4. Programming OWL Ontologies with OWL API

Exercise 4.1 Programming OWL Ontologies with OWL API

1. Install a modern Java IDE. IntelliJ IDEA is recommended.
2. Tutorial of OWL API by (outdated) slides
   - OWL API is a Java API for creating, manipulating and serialising OWL Ontologies. [1]
   - https://github.com/owlcs/owlapi/wiki/Documentation
   - Latest version 5.1.0 (released in March, 2017)
3. Try and study the code of OWL-Toolkit [2]
4. Implement a converter from OWL to first order logic formulas following the algorithm as on pages 52–55 in KRO-2-dls.pdf (Part 2: Description Logics).
   - Tip 1: Use the Visitor Pattern:
     - `OWLAxiomVisitorEx`,
     - `OWLPropertyExpressionVisitorEx`,
     - `OWLClassExpressionVisitorEx`
   - Tip 2: Unicode logical symbols are available at Wikipedia `https://en.wikipedia.org/wiki/List_of_logic_symbols`
   - Certain OWLAxiom types are just syntactic sugar of certain $\mathcal{ALC}$ notions, e.g.:
     - OWLSubClassOfAxiom
     - OWLSubObjectPropertyOfAxiom
     - OWLObjectPropertyDomainAxiom
     - OWLObjectPropertyRangeAxiom

[1] `https://github.com/owlcs/owlapi`
[2] `https://github.com/ghxiao/owl-toolkit`