Artificial Intelligence 2022 - 2023

Assignment – 2

Ontology Modeling and Reasoning

Modify the **companies-geo.rdfs-owl-L2-2.owl** ontology with Protégé by creating two ontologies as specified below.

1. companies-geo.rdfs-owl-L2-2-Your_Surname_clean.owl

These specifications must be satisfied in ensemble in the final ontology; the order in which they are listed here below does not need to reflect the optimal order for a sequential implementation.

- Add two more branches to the ontology (the new classes are highlighted in bold):
  - **Person** > **Student**
  - Organization > **University**
- Make sure that each new class has at least two instances; you must appear as an instance of Student
- Model the following patterns by specifying the required object and datatype properties and by introducing two triples for each the pattern
  - Persons are friends to each other
  - Persons have a birthplace
  - Persons have names
  - Students attends universities
- Interpret the above patterns by specifying domain and range restrictions over object and datatype properties so as to implement intuitively sound inferences in the ontology; prepare at least two examples of inferences that are derived from the above axioms.
- Introduce:
  - One class of choice defined using the equivalence relation, so that necessary and sufficient conditions are specified and entities can be classified; show an example with at least two entities classified under this class by a reasoner.
  - One RDF property of choice in such a way that some reasoning is supported (e.g., a symmetric property, a property that is the inverse of another one, another transitive property, etc.)

Provided that you satisfy the above specifications, you can make any additional change to the ontology needed to improve your ontology.

Remarks:

- At the exam, you may be asked questions about your ontology, e.g., to justify your choices

2. companies-geo.rdfs-owl-L2-2-Your_Surname_wrong.owl

Modify the **companies-geo.rdfs-owl-L2-2-Your_Surname_clean.owl** ontology in such a way that an inconsistency is derived. Be ready to explain the inconsistency.