Semantic Web
Lab Assignment 4

Goal: *Be able to create ontology and instance data using Protégé and OWL*

Download and install the latest release of Protégé at http://protege.stanford.edu/.

Windows, Linux, and Mac users

Select "Download now"

Download options:

Download the latest version (as of 10/19/2015, "Protégé desktop 5.0 beta"). The platform independent version may be the best option for novice computer users as it does an automatic install.

Save to local machine (in handy location) and run the installer.

To run:

See the installation instruction on the Protégé website for your version and specific OS. The following is a general guide.

Unzip the "protege-5.0.0-beta-xx.zip" to a handy location, it makes a directory "./Protege_5.0_beta".

Windows: In the ./Protege_5.0_beta directory, run (double click) the "run.bat" file.

Linux: In the ./Protege_5.0_beta directory, execute the "run.sh" file.

Mac: In the ./Protege_5.0_beta directory, execute the "run.command" file. Apple security may prevent it from running the first time, so use System Preferences → General to see the ' "run.command" was blocked…' message, then use the "Open Anyway" button to start it.

It might be slow to start, but prints messages to a terminal window.

Other users

Select "Use Web Protégé"

You may use the Web Protégé hosted by Stanford, or install it locally. I like my tools to be local, but it is up to you.

The tutorial, below, was written for the Windows version. Owl:imports are a challenge: create a basic ontology, save it, and download it to local file. Add owl:imports using a text editor, then upload it and it will ask additional questions.

1. Protégé OWL Introduction

See the "Protege Introduction.pdf" for a presentation and reference on the essential screens used in Protégé.

Work through Ch 1-4.7 of the Protégé Owl 4 Tutorial v1.3:

See the file "Protege OWL Tutorial v1_3.pdf"

Also at:

http://owl.cs.manchester.ac.uk/publications/talks-and-tutorials/protg-owl-tutorial/

At this point, you may ignore the discussion regarding add-ons and pre-requisites. The serious changes are at Protégé start-up (near start of Chapter 4):

After getting started, the tutorial says a "Create Ontology URI" wizard will appear (but it doesn't appear – the tool starts up ready for work in OWL).

NOTE: Protégé properly calls the namespace an IRI instead of URI in the tutorial.

- Use the tutorial's provided Ontology IRI (as directed in Exercise 2).
- Put ontology file in a convenient location you can find again.
- When you save your files, select OWL/XML as the type of file.

For more information on the opening screens see:

http://protegewiki.stanford.edu/wiki/Protege4GettingStarted

and note that we use the Protégé Owl views)

After the wizard finishes, the view is set to the "Active Ontologies" tab. We haven't added the common plug-ins, so the view is simpler than in the Tutorial. Add the comment as described in the Tutorial and proceed on to the Tutorial's section 4.1.

Continue performing the instructions of chapter 4.1 through 4.7 of the Tutorial (using hints below to make it through since the tutorial is a bit different than the tool).

Hints:

Exercise 6 – You may have to scroll the Description pane to see the added disjoint classes.

Exercise 8 – You have to select the topObjectProperty in the window and select to make a sub-property of it.

Exercise 10 – Step 1: You have to select the topObjectProperty in the window and select to make a sub-property of it.

Step 4: In the sub-window you should first select isIngredientOf and make sub-property isBaseOf

Step 6: You have to first select isIngredientOf and make sub-property isToppingOf

Exercise 13 – Step 3: When the dialogue pops up, select the class Hierarchy tab and navigate to the desired class.

Before Exercise 15 (NOTE) – We have not added the necessary plug-in's for Protégé to automatically populate the inverse properties with domain and range.

2. **Read and understand how Protégé Handles Owl Imports:**

   http://protegewiki.stanford.edu/wiki/Importing_Ontologies_in_P41
   The older docs may also provide some helpful information:
   http://protegewiki.stanford.edu/wiki/How_Owl_Imports_Work and
   http://protegewiki.stanford.edu/wiki/How_Owl_2.0_Imports_Work
   The link from the P41 page to the Owl_2.0 page is misconfigured, so you'll need to type in the above two URLs.

   Note that previous versions of Protégé had an Ontology Repository Manager to help specify where to retrieve ontology files. In this version of Protege, the Ontology Repository Manager is now a mixture of items on the file menu and in the Active Ontology tab that look nothing like in the document above, but the required functionality is available:

   a. Loaded ontology sources
   b. Edit ontology libraries
   c. Edit active ontology library
   d. Gather ontologies
   e. Add the Ontology imports item (on the Active Ontology tab)

3. **Create a new ontology file with IRI:**

Name the IRI http://utdallas.semtech/class/Lab4_1.owl
It should supports OWL/XML. Save project in file named "lab4.owl" in an empty directory named Lab4_3_<YourID> where <YourID> should be replaced with your first initial and lastname.

Modify the metadata of the ontology to include prefix "sc" (short for semantic class) associated with the namespace.

Add a copy of the FOAF ontology named "FOAF.rdf" to the same directory as your owl file. Then, add it as an import to your ontology:

a. Copy the provided file, "foaf.rdf" to the same directory as your .owl file.

b. Add the file as an import to your ontology:

With your .owl file open in Protégé, on the Active Ontology tab, there is a tab near the bottom named Ontology Imports – select that and choose "Direct Imports" and the select "Import an Ontology contained in a specific file".

Your ontology now imports (i.e. includes) FOAF, which is relatively large and somewhat complicated and additionally uses some of the Dublin core definitions. When Protégé first adds this import, it creates a "catalog*.xml" file in the directory—leave that for Protégé to use. You should review the file. The contents should start to make sense for how Protégé handles owl imports.

Then add a class named "Person" and say that foaf:Person is a subclass of it where foaf: here just refers to the appropriate namespace. (The Superclasses item is useful). Note that you need to hover your mouse over class names in the Class Hierarchy view to understand their namespace.

Add the following datatype properties with noted domains and ranges:

Property	Comment	Domain	Range
sc:title	Name of position held as part of an organization.	sc:person	String
sc:email	E-mail address	sc:person	String

Add an instance of type "sc:Person" with properties shown in the table below. Note that the prefix "sc:" refers to the default namespace (the Individuals tab in the Members List area and then Properties assertion area may be of some help):

Property/ID	Value
Node ID	sc:KevenAtes
sc:email	atescomp@utdallas.edu
sc:title	Lecturer
foaf:firstName	Keven
foaf:surname	Ates

4. Save

Save your project, restart Protégé, and reload your project. Confirm the desired structures and data are still there. Be prepared to discuss any changes in class.

Please compress your entire directory of owl files from steps 3 and 4 into one zip file and submit the zip file on eLearning.

Grading (100 points):

-100	Nothing submitted
-25	FOAF.rdf not included
-10	Incorrect sc: namespace
-10 each	Missing any sc: property definition
-5 each	Missing sc: domain definitions
-10	Lacking FOAF import
-10	FOAF import from web rather than local file
-5	Incorrect directory or filenames