Previously on COMP62342

- Last week, what is a knowledge representation and what is an ontology;
- Gaining operational knowledge of using OWL and a reasoner in Protégé
- This week:
  - Acquiring knowledge to put into an ontology
  - Formalising that knowledge
  - The semantics of OWL
What are CQ?

- Michael Grüninger and Mark Fox (1995)
- What must an ontology be “competent” to do (answer)?
  - The ontology should have the axioms sufficient to answer competence questions
  - What vegetarian pizzas are there that don’t have olives?
  - Implies discriminations of different toppings, vegetable/fish/meat toppings and closure of toppings

The role of CQ in ontology authoring

- Questions that help capture:
  - Scope
  - Content
  - A form of evaluation
  - What pizzas have both capers and anchovy, but no meat?
    Indicates some basic content and scope
  - Implies ability to close off toppings lists
  - Implies categorisation of toppings
  - Is by no means exhaustive – CQ don’t list all toppings
  - Can transform CQ into queries against an ontology
Some example CQ for pizza

- How many pizzas are available?
- How many pizzas in the menu contain meat?
- Can you have a pizza with any combination of toppings?
- Do pizzas come in different sizes?
- Are there any children's pizzas?
- Are different bases available?
- What kind of bases are possible?
- Show me all pizza base options
- Is it thin or thick bread?
- Is it "deep pan" or "Chicago" style? (deep pan sucks?)
- Which pizzas have either ham or chicken topping?
- Which pizzas have prawns but not anchovy topping?
- Which pizzas are spicy?
- Which toppings are allowed for customisation purposes?
- What kind of bases are possible?
- Which are gluten free bases?
- Which cheeses do we have?
- What sauces are available?
- Find pizzas with peppers and onions
- Show me the offers of the day
- Find all nutrition free pizzas
- Find all pizzas which are sharing 3 or more ingredients
- Find pizzas with a single meat ingredient
- Find all the nut free pizzas
- Find pizzas with a single vegetable ingredient
- What kind of bases are possible?
- Show me all pizza base options
- Which pizzas do not have nuts?
- Are we including folded pizzas (calzone) in our domain?
- Which pizzas are spicy?
- Which toppings are allowed for customisation purposes?
- What sort of cheese do we have?
- Reason back and suggest toppings that commonly go with each other (e.g. anchovies and capers)
- I want to know whether a pizza is healthy
- Reason back and suggest toppings that commonly go with each other (e.g. anchovies and capers)
- I want to know whether a pizza is healthy
- Some example CQ for family history

- Must be able to represent kin relationships –
  - Parentage;
  - Grandparents;
  - Greatgrandparents;
  - Ancestors;
  - Aunts, uncles and cousins to the second degree.
- Must represent marriage
- Must represent in-law relationships – parents, siblings, etc
- Must represent birth, death and marriage years
CQ and testing

• Obvious relationship to testing
• My ontology must be *competent* to do this question
• CQ “What pizzas have anchovy?”
• Class: AnchovyPizza

EquivalentTo: Pizza and hasTopping some Anchovy

• We need a list of the pizzas with anchovy to make it work as a test
• CQ look a lot like acceptance tests

CQ for Sushi

• This afternoon you’ll generate some CQ for an ontology of Sushi
• Look at the Sushi menu and think what you’d want an ontology driven Intelligent Sushi finder be competent to do