Semantic Web - 11/2/2011

Exercise 1

Describe the SPARQL language and explain its role in the Semantic Web.

Exercise 2

(a) Write an RDF/RDFS model representing the following statements about URIs `Person`, `Manager`, `Employee`, `isManagerOf`, `worksWith`, `Joe`, `Ann`, `Mary`, `Paul`:

1. `Person`, `Manager` and `Employee` are classes;

2. `Employee` is a subclass of `Person`;

3. `Manager` is a subclass of `Employee`;

4. `isManagerOf` and `worksWith` are properties;

5. `isManagerOf` is a subproperty of `worksWith`;

6. `isManagerOf` has domain `Manager` and range `Employee`;

7. `worksWith` has domain `Employee` and range `Employee`;

8. Paul is an employee;

9. Ann and Joe are managers;

10. Mary is the manager of Paul;

11. Joe works with Ann.

(b) Write SPARQL queries corresponding to the following requests: (b1) "return every employee"; (b2) "return every person that either works with Joe or is the manager of Paul";

Exercise 3

Describe the difference between OWL-Lite and DL-Lite.

Exercise 4

Write an OWL ontology that formalizes knowledge about the domain of people, using the classes `Person`, `Man`, `Woman`, the properties `hasParent`, `hasMother`, `hasFather`, and the individuals `Lucy`, `Paul`, `Sally`. In particular, the ontology must formalize the following statements:

1. every man is a person;

2. every woman is a person;

3. man and woman are disjoint classes;

4. every person has a mother;

5. every person has a father;

6. every person has exactly two parents;

7. every person has a father, who is a man;

8. every person has a mother, who is a woman;

9. Lucy is a woman;

10. Sally is a woman;

11. Paul is a man;

12. Lucy has father Paul;

13. Paul has mother Sally.

Then, tell whether the resulting OWL ontology is redundant, i.e.: can some of the axioms constituting the ontology be deleted without changing the meaning of the ontology? if so, identify and list such axioms.