Semantic Web - 11/2/2011

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Exercise 1

Describe the difference between RDF and RDFS.

Exercise 2

(a) Write an RDF/RDFS model representing the following statements about URIs `Person`, `Woman`, `Man`, `isMotherOf`, `isFatherOf`, `Joe`, `Ann`, `Mary`:

1. `Person`, `Woman` and `Man` are classes;
2. `Man` is a subclass of `Person`;
3. `Woman` is a subclass of `Person`;
4. `isMotherOf` and `isFatherOf` are properties;
5. `isMotherOf` has domain `Woman` and range `Person`;
6. `isFatherOf` has domain `Man` and range `Person`;
7. Joe is a person;
8. Ann and Mary are women;
9. Mary is the mother of Joe;
10. Joe is the father of Ann.

(b) Write SPARQL queries corresponding to the following requests: (b1) "return all the children of Joe"; (b2) "return every person that is either a woman or the father of a woman";

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.