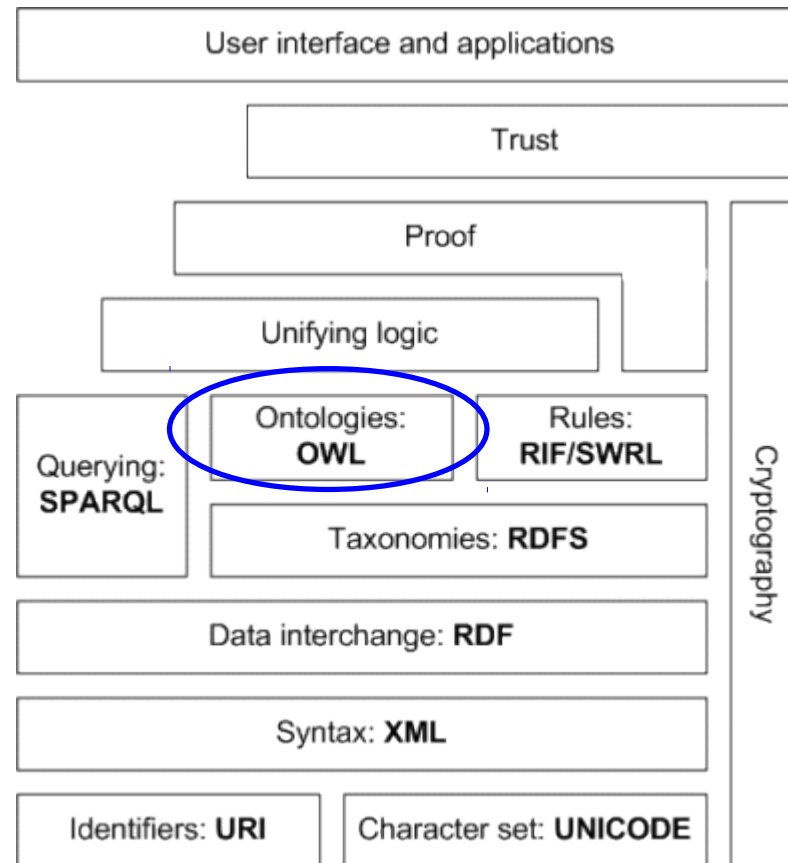
Domain knowledge is codified axiomatically in an ontology so that algorithms can operate on it for querying etc.

An ontology represents a consensus reached by a community



<http://lsdis.cs.uga.edu/projects/glycomics/report/Report2006.html>

OWL is a Knowledge Representation language proposed by the W3C as a standard to codify ontologies in a (prospective?) Semantic Web



OWL is based in Description Logics (DL)

We can represent a knowledge domain computationally in an OWL ontology, in order to

Apply automated reasoning: infer “new” knowledge, queries, consistency, classify entities against the ontology, ...

Integrate knowledge from different resources

...

Everything about OWL 2

<http://www.w3.org/standards/techs/owl>

Document overview

<http://www.w3.org/TR/2009/REC-owl2-overview-20091027/>

Primer

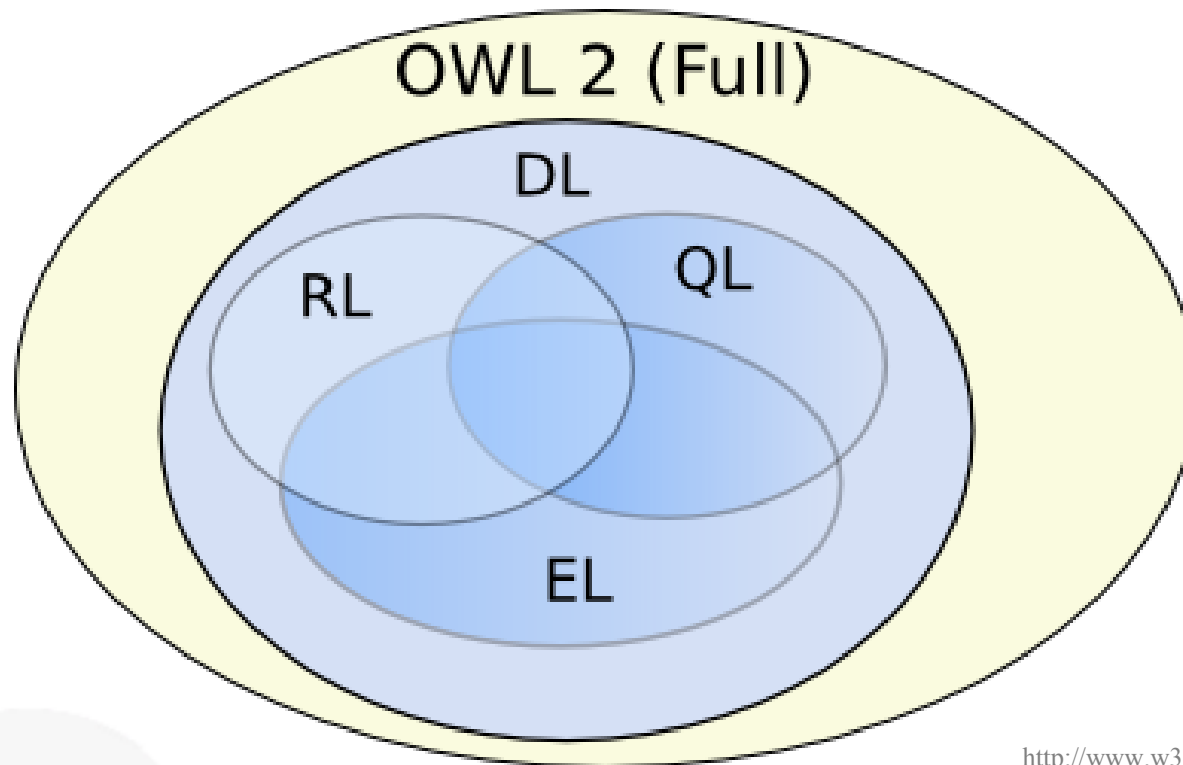
<http://www.w3.org/TR/2009/REC-owl2-primer-20091027/>

Manchester OWL + Protégé tutorial

<http://owl.cs.manchester.ac.uk/tutorials/protegeowltutorial/>

“OWL 1”: OWL lite, OWL DL, OWL Full

OWL 2 profiles



<http://www.w3.org/TR/2009/WD-owl2-overview-20090327/>

An OWL ontology is a *model* that can be serialised in different *sintaxes*

For computers: RDF/XML, OWL/XML, ...

```
<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>
```

For humans: Manchester OWL Syntax, functional, ...

```
arm subClassOf part_of some body
```

Ontology editors:

Protégé: <http://protege.stanford.edu/>

TopBraid composer:

http://www.topquadrant.com/products/TB_Composer.html

NeOn toolkit: <http://neon-toolkit.org>

APIs:

OWL API: <http://owlapi.sourceforge.net/>

Reasoners:

Pellet: <http://clarkparsia.com/pellet/>

HermiT: <http://hermit-reasoner.com/>

FaCT++: <http://code.google.com/p/factplusplus/>

Racer: <http://www.racer-systems.com/>

OWL entities

An OWL ontology comprises

Entities: the named elements from the knowledge domain, created by the ontology creator. Entities are identified using URIs (To work in a web setting)

Axioms: axioms relate the entities to each other using the OWL logic vocabulary

An OWL ontology can import other ontologies ([owl:import](#)): the entities of the imported ontology can be referenced by axioms on our ontology

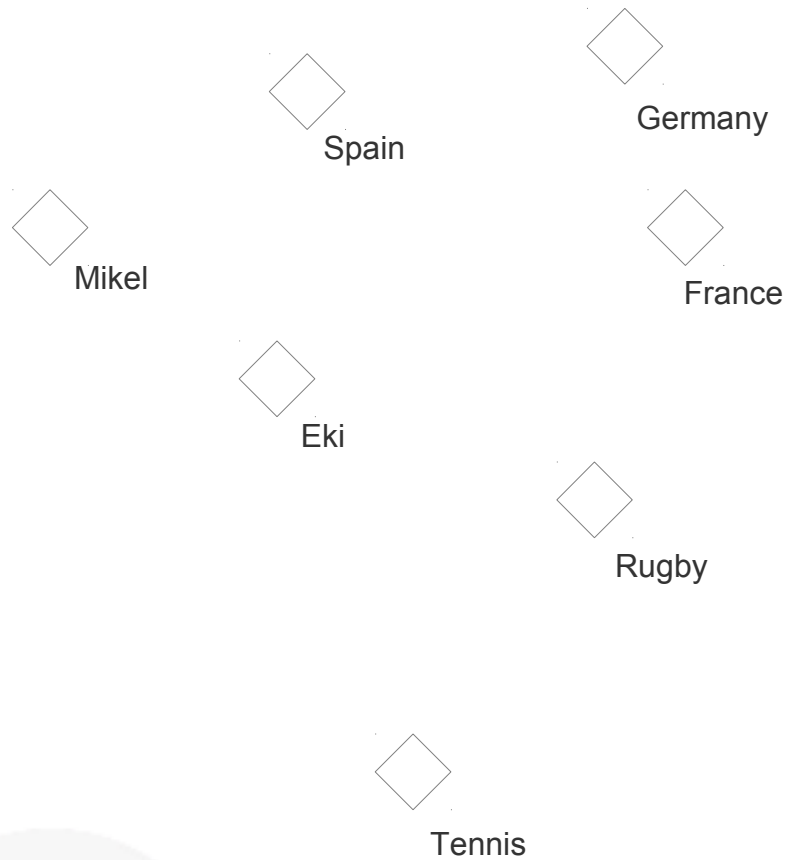
There are three types of entities in an OWL ontology

Individuals

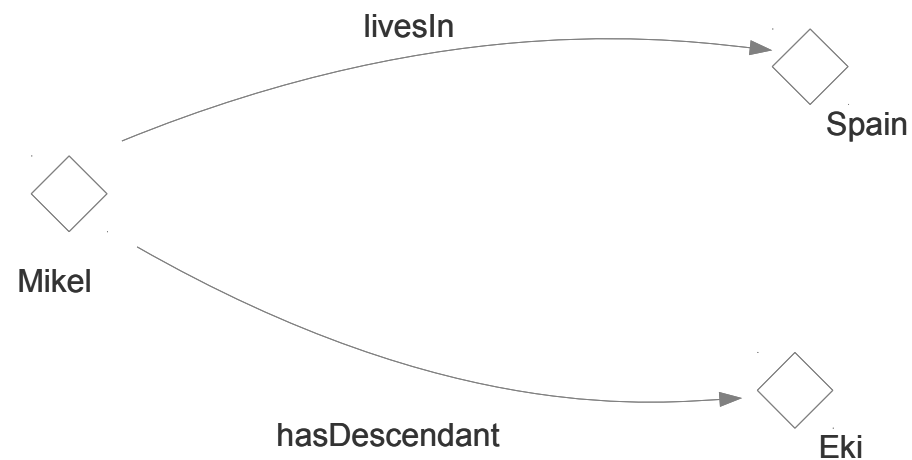
Properties

Classes

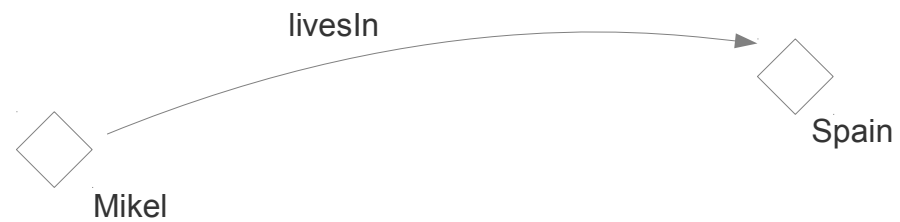
Individuals: the objects of the knowledge domain



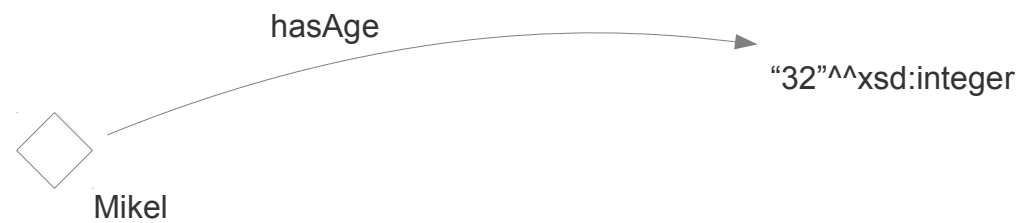
Properties: they can be used to link individuals in binary relations



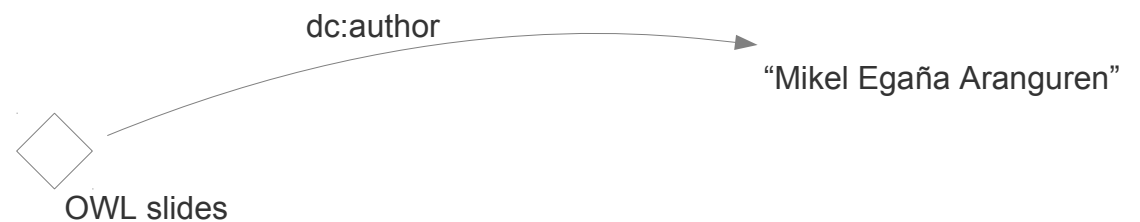
Object Properties



Data Type Properties



Annotation Properties*



Classes: sets of individuals with common characteristics

