

# INFS3101/7100 Ontology and the Semantic Web

## Module 2 Institutional Facts

INFS3101/INFS7100 week 2, 21 February, 2005

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## Last lecture: 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.

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## Worlds

- ❖ Ontology is a description of a world in which a community of agents operates
- ❖ But when we think about worlds, we tend to use the physical world as an example.
- ❖ Leads to many misleading intuitions
- ❖ Makes it hard to think about interoperating information systems
- ❖ For example, what properties does a physical object have?

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## Physical Object

- ❖ Has mass, movement, colour, location in space and time
- ❖ Can be seen, touched, smelled, heard, even tasted
- ❖ Has independent existence. Can be discovered, experimented upon, learned about.
- ❖ Can often be transformed, used, broken, discarded (ending up in landfill).
- ❖ Now think about the sort of object appearing in an information system. Your grade in this course, say.

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## Information System Object

- ❖ Has no properties but existence in time
- ❖ Can have many different representations
- ❖ Existence is sort of independent (can be forgotten), hard to experiment with, can be learned of but what does it mean to learn about?
- ❖ Representation can be transformed or used, but can't be broken. Can't be discarded but can be ignored or erased. Certainly doesn't end up in landfill. The bit bucket has infinite capacity.
- ❖ We need a different story.

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## Searle's Institutional Facts

- ❖ Social reality
- ❖ Brute fact - exists in the physical world, independent of humans
  - A document (your transcript) is a brute fact
- ❖ Institutional fact - depends on a human society
  - The meaning of the document is an institutional fact
- ❖ Brute fact X counts as institutional fact Y in context C
  - Under what conditions does a document count as a transcript?

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## Institutional facts

- ❖ An institutional fact is created in a speech act
- ❖ Institutional fact is memory of the speech act having taken place
- ❖ Information systems store mostly institutional facts
- ❖ Agents perform mostly speech acts
- ❖ Interoperation requires ontology and context
- ❖ Context partly codified as framing rules, but much is background, mostly unarticulated behaviour patterns and expectations.

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## Games are social reality

- ❖ We live in institutional reality, but we don't think about it much.
- ❖ But we all know about games. Think of the World Cup, the Olympics, a chess tournament.
- ❖ Games have worlds, but the worlds are obviously not the "real world"
- ❖ We can use this experience to build intuitions we can use to help understand semantic web ontologies

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## What do we need to play a game with others?

- ❖ Players
- ❖ Objects
- ❖ Moves
- ❖ States of objects
- ❖ States of players
- ❖ States of game
- ❖ Structural features of game
- ❖ Strategies and tactics
- ❖ Sources of and enforcers of rules

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## Games as social reality

- ❖ The rules of a game define its world, including its physics
- ❖ Each move in a game is a speech act which creates a new state of the game instance, which is an institutional fact
- ❖ Vocabulary used to talk about the game denotes institutional facts
- ❖ Physical realisations of tokens and moves are brute facts which count as institutional facts in the context of a valid game instance
- ❖ Done in the context of normal background behavioural norms and expectations
- ❖ Games are pure social reality

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## Kinds of Speech Acts

- ❖ Performative
  - Creates a new institutional fact
    - Business transaction
- ❖ Informative
  - Other players come to know the new institutional fact
    - Query
    - Announcement

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## Interoperating information systems

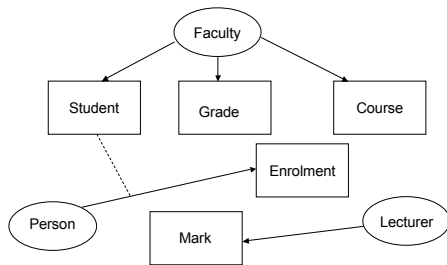
- ❖ Many entities interact in an industry as customers and suppliers for possibly complex goods and services
- ❖ Automated business interaction requires interoperation of their information systems
- ❖ Business involves speech acts whose records are institutional facts. Agents perform speech acts.
- ❖ We can think of this as a sort of game, and can use many of our game intuitions to understand

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## A University World



## The University Game

- ❖ **Players**
  - Faculties, persons
- ❖ **Roles**
  - Faculties, lecturers, students
- ❖ **Performative speech acts**
  - Faculties create lecturers and students
  - Faculties create courses
  - Students create enrolments
  - Lecturers create marks
  - Faculties create grades

## The University Game

- ❖ **Performatives are business transactions**
- ❖ **Informatives**
  - **Announcements (push)**
    - Course catalog
    - Marks are sent to Faculty
    - Grade reports can be sent out
  - **Queries (pull)**
    - Classlists, courses, grades found by queries on the student information system

## The University Game

- ❖ **What background is needed to make the University Game work?**

## Summary: Key Terms



- ❖ **Institutional fact** is a record of a **speech act**. **Brute fact** X counts as institutional fact Y in **context C**.
- ❖ Context includes **framing rules** and **background**.
- ❖ Most information systems manage records of speech acts. Interoperating agents perform speech acts, both **performative** and **informative**.

## Resources

- ❖ **Essential**
  - Notes chapter 2 Institutional Facts
- ❖ **Further**
  - Searle *Construction of social reality* Free Press 1995, especially ch 2, 6