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1. Overview

Protégé is a free, open-source, ontology editor.

Please note Protégé is available in two ways:

- WebProtégé: A web application that you can run from your browser (**We will be working with the Web application/platform in this tutorial.)
- Protégé Desktop: Desktop software that needs to be installed on your computer.

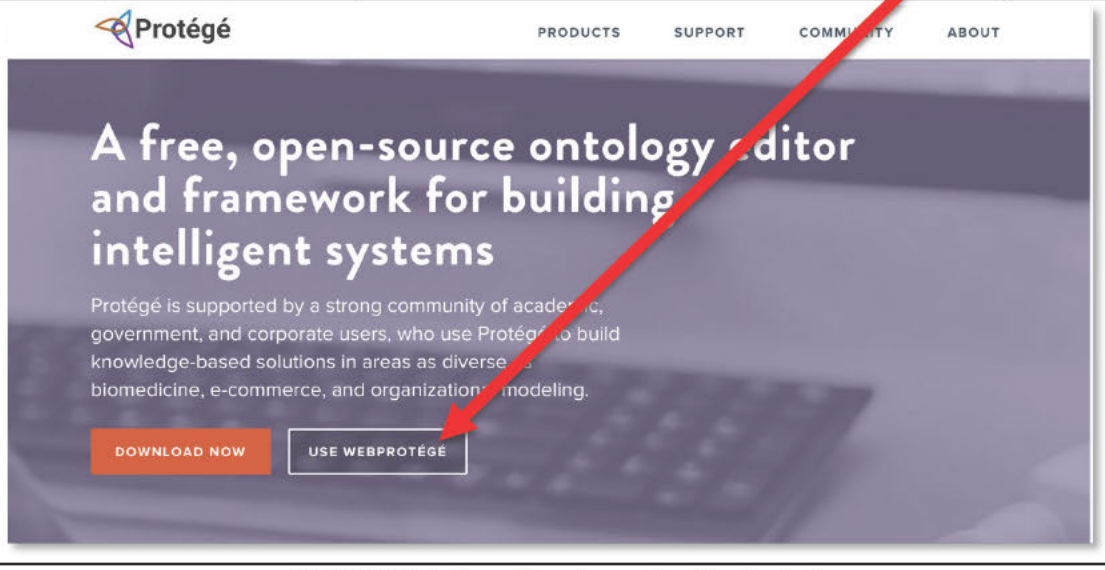


FIGURE 1: https://protege.stanford.edu/

For LEADING, we will be working with the Web application so you may start to see the basic functions of the software.

Protégé provides a convenient way to deal with the technical and visual aspects of making an ontology. It's important to emphasize that working with and building the ontology comes after you have thought through the ontology. If you can't yet sketch out your ontology on paper, you're not ready to go into Protégé. Said another way, before you launch your own Protégé project, **make sure you've thought through the different classes/subclasses, properties**, etc., in your ontology.

2. Getting Started with WebProtégé

To get started with Protégé, go to: http://webprotege.stanford.edu with WebProtégé . You will see a login screen.

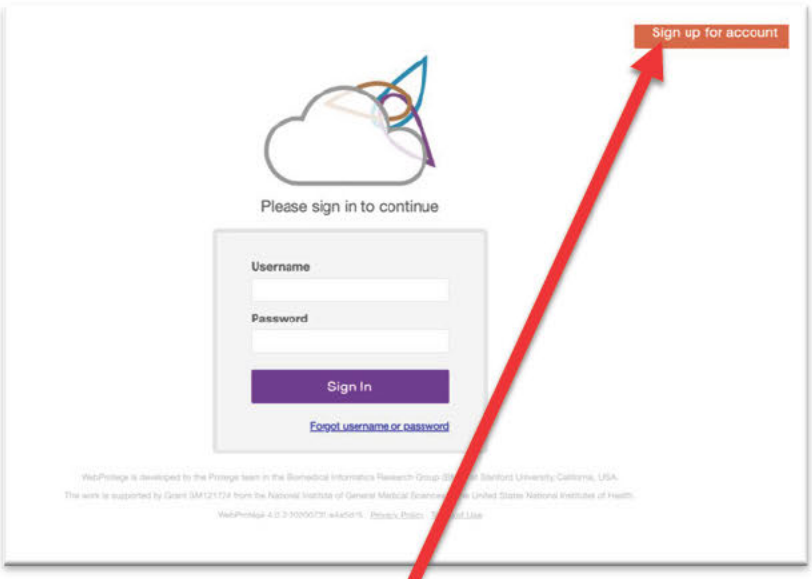


FIGURE 2: http://webprotege.stanford.edu

At the top right, click *Sign up for an account*. Fill out the form and then click Create Account. You should get a message saying *Registration complete.*

Now you can sign in. **Enter your username and password and click *Sign in***. You will see something like this:

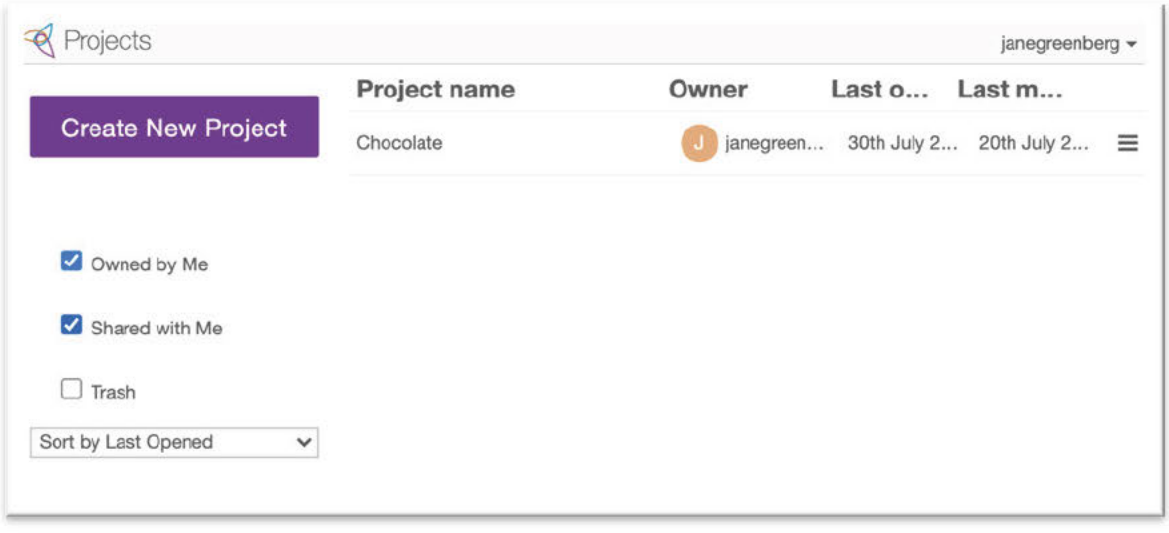


FIGURE 3: https://webprotege.stanford.edu/#projects/list

You are signed-in!

3. Creating a New Project

Click the *Create New Project* button at the upper left (FIGURE 3, PURPLE BUTTON). Give it whatever name you like and a description. Note, for future reference, you can upload a file if you already have something started.

The project you created will now appear in the list. On this page.
Click the ≡ symbol at the righthand side and select *Open* (FIGURE 3,far right-hand side)).

You will then come to a screen like the one shown below, FIGURE 4.

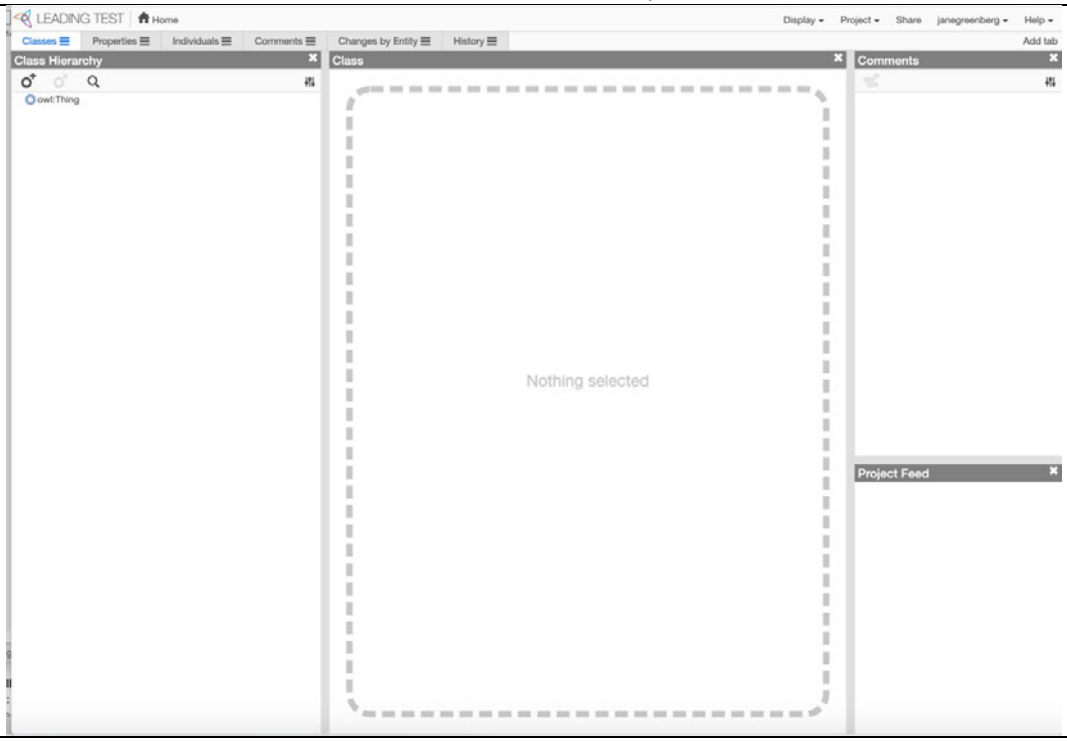
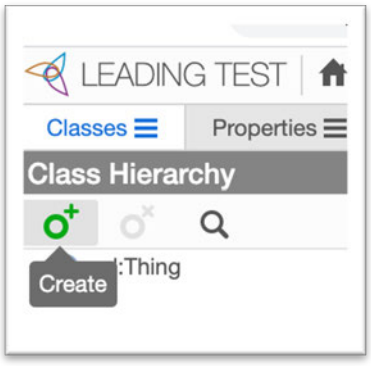


FIGURE 4: Input Screen –A blank project template

4. Establishing ontology terms (semantic concepts)

See the upper-leftmost section of the window, under Class Hierarchy. There are options to Create, Delete, and Search.



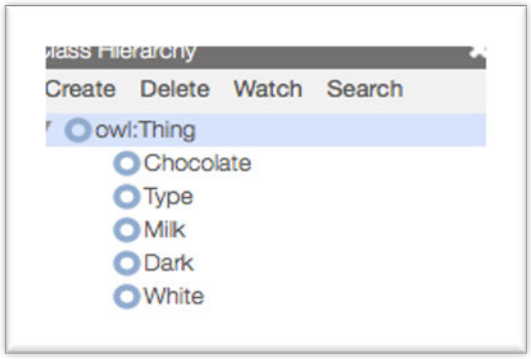


FIGURE 4A and FIGURE 4B: Adding terms to Protégé

Click Create to create a class. A window will pop up where you can type in the classes (terms) you would like to add and select the create button. (Note: You may also type multiple terms in at once, hitting enter after each term).

Type the following words, each in as a new entry: Chocolate, Type, Milk, Dark, White. Then the words you typed will appear under Class Hierarchy, as pictured below Figure 5.

5. Establishing the hierarchy

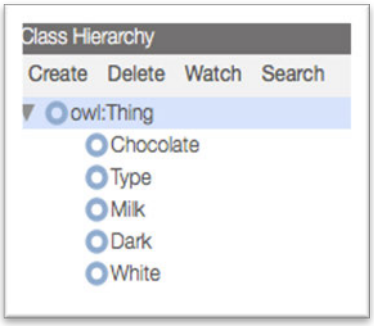


FIGURE 5: Initial set of term

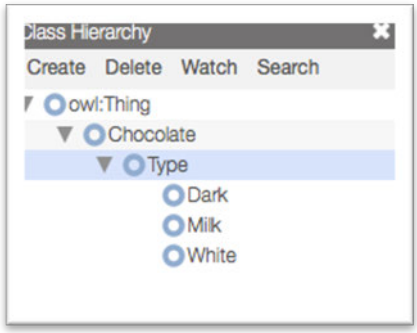


FIGURE 6A: Creating the hierachy

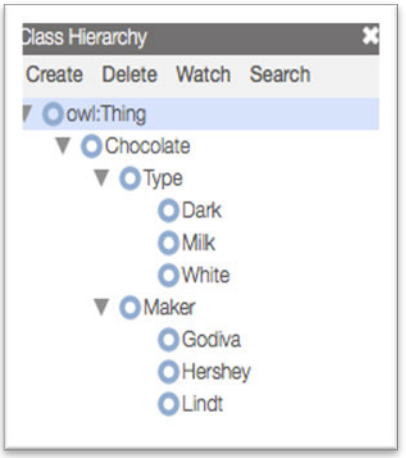


FIGURE 6A: Extending the hierachy

You'll notice that all the terms are at the same level of indentation (Figure 5). However, we want Milk, Dark and White to be under Type, which in turn should be under Chocolate. Making this change is just a matter of dragging and dropping. **Drag Milk onto Type**. You'll see that Milk moves to be indented below Type. **Now do the same for Dark and White. Then, drag Type onto Chocolate**. Note that you can click the ▶ to expand and contract a class. Now your hierarchy should look like Figure 6A.

Let's also create a class for Maker. Just as before, click Create, and try to make a hierarchy as shown in Figure 6B.

5. Creating individuals and establishing relationships

We want to have some individuals in our ontology. On the left-hand side, **find the section that says *Individuals by Class.* Click Create**. Type in: **Lindt 85% Cocoa Extra Dark. Then click the *Create* button**. The following two images capture this process.

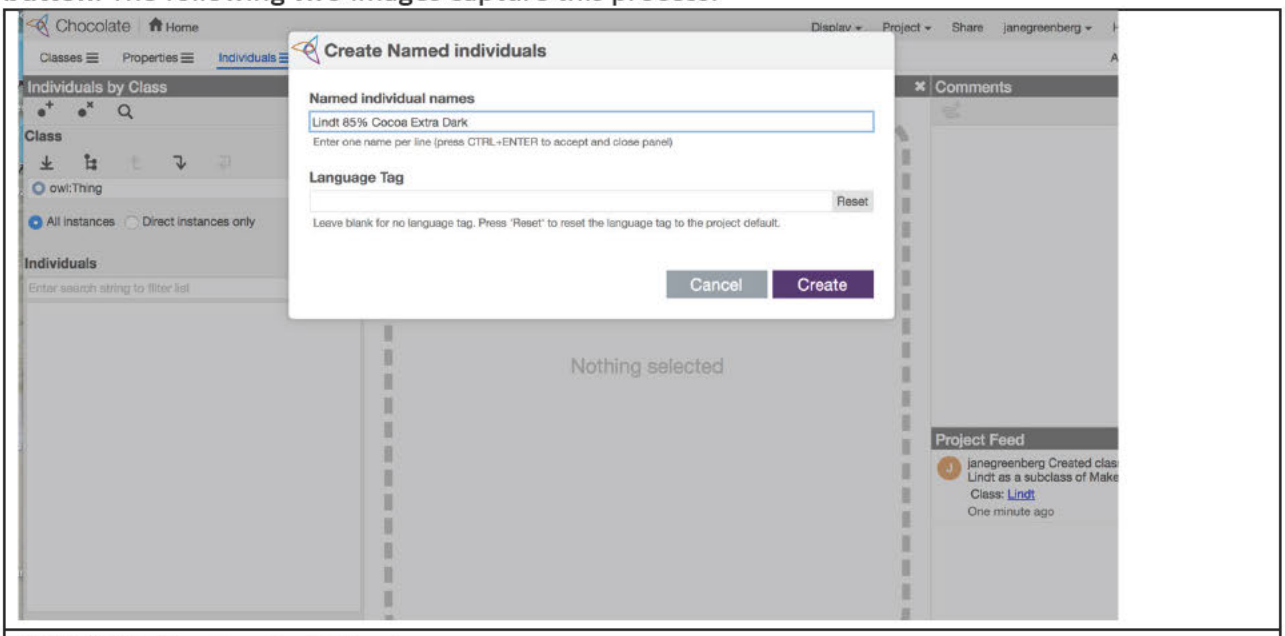


FIGURE 7: Creating individuals

This individual is made by Lindt, and we can **specify that there is a relationship between an individual and a Maker**. Of course, a human can see that plainly enough, but we want to make this explicit so that a computer can read this ontology. In this ontology, we will use the property madeBy to connect an individual with a Maker.

If you scroll down, you will see a section called Relationships. There is already a property there: rdfs:label. Below that, you will add another one. **On the line that says *Enter property*,** type in **madeBy**. A little yellow message will appear telling you it is a new name. In the future, this message will be useful to make sure you haven't mistyped something.

Now, to the right of madeBy, we want to specify who it is made by. **Where it says *Enter value*,** type in **Lindt** (Figure 8A). Now, if you go to the Properties section of Protege, you will see our **madeBy** appears in the list (Figure 8B)

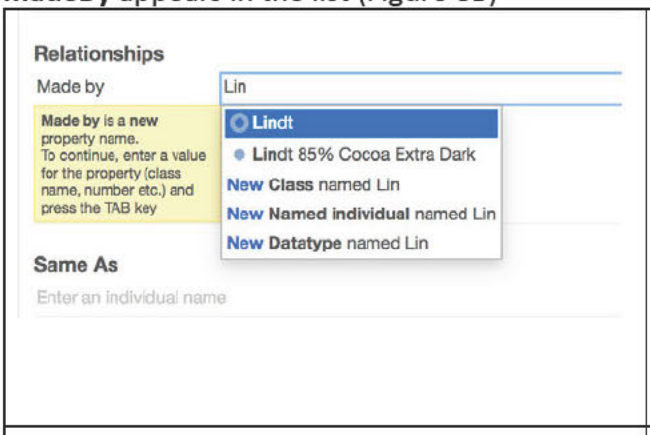


FIGURE 8A: Confirming the relationship

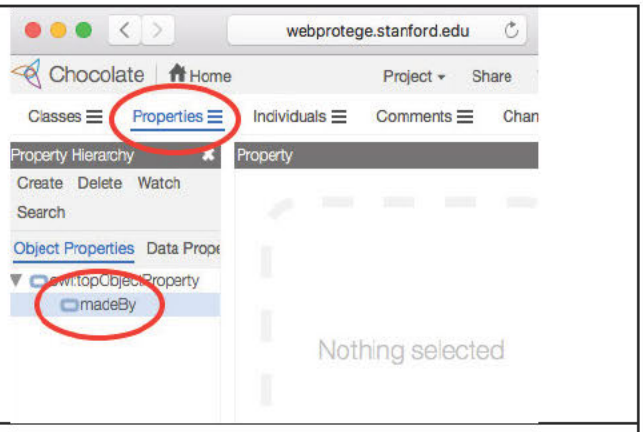


FIGURE 8B: Established relationship

As you create an ontology, you can move among Classes, Properties and Individuals freely, and everything will update nicely. You'll also notice that there is a place for comments (useful for long-term or collaborative projects) and to see the history of your project (useful to review changes or revert to previous versions).

6. Downloading and playing with/visualizing your ontology

When you are done making an ontology, download form Protégé for operation in any information system you're using. To do that, first **click Home at the top left of the screen**.
Now, to the right of the project you want, **click the ≡ symbol and select *Download***. You will be presented with some options. In this class, **you'll turn in an ontology in RDF/XML format, so select that** (Figure 9)

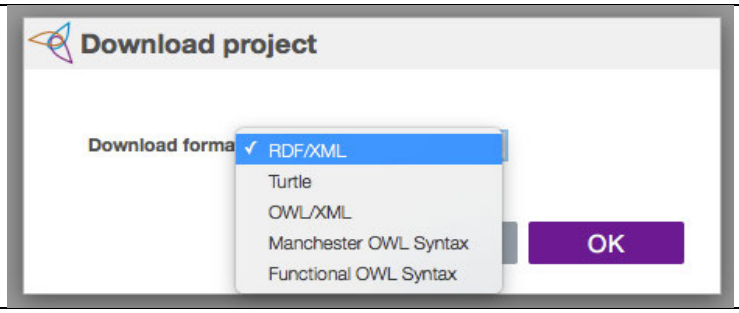


Figure 9: Downloading your Protégé project

A zip file will download, and if you extract that, you'll get a .owl file that you can open. To see what it looks like, **open it in a plain text editor**. The image below shows what the individual we created looks like in XML.

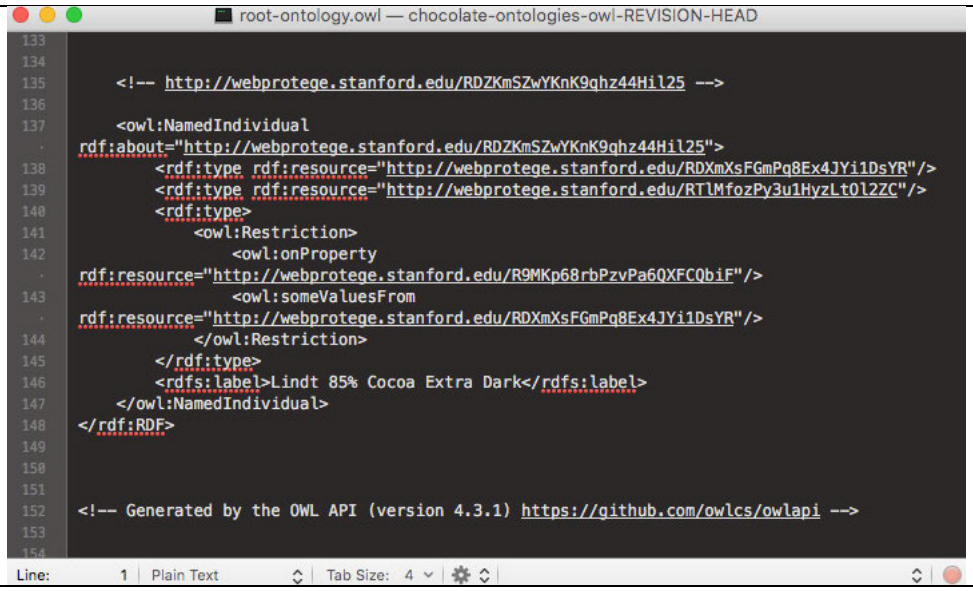


Figure 10: OWL view of your ontology

That may not be very interesting, and it's hard to visualize the ontology's structure. Luckily there are visualization tools. We'll use one of those now to see what we've created.

Go to http://vowl.visualdataweb.org. This is the website of the VOWL project, which makes tools for visualizing OWL ontologies. (The ontology we just made is in OWL format!)

Notice that there is a ProtégéVOWL. If you need to make ontologies in the future and want to use Protégé Desktop, you might consider getting ProtégéVOWL, which is a plugin for that. But for now, we will use WebVOWL. **Now, click the green button that says *WebVOWL***.

You will be at the landing page for WebVOWL. **Now click the blue button that says *Run WebVOWL***.

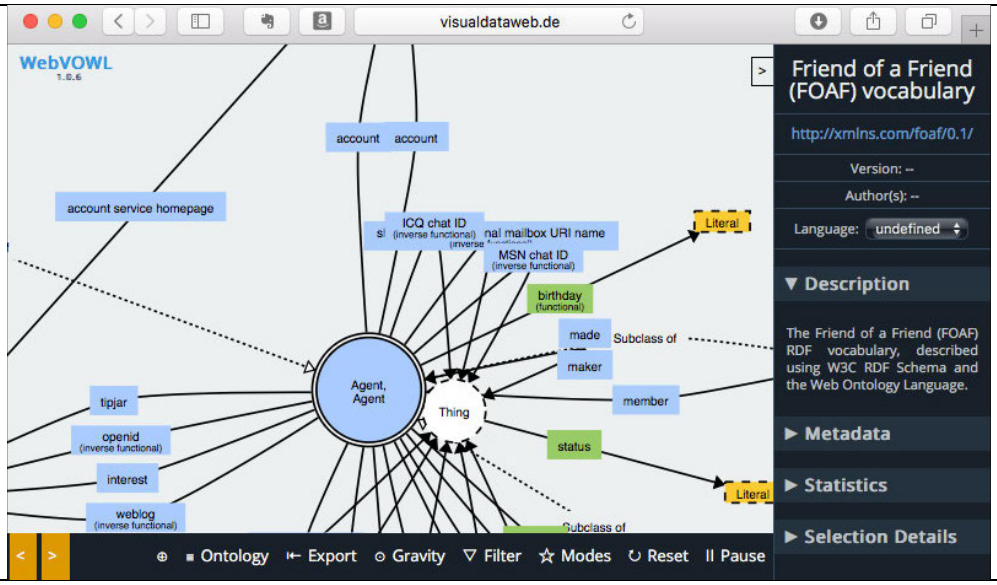
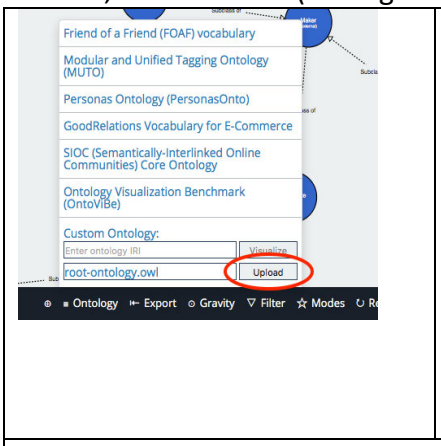


Figure 11: FOAF Ontology visualization

Now you will be in WebVOWL. You'll see that an ontology has come pre-loaded, the Friend of a Friend (FOAF) vocabulary, as pictured above. You can explore this ontology. Now we will upload our ontology to see what it looks like. At the bottom of the screen, hover over where it says **Ontology,** the **bottom of the popup menu, there is an option to Upload**

Navigate to where the .owl file is (perhaps your Downloads folder, or wherever you saved it) and select it, then click OK (see Figure 12A and 12B for these last steps.



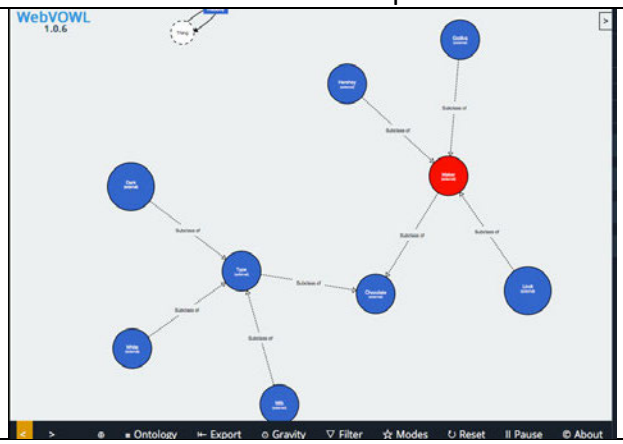


Figure 12A and 12B: Working with WebVOWL

Congratulations! You've created an ontology.
If you want to learn more about Protégé, **head to the WebProtégé User's Guide**, where you can find screencasts and documentation. There's also plenty more at the general Protégé Wiki; you'll find guides for Protégé Desktop as well as guidance on description and ontology-making.

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