# Week 12 Semantic Web

## 1. Introduction

The topic of this chapter is scantily addressed in the text. This material is taken from various sources, primarily material developed by Kerry Taylor, David Ratcliffe and Armin Haller. Attribution to other sources is given throughout.

**ACTION: Watch this TED talk video of Tim Berners-Lee in 2009. 16 minutes.**

https://www.ted.com/talks/tim_berners_lee_on_the_next_web

**Key message:** 4 rules:

1. Use URIs as identifiers for things
2. Use standards for data representation
3. Resolve URIs to look up things and retrieve structured data
4. Explicitly name relationships amongst things

## 2. Key technologies

Here we present the key architectural principles for the Semantic Web and some critical standards: URIs, RDF, RDFS and SPARQL

## 3. Practical exercises: SPARQL and OWL

**Goal**

The goal of this lab is to consolidate and extend the lecture material. You should not expect to be an expert after this, but you should be well prepared to understand the basic concepts and most important tools, and to engage in a semantic web project together with an expert team.

**1. RDF and SPARQL**

You are asked to familiarise yourself with SPARQL using this on-line resource. Using SPARQL this way you will also be interacting with RDF served through a *triple store,* which is the SPARQL/RDF alternative to an RDBMS.

ACTION: Go to https://www.cambridgesemantics.com/blog/semantic-university/learn-sparql/sparql-by-example/

You can see the lower left for navigation instructions and use arrow keys to move about. You will need to ignore the various Apollo-related "solutions" interspersed in the slides. Just go up to the end of Query#4. Read and think carefully as you go through. This will take 10-15 minutes. You may continue the tutorial at a later time if you wish, but there are errors in the turorial as you go

further.

**2. OWL and Protege**

In the second part of the lab you will be working on the Web Ontology language, OWL. This has not been addressed in lectures, but the intention here is to teach it in a hands-on manner, working with a popular ontology editor called *Protege.* This is quite a lot to take in in one go, and you will be directed step-by-step through these slides in the lab.

# 4. Mining the Semantic Web

Having put in place the basic principles, data models and standards of the semantic Web, now we turn to the question of mining all that Web data.

First we introduce the Web Ontology Language (OWL) then look at a particular rule learning method designed for the semantic web, called OWL-Miner.

# 5. Practical exercises: OWL-mining

In this lab we work with a state-of the-art tool for mining over Semantic Web data developed by David Ratcliffe as a part of his PhD work at ANU.

**ACTION:**

1. Download the file below:  owlminer-lab.tar.gz
2. Extract it with: tar xvf owlminer-lab.tar.gz

This creates the new folder: owlminer-lab, in which the lab notes are owlminer-lab.pdf

# 6. Further reading

This paper is a good read to tie together the concepts we have studied. It dates from 2006, so some of its forward-thinking ideas have been put into wide practice since that time.

**ACTION: Please read it**