Ontology Engineering for the Semantic Web

COMP62342

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Aims

The unit will provide students with a theoretical and practical understanding of leading edge solutions for the Semantic Web.

It will introduce students to the W3C standard Web Ontology Language, OWL, and its underlying Description Logics.

It will provide students with experience using a set of established patterns for developing OWL ontologies and help them to learn to avoid the major pitfalls in using OWL.

It will give them an opportunity to become familiar with a widely used environment for developing and an API for applying OWL ontologies, and making use of reasoning services accessible via both.
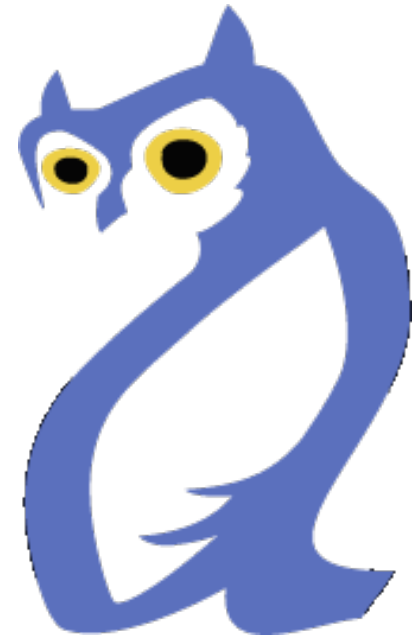
Organisational

- **COMP62342** is taught by:
  1. Sean Bechhofer
  2. Uli Sattler

- **Prerequisites**: some familiarity with logic, programming, Java

- **Teaching period**: Fridays of the next 5 weeks
  - with demonstrators present to ask during labs

- We will use **Blackboard** for **additional material** and the **coursework**

- **Homepage**: http://studentnet.cs.manchester.ac.uk/pgt/COMP62342/

- Please do not hesitate to ask if you have a question!

Organisational

- Lab Demonstrators:
  - **Haoruo Zhao**

- Communication:
  - Blackboard discussion forums
  - Twitter **#uom #comp62342**

- You will also need to acquaint yourselves with the tools we will use during the exercises, in particular Protégé 4.

- Protégé is installed on the machines in the lab under Linux
  - instructions on how to install it at home/on your laptop is in Blackboard

Organisational

- **Assessment**: 50% exam

  50% coursework

- **Coursework and Exercises**:
  - 1.5 days per week plus
  - reading
  - each week 3 pieces of coursework:
    - Quiz
    - Essay(s)
   - Modelling or Programming

Who are we?

- Sean Bechhofer:
  - Participant in W3C WebOnt WG that defined the original OWL language
  - Developer of OilEd, the WonderWeb OWL API and other DL/OWL tools
  - Editor of W3C's SKOS Recommendation

- Uli Sattler:
  - Co-developer of the logics underlying OWL, OWL 2 and of their reasoning algorithms
  - Participant in W3C WebOnt WG that defined OWL 2

Coursework and Exercises

- Ontology Development is a practical discipline, and the assessment of the unit includes significant practical work.
- All work is **distributed** and **collected** through Blackboard
  – always retain a copy of your work elsewhere!
  – backup!
- Marks & feedback are **distributed** through Blackboard
- We encourage you to use Blackboard's **discussion boards**
  – we will even help with questions
  – don't forget to subscribe!

- **Lateness**
  – work is generally due **one week after assignment**
    i.e., Fridays at 9am
  – work that is late: marked 0, no late submission
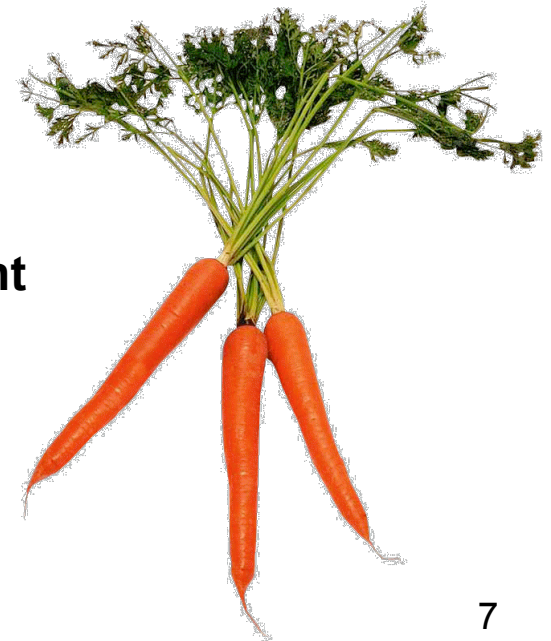
Coursework and Exercises

- Each week, we give you several pieces of coursework:
- a number of small, **short questions**, often multiple choice
    - to ensure you grasp the basic concepts
- Along with other tasks that may be :
- a small **modelling task**
    - to appreciate the numerous ways in which things can be done
    - to get your hands dirty
- a short **essay** of ~200 - 300 words
    - about an average blog post
    - to make you think & practice writing (project!)
- an **assignment**
    - a programming task
➡40 marks per week

Coursework:
The Furniture Ontology

- In addition to the weekly tasks, there is a modelling task that spans the entire course. We will go through steps of ontology building process including the identification of *Competency Questions*, performing *Knowledge Acquisition*, developing the *Formalisation* and *Evaluating* the results.

- The domain for this ontology will be *Furniture*.

- Ontology building is usually a collaborative process, and this task will be done in small groups (of 3-4 students).

  – You will be allocated to groups (see BB), although formal group work does not begin until Week 2.

- Following the development of the ontology, you will be asked to provide an evaluation of the ontology from another group.

  – You will be assessed on how well you have performed this evaluation process, but the results of *your* evaluations will **not** contribute towards assessment of the other ontology.

- You will also be required to provide individual reports discussing your ontology and the process that you went through in developing it.

The University of Manchester

Plagiarism & Academic Malpractice

- We assume that you have successfully completed the

   Plagiarism and Malpractice Test

   on Blackboard

- ...if you haven't:

   do so **before** you submit **any** coursework (assignment or assessment)

- ...because we work under the assumption that you know what you do
- ...and if you don't, it costs you marks or more.

- Please be careful to distinguish between *group* tasks and *individual* tasks.

Literature

- To obtain more detailed information, please refer to **the reading list** on the course **homepage**

- Follow the various available web resources linked from the course homepage

- We assume that you
  - are enthusiastic about your subject
  - go and find out about stuff you don't know yet

Goals of the course: to be able to

- **discuss/explain** the role of ontology languages in applications, in particular OWL and SKOS

- **explain** the syntax and semantics of OWL, and the decision procedures that underpin the use of reasoning

- **create** an ontology for a particular domain to enhance an application

- **understand** how and which applications can be enhanced through the use of an ontology

- **apply** patterns in the design of ontologies

- **design** and **build** ontologies in OWL using the de facto standard editor, Protege, justify and evaluate their design and explain their behaviour

See http://studentnet.cs.manchester.ac.uk/pgt/COMP62342/syllabus

Roadmap

- **Week 1** Motivation, intro to KR. Practical introduction to OWL and Protégé
- **Week 2** Knowledge Acquisition. Formalising Definitions. Formal Semantics.
- **Week 3** Patterns. Modelling using roles. Reasoning.
- **Week 4** Programmatic manipulation of ontologies with the OWL API. More reasoning.
- **Week 5** Case studies. SKOS. Linked Data.

- **Schedule**
  - Morning Lectures
  - Afternoon Practicals
  - TA Support on Tuesday afternoons

Bloom's taxonomy of Learning

Combining parts to make a new whole — **Create**

Judging the value of information or ideas — **Evaluate**

Breaking down information into component parts — **Analyze**

Applying the facts, rules, concepts, and ideas — **Apply**

Understanding what the facts mean — **Understand**

Recognizing and recalling facts — **Remember**

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