

COMP3041 I: Knowledge Representation

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Knowledge Representation

- Knowledge Representation (KR) lies at the intersection of (at least) Artificial Intelligence and Information Management.
- KR attempts to provide rich representations of the world and various things in it that supports building programs that are sensitive to the world via these representations.
- KR has been used to build expert and diagnostic systems, speech recognizers, games, automated planners
- KR is the foundation of the Semantic Web, an attempt to remake the World Wide Web so that the content is accessible not only to human beings, but to sophisticated artificial agents.

COMP3041 I

- In this course, we will explore various formalisms for knowledge representations
- Our focus will be on classical first order logic (FOL) and interesting fragments thereof (primarily, Description Logics).
- We will look at attempts to represent various parts of commonsense and scientific knowledge, as well as the use of KR for conceptual modeling in information systems.
- We will pay special attention to knowledge representations found on the Web, and the special challenges involved.

Anatomy of the Course

- The module will mostly consist of lectures
 - Tuesday at 09:00
 - Thursday at 16:00
- Associated/recommended reading will be given to accompany the lectures.
 - Not all of the relevant information will be contained in lecture materials and notes
- Please feel free to ask questions and promote discussions during the lectures.

Assessment

- Assessment of the module will be through an exam and coursework
- Exam: 80%
 - 2 hours
 - (Probably) answer 3 questions from 5
- Coursework/Labs: 20%

Labs and Coursework

- Part of the assessment for this module is based on coursework.
- Some of the lecture slots will be used as “lab/exercise” sessions.
 - Rather than “programming” labs, these will be discussion/exercise based
- We’ll go through some exercises and there will then be some associated coursework to hand in

- We also hope to hold some discussion sessions which will give you an opportunity to reflect on what you have learnt in the previous lectures.
 - The success of these depends partly on **your** participation.

Resources

- Course web pages
 - Lecture Schedule (subject to change)
 - Reading Lists
- Moodle
 - We will also use the school's moodle system:
<http://moodle.cs.manchester.ac.uk>
 - A central resource for discussion and collection of relevant materials.
 - Wiki
 - Discussion Forum
 - Glossary
 - Driven by **you** rather than us...

Course Contents

- KR Overview/What is a KR?
- Knowledge Acquisition
- From Taxonomies to Definitions
- First Order Logic
 - A recap on FOL, including syntax, semantics and key properties concerning reasoning and inference
- Examples of using FOL
- Subsets of FOL: Descriptions Logics
- Logic Engineering
 - Reasoners and Implementation
 - Tools and Services for Knowledge Representation
- Ontology Engineering
 - Modularity, Mapping, Alignment
- Applications and Case Studies
- Semantic Web

What we expect from you

- Turn up (on time)
- Read the suggested materials before the lectures
 - Monitor the web pages
- Participate!
 - Ask Questions
 - Contribute to discussions
 - Use the wiki
- Enjoy yourselves

