Mestrado (Integrado) em Engenharia Informática
Universidade Nova de Lisboa

Knowledge Representation and Reasoning Systems
First Project (due on October 22 in Portugal)

– Ontology Development –

1 Objective

In this project, we want you to experiment with an ontology editor and its reasoners, and employ what you have learnt so far, in theory, in the development of an ontology. One goal of this project is also to promote your skills to conduct independent unsupervised work. This is why this project is intentionally underspecified. You should keep its goals in mind, and decide how to proceed accordingly.

2 Tasks

To achieve the goals, you should start by downloading and installing the Protégé Ontology Editor,[1] and learn your way around Protégé and its reasoners by following the tutorial, available in CLIP, and further complementary information.[2] You may also use WebProtégé (the registration is simple and free), which allows you to work cooperatively on a project, but edition of features is more limited compared to the Desktop version and the server is external (see Chapter 12 of the tutorial on the pros and cons of WebProtégé).

The objective is create an interesting ontology on a domain of your choice. Do not get carried away and develop a huge ontology. It should demonstrate interesting use of a reasoner – ideally, it should be satisfiable. If not, identify problems and efforts made to trace them. Note that an interesting ontology with sensible test procedures that did not quite succeed is preferable over a trivial one with no testing procedures.

As already mentioned, the topic/domain you want to represent is up to you, you should, however take the following indications into consideration:

- Permit some interesting usage of ontology-based data access using ontop (material on how to do this will be made available in the course of the practical class later on October 9/10);
- Permit some interesting usage of data in your ontology besides that of using OBDA;
- Use at least two different description logic constructors that are not part of $\mathcal{ALC}$ and use them when demonstrating the interesting usage of a reasoner;
- Include some general class axiom, and show its usage.

Finally, one possible example (just to give you an idea on the possible scope) is given as follows:

- Extend the university ontology (focussed on people in the university - students, professors, stuff - we will see an example in the tutorial on OBDA) to cover other aspects of the university domain such as:
  - Accommodation – buildings, staff, etc.
  - Study facilities – the library, what it contains, how it is used, who uses it, who works
  - Greater detail on teaching activities – different kinds of labs, lecturers, etc.
  - Eating facilities, shops etc.

[1] `http://protege.stanford.edu/`
[2] `https://protegewiki.stanford.edu/wiki/Main_Page`

3 Deliverables

You should send a single zip file labelled with your student numbers (in groups of two students) to `mkn@fct.unl.pt`. The file should contain:

- The ontology itself;
- The complementory files for realizing the OBDA usage;
- A report (single PDF file in English or Portuguese) explaining:
  - Purpose and scope of the ontology including limitations and workarounds;
  - The decisions made and the rationale for them;
  - Special features and problems encountered;
  - What you would like to have done, but did not know how to do;
  - What inferences can be drawn (and what tool(s) did you use to that end);
  - A brief explanation of your choices regarding the given indications to be considered;
  - The testing procedures and whether they were passed;
  - Any additional material you added.
- If you wish, you can add a section to the report with comments and suggestions about this project, and how to improve it.

The usage of AI-based tools (LLMs etc.) is permitted (e.g. for aiding to write the report) as long as it is not excessive and the usage is concisely documented in the report.

Collaboration between different groups is not permitted. In case of plagiarism all groups involved will fail the course.