

INFS3101/7100 Ontology and the Semantic Web

Week 8-9 Tutorial Ontology Quality

Semester 1, 2006

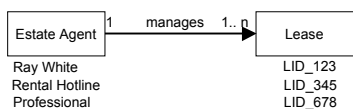
Key Terms

- Quality principles for ontologies include clarity, coherence, extendibility, encoding bias and ontological commitment. Want to maximise the first three and minimise the last two.
- Quality involves cost-benefit tradeoffs.

Question1- Clarity

Consider the rental accommodation exchange from the week 8 tutorial and the representation in the solution to the week 4 tutorial and following.
Q1a: Criticise the ontology in terms of five principles of Gruber.
Clarity: suggest a plausible unintended interpretation of one of the concepts. How does (or could) the ontology prevent that unintended interpretation?

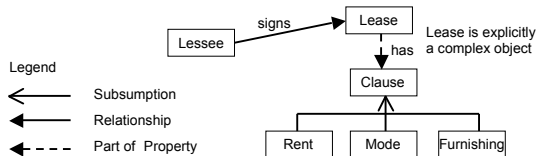
- Leases vs. Estate Agents
- Is there more than one estate agent in a lease?
- If not, how do you prohibit it?
- Cardinality can be introduced into the ontology to enhance the clarity and make the ontology coherent (consistent).



Q1a – Clarity

Clarity: suggest a plausible unintended interpretation of one of the concepts. How does (or could) the ontology prevent that unintended interpretation?

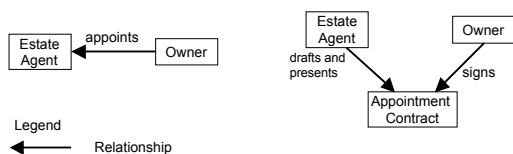
- What is specific relationship between classes lease and clause?
- As mentioned in the last tutorial, some of implicit relationships in our ontology can be made more explicit /clearer by introducing BWW upper ontology. In above question, the more specific relationship between the two classes are *part of* property, so that the representation of the ontology are more consistent and coherent.



Q1a – Clarity

Clarity: suggest a plausible unintended interpretation of one of the concepts. How does (or could) the ontology prevent that unintended interpretation?

- How are owners created in the accommodation ontology?
- The introduction of Dolce upper ontology can help detect the above defect because endurants are created, and then destroyed by perdurants. In the ontology, the creation of the owner has not been taken into account.



Q1a – Coherence

Suggest a plausible inference that an agent could be expected to draw from the ontology. How does (or could) the ontology support the reasoning necessary to make the inference?

- Defined subclasses are encouraged due to objectivity, while declared subclasses are discouraged due to subjectivity.



Class	Declared/defined	Subclass
(Leased) Property	Defined: rent range from AUD1,000 – 1,500	Luxury Property
	Defined: rent range from AUD500 – 1,000	Standard Property
	Defined: rent range from AUD200 – 500	Economic Property

Q1a – Coherence (Continues)

Suggest a plausible inference that an agent could be expected to draw from the ontology. How does (or could) the ontology support the reasoning necessary to make the inference?

- The clauses set by lessors must comply with Residential Tenancies Act (1994).
- In our ontology, we did not specify that. For example, the amount of rental bond is equal to or less than a four-week rent payment. It could result in that the lessors require higher amounts for the bonds.

Q1a – Coherence (Continues)

Suggest a plausible inference that an agent could be expected to draw from the ontology. How does (or could) the ontology support the reasoning necessary to make the inference?

- Can a lease starting date be later than the ending date?
- Can the duration between the starting date and ending date be not equal to the specified duration in a lease?
- The above results in incoherence in the ontology. We need have rules to make our ontology more consistent.

Q1a – Extensibility

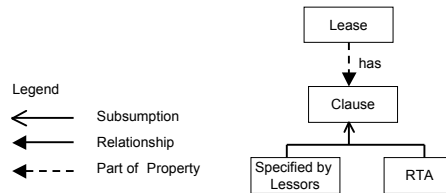
suggest a plausible extension to the ontology. Show what changes would need to be made. Are any of the changes redundant? If so, show how. If not, show how the ontology design anticipated the extension.

- In general, the extensibility of our ontology is not bad.
- For example, Airport could simply be added as a subclass under Class Amenity and no other changes on others.

Q1a – Extensibility (Continues)

suggest a plausible extension to the ontology. Show what changes would need to be made. Are any of the changes redundant? If so, show how. If not, show how the ontology design anticipated the extension.

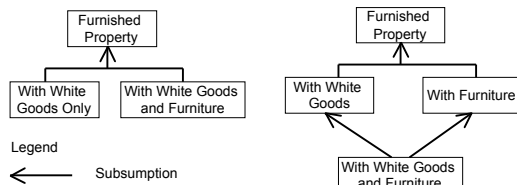
- However, our ontology is not good enough
 - As mentioned before, lease clauses are set by lessor and governed by Residential Tenancies Act (1994). We can have two subclasses: lessor clause and RTA clause subsumed under class clause in our ontology. One of advantages is any changes of RTA clause can be minimised on their instances.



Q1a – Extensibility (Continues)

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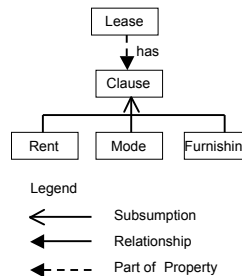
- On the LHS subsumption is not extendable because it ignores a fact that the properties are furnished with furniture only. Whereas, the RHS revised subsumption embraces all likelihoods and becomes more extendable.



Q1a – Encoding bias

Show how one of the actions of week 2 might be implemented. Does it make sense for it to be implemented in a different way? If not, why not? If so, does ontology make the different implementation difficult? Consider each element of the implementation of the action.

- Leases have clauses
 - Array
 - Set
 - List/Sequence
 - ...
- A part of relationship may have a variety of ways to represent in implementation.
- So, to reduce the encoding bias, the above are not taken into account in the ontology development.



Q1a – Ontological Commitment

There are many different system of interoperations in which the ontology could be reused. Describe one such system and how the ontology could be adapted to the re-use.

- Obviously, our ontology is suitable to Brisbane.
- In Melbourne, property amenities should include tram stations.
- In Sydney and Perth, beachside suburb should be embraced in our ontology.
- Thus, the ontological commitment would be quite low if our ontology is used elsewhere in Australia. This means less effort taken for the modification of the ontology to other applications.

Q1a – Ontological Commitment

There are many different system of interoperations in which the ontology could be reused. Describe one such system and how the ontology could be adapted to the re-use.

- On the other hand, the ontological commitment is quite high if we introduce our ontology into Hong Kong accommodation industry
 - Amenity:
 - MTR (Mass Transit Railway) stations.
 - Tram stations
 - Boundary checkpoints
 - Hong Kong RTA clauses
 - E.g. the lease commission paid by lessees, rather than lessors
- Applying our ontology to the above environment will take much more effort to modify, or even need to rewrite the ontology.

Q1b Propose an improvement to the ontology. Argue why this improvement is a good idea in terms of at least one of Gruber's principles

- Any of the proposed changes to increase clarity, coherence, extendibility or to reduce encoding bias or ontological commitment, qualify as proposed improvements.
- We have discussed some in the previous slides.

Q1c Examine the cost and benefits of the improvement, taking into account the generality of the ontology and the number of implementations one might expect it to have. On balance, is the improvement a good idea? Take a position and justify it.

- Each of the improvements has associated with cost.
- For examples
 - Introducing cardinality constraints or defined subclasses is fairly easy because they can be implemented by SQL
 - This is approach is worthwhile because it makes the ontology more coherent and is not costly.
 - On the other hand, representing the lease clauses in a formal language takes much more effort since the reasoning needed to do the checks on the lease formal representation would require more powerful and less commonly available software, so a great cost.
 - Such improvement benefits the coherence as well (less misunderstanding), but it is quite expensive. The higher frequency of the reuse, the lower cost per unit it incurs.
- Thus, the choice therefore depends on how you see the benefit relative to the cost

Consultation Sessions

- Today 2-3pm at 78-631
- 3 May 2006 Wednesday 1-2 pm at 78-631