

Knowledge Representation Laboratory 9: OWLReady

CITS3005

This laboratory will involve converting the basic OWL ontologies from laboratory 8 to Python Ontologies using OwlReady 2.

1. Install Owlready2 following the instructions at <https://owlready2.readthedocs.io/en/v0.44/intro.html> to familiarise yourself with the key elements of the interface.
2. Using <https://owlready2.readthedocs.io/en/v0.44/intro.html> as a reference, convert the bacteria ontology from laboratory 8 to an owlready ontology.
3. Reattempt the following exercises, using Python and OwlReady2:
 - (a) In the bacteria ontology, add an individual of the *Staphylococcus* class having a rod shape. Run the reasoner; what do you observe?
 - (b) Extend the ontology of bacteria by adding the catalase test. This biological test helps to identify bacteria, and its result can be positive or negative. The catalase test is positive for *Staphylococci* and *Pseudomonas*, negative for *Streptococci*.
 - (c) Extend the bacteria ontology by adding the colour of the bacteria. *Staphylococci* are white or golden (this is the famous *Staphylococcus aureus*), *Streptococci* are translucent, and *Pseudomonas* are generally coloured (that is to say, not white).
 - (d) Add a new class of bacteria: *Mycobacterium leprae* (Hansen's bacillus, which causes leprosy). This species of bacteria is Gram positive, rod shape, and isolated or grouped in pairs. The catalase test is not relevant for this bacterium because it is very difficult to grow in vitro. The colour is yellow. Finally, all of these characteristics are sufficient to identify the bacteria.
 - (e) Create an individual of the class *Bacterium*, rod shape, isolated, and yellow in colour. Check that this individual is properly classified as *Mycobacterium leprae*.
 - (f) In the ontology of bacteria, add a disjunction between the different subclasses of *Bacteria* (*Staphylococci*, *Streptococci*, *Pseudomonas*, etc.). Does this change the result of the reasoning on the unknown bacterium?