

# INFS3101/7100 Ontology and the Semantic Web

2006 Semester 1

## Welcome to INFS3101/7100: Contacts

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## Teaching & Learning

- ❖ Lectures
  - Time: 10:00am-12:00pm
  - Day: Monday
- ❖ Concrete Example session
  - Time: 1:00pm-2:00pm
  - Day: Monday
  - Purpose: work through application of lecture material to a concrete example
- ❖ Tutor consultation
  - The tutor will be available for consultation at times to be nominated

## Teaching & Learning: Consultation

- ❖ Bob Colomb
  - GP South 628
  - by appointment: [colomb@itee.uq.edu.au](mailto:colomb@itee.uq.edu.au)
- ❖ Prepare your questions prior to consultation
- ❖ Consultation in a group is a good idea

## Introduction: Teaching & Learning Resources

- ❖ Web-site
  - [www.itee.uq.edu.au/~infs3101/](http://www.itee.uq.edu.au/~infs3101/)
  - Contains
    - all course details
    - notices
    - links/references to further reading
- ❖ Text Book
  - Notes and readings available from bookstore  
POD service or on the web site

## Teaching & Learning: Assessment

- ❖ Assessment by assignments and examination
  - Assignment due week 10, Monday 8 May, 4:00 pm 40%
  - Assignment in groups of up to 3
  - Final examination 60%

## Semantic Web

- ❖ The Web is about people accessing web sites
- ❖ The Semantic Web is about programs interoperating with programs in a Web environment.
- ❖ These programs often called intelligent agents.
- ❖ Programs interoperate by exchanging messages.

## Ontology

- ❖ If two programs are going to exchange messages, there must be some agreement as to what the words mean. These agreements are called **ontologies**. So ontologies are needed to make the semantic web work. Ontologies are something like conceptual data models, but they are used for different purposes, so have their own issues. INFS3101 will look at what ontologies are needed for, the design considerations and languages needed to build them, and the requirements for the software that supports their use.

## A Book-Shopping Bot

- ❖ We want to build a program (agent) that will identify a supplier for a given book, choose the one with the best price/ delivery, and place the order.
- ❖ At a minimum the agent and the sellers must agree on what is meant by book, price, delivery
- ❖ And to identify the book.
  - ISBN helps here

## Finding bookseller agents

- ❖ Search engine?
  - Welcome to TheBookseller.com/The Bookseller is a central source of industry information for publishers and booksellers in the UK....
  - [www.bookweb.org/bookstores/Trade](http://www.bookweb.org/bookstores/Trade) organization devoted to the support of booksellers.
  - **BarnesandNoble.com - The World's Largest Bookseller Online**
  - Bem-Vindo à Bookseller Editora-/Bem-Vindo à Bookseller Editora, uma das mais conceituadas editoras jurídicas do Brasil. ...
  - Ken Lopez - Bookseller, ABAA. Modern First Editions/ Good as it is to inherit ... not be shared with anyone. email:
  - Pat Ledlie - Bryology in Maine/Bookseller for books about conservation biology, environmental science, and natural history books.
- ❖ Where is Amazon.com?

## Need a bookseller directory

- ❖ All and only booksellers
- ❖ Reputable sellers
  - our agent is spending our money!!
- ❖ Entries and reputation certificates current
- ❖ Someone must take responsibility for this
- ❖ Called an e-commerce exchange

## Need a standard conversation protocol

- ❖ Your agent is carrying on a conversation with many bookseller agents.
- ❖ Hard unless all parties use the same messages
  - Price&availability query
  - Price&availability response
  - Order message
  - Order acceptance
  - Etc.
- ❖ EDI (Electronic Data Interchange) standards include message types like these

## So an agent needs

- ❖ A trusted list of sources with which to communicate
- ❖ A standard set of types of messages with agreed semantics
- ❖ Each message having a standard schema of data items, with agreed interpretations
- ❖ These are packaged into an exchange.
- ❖ But things are more complicated than that

## The Exchange

- ❖ There are many thousands of booksellers
- ❖ Some very specialised
  - But if you want a book on chess, a chess bookstore is often what you need
- ❖ Some very general
  - Barnesandnoble.com, borders.com, amazon.com
- ❖ Some sell other things than books
  - Amazon.com sells music, electronic goods, toys, clothing, etc.

## The Exchange

- ❖ So we need a classification system for the sellers in the exchange
- ❖ Something like a yellow pages.

## Message Types

- ❖ Business to business (B2B) conversations are much more complex than business to consumer (B2C)
- ❖ Many more message types
  - Request for quote, quote, purchase order, delivery advice, delivery acknowledgement, invoice, payment eg
  - Agents must maintain state during the conversation, so they know how to interpret the next message and what response to send.

## Message Contents

- ❖ EDI protocols have many fields in a single message type (purchase order has hundreds)
- ❖ Exchange must agree on what fields to use
- ❖ Messages refer to each other
- ❖ And to more-or-less complex objects existing outside the messages (books, prices, etc.)
- ❖ How to identify objects in the world?
  - Standard identifiers like ISBN, currencies, dates, and much more.

## Outline of Course

2	What is going on in interoperating systems. Speech acts and institutional facts.
2	Why the bottom-up approach fails – semantic heterogeneity. Sketch of a feasible approach.
3	A look at some examples
4	Complex objects - the part/whole relationship
5	Complex structures - subclasses and subproperties
6	Formal upper ontologies
7	Quality of ontology – Gruber's principles

## Outline of Course

After the assignment

	Uses of Ontology
8-9	Semantic web view – RDFS
10	Semantic web view – OWL
11	Advanced issues
12	Predicates
13	Using an ontology – the ontology server

## Summary: Key Terms



- ❖ For agents to interoperate on the semantic web, they need an ontology supporting an exchange of trusted sources.
- ❖ The ontology includes message types, message contents, and descriptors of services.
- ❖ An ontology is a world, so must include individuals as well as types.

## Resources

### ❖ Essential

- Colomb tutorial chapter 1 Introduction

### ❖ Further

- [http://en.wikipedia.org/wiki/Semantic\\_Web](http://en.wikipedia.org/wiki/Semantic_Web)
- Tim Berners-Lee and Mark Fischetti *Weaving the Web : the original design and ultimate destiny of the World Wide Web by its inventor* San Francisco : HarperSanFrancisco, 1999.
- Paul, et al. "Enabling B2B marketplaces: the case of GE Global Exchange Services" *Annals of Cases on IT*, Idea Group 2003 copy on-line in Library system.