

Exercise 3

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

1. every director is a person;
 2. every actor is a person;
 3. the property "worked in" has domain person and range movie;
 4. the property "acted in" has domain actor and range movie;
 5. the property "directed by" has domain movie and range director;
 6. the property "acted in" is a subproperty of "worked in";
 7. if a director was born in Italy, she/he is an Italian director;
 8. if a director was born in a European country, she/he is a European director;
 9. an actor-director is a director who is also an actor;
 10. every movie directed by an actor-director is a special movie;
 11. every movie directed by a European director is a European movie.
- (a) Choose the most appropriate knowledge representation language for expressing the above knowledge among the following ones: *ALC*, *Datalog*, *Datalog with constraints*, *ASP*, *OWL*, *DL-Lite_R*, *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) Not possible in EL because we do not have inverse role. We do not have inverse role in ALC but we can express it using universal constructor
- 4) Same as previous
- 5) Same as previous
- 6) Not possible in ALC because we do not have subroles. Not possible in EL for the same reason
- 7) Not possible in RDFS because we do not have qualified existential restriction. Not possible for DL-Lite R for the same reason.
- 8) Same as previous
- 9) Not possible in DL-LiteR because we do not have conjunction. No possible in RDFS for the same reason.
- 10) Not possible in DL-Lite because we do not have conjunction and qualified existential restriction. Not possible in RDFS for the same reason.
- 11) Same as previous

The language we choose is RL because prefer less expressive but better in performance of reasoning task

b)

- 1) DIRECTOR subseq PERSON
- 2) ACTOR subseq PERSON
- 3) Exists workedIn subseq PERSON
Exists workedIn⁻ subseq MOVIE
- 4) Exists actedIn subseq PERSON
Exists actedIn⁻ subseq MOVIE
- 5) Exists directedBy subseq MOVIE
Exists directedBy⁻ subseq DIRECTOR
- 6) actedIn subseq workedIn
- 7) DIRECTOR and Exists bornIn ITALY subseq ITALIAN-DIRECTOR
- 8) DIRECTOR and Exists bornIn EUROPEAN-COUNTRY subseq EUROPEAN-DIRECTOR
- 9) DIRECTOR and ACTOR subseq ACTOR-DIRECTOR

ACTOR-DIRECTOR subseq ACTOR

ACTOR-DIRECTOR subseq DIRECTOR

10) MOVIE and Exists isDirectedBy ACTOR-DIRECTOR subseq SPECIAL-MOVIE

11) MOVIE and Exists isDirectedBy EUROPEAN-DIRECTOR subseq EUROPEAN-MOVIE