19/07/2016 EX3

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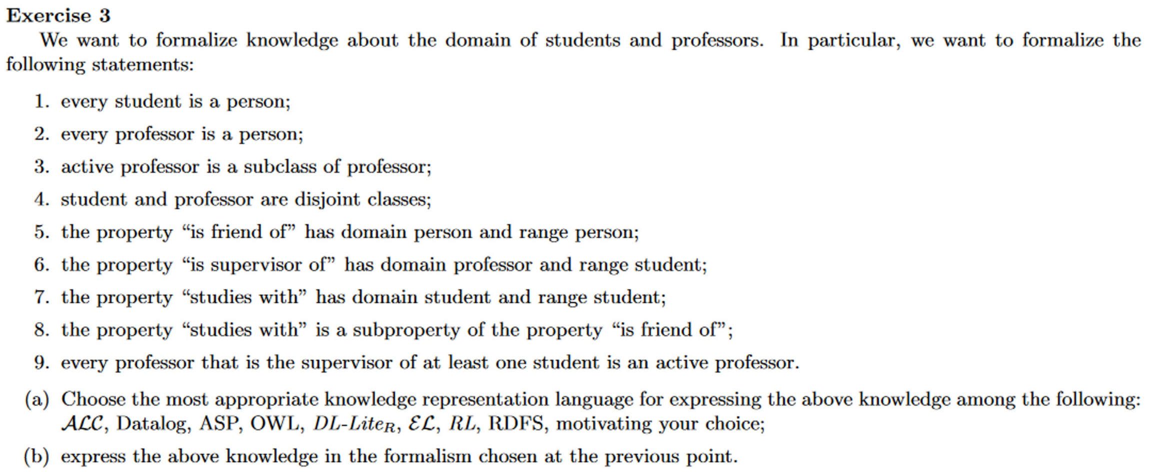

Exercise 3

We want to formalize knowledge about the domain of students and professors. In particular, we want to formalize the following statements:

1. every student is a person;
2. every professor is a person;
3. active professor is a subclass of professor;
4. student and professor are disjoint classes;
5. the property "is friend of" has domain person and range person;
6. the property "is supervisor of" has domain professor and range student;
7. the property "studies with" has domain student and range student;
8. the property "studies with" is a subproperty of the property "is friend of";
9. every professor that is the supervisor of at least one student is an active professor.

(a) Choose the most appropriate knowledge representation language for expressing the above knowledge among the following: $\mathcal{ALC}$, Datalog, ASP, OWL, *DL-Lite*$_R$, $\mathcal{EL}$, *RL*, RDFS, motivating your choice;

(b) express the above knowledge in the formalism chosen at the previous point.

a)

1) All languages admitt it
2) All languages admitt it
3) All languages admitt it
4) Not in Datalog because it is positive so we cannot represent disjoint classes, not in EL because we do not have negation
5) Not admitt in EL because it does not have the inverse role, also ALC not admitt inverse role but we can rewrite range using universal qualifier and so we can write it
6) Same as previous
7) Same as previous
8) Not admitt in ALC because we don't have the subroles, also not possible in EL because it does no admitt subroles
9) Not possible in RDFS because of the presence of conjunction, not possible in DL-Lite because of conjunction

b)

We prefer to choose RL because it is less expressive but better in performance respect to OWL

1) STUDENT subseteq PERSON
2) PROFESSOR subseteq PERSON
3) ACTIVEPROFESSOR subseteq PROFESSOR
4) STUDENT subseteq not PROFESSOR
5) Exists isFriendOf. T subseteq PERSON
   Exists isFriendOf^-. T subseteq PERSON

6) Exists isSupervisorOf. T subseteq PROFESSOR
   Exists isSupervisorOf^-. T subseteq STUDENT
7) Exists studiesWith. T subseteq STUDENT
   Exists studiesWith^-. T subseteq STUDENT
8) studiesWith subseteq isFriendOf
9) PROFESSOR and Exists isSupervisorOf STUDENT subseteq ACTIVEPROFESSOR