

### 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. student and professor are disjoint classes;
  4. the property "is friend of" has domain person and range person;
  5. the property "is supervisor of" has domain professor and range student;
  6. the property "studies with" has domain student and range student;
  7. the property "studies with" is a subproperty of the property "is friend of";
  8. every student is friend of someone.
- (a) Choose the most appropriate knowledge representation language for expressing the above knowledge among the following: *ALC*, *Datalog*, *ASP*, *OWL*, *DL-Lite<sub>R</sub>*, *EL*, *RL*, *RDFS*, motivating your choice;
- (b) express the above knowledge in the formalism chosen at the previous point.

a)

- 1) All language admitt it
- 2) All language admitt it
- 3) No admitt in EL because we do not have negation. No admitt in RDFS because we do not have negation.
- 4) Not possible in EL because we do not have inverse role
- 5) Same as previous
- 6) Same as previous
- 7) Not possible in ALC because we do not have role hierarchy. Not possible in EL for the same reason
- 8) Not possible in EL because we don't have unqualifies existential restriction. Not possible in RDFS because we don't have the unqualified existential restriction.

b)

We can choose only DL-Lite

- 1) PROFESSOR subseq PERSON
- 2) STUDENT subseq PERSON
- 3) PROFESSOR and STUDENT subseq bottom
- 4) Exists isFriendOf subseq PERSON  
Exists isFriendOf<sup>-</sup> subseq PERSON
- 5) Exists isSupervisorOf subseq PROFESSOR  
Exists isSupervisorOf<sup>-</sup> subseq STUDENT
- 6) Exists studiesWith subseq PROFESSOR  
Exists studiesWith<sup>-</sup> subseq PERSON

7) studiesWith subseq isFriendOf

8) STUDENT subseq Exists isFriendOf