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Semantic Web Exam: Q8-Q11

***Q8.* Identify two different assertions that would make the ontology inconsistent.**

1) I can declare an individual as an instance of two disjoint classes:

Event **DisjointWith** Narrative

event1 **Type** Event

event1 **Type** Narrative

2) I can violate the subclass axiom stating that a member of the class Book has only one Publisher:

hasPublisher exactly 1 Publisher,

by stating that individual book1 has two publishers (which are different):

book1 **Type** Book

book1 hasPublisher publisher1

book1 hasPublisher publisher2

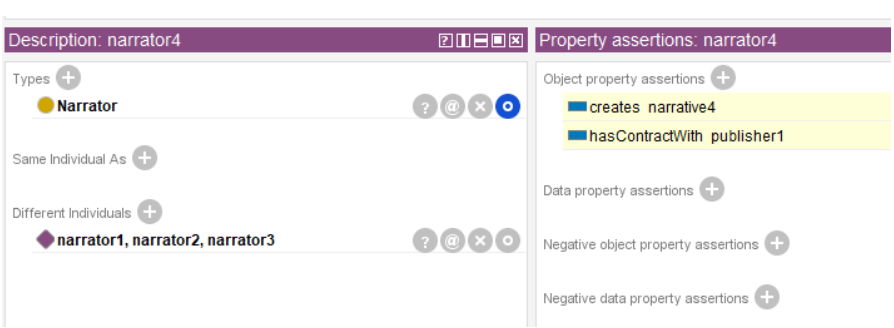
publisher1 **DifferentFrom** publisher2

***Q9.* Define the complex role inclusion axiom capturing the fact that if a narrator creates a narrative that is reported in a book that is published by a publisher, then the narrator has a contract with that publisher.**

SubObjectPropertyOf(ObjectPropertyChain(:creates :isReportedIn :hasPublisher):hasContractWith)

In Protégé "terms": creates **o** isReportedIn **o** hasPublisher → hasContractWith

The axiom has been included in the ontology itself. In the following example, the assertion stating that narrator4 has a contract with publisher1 is inferred thanks to it:



Q10. **Verify if the created ontology (including the complex role inclusion axiom defined in Q9) satisfies the global restrictions on the axioms of an OWL 2 DL ontology.**

1. The restriction on owl:topDataProperty is satisfied because the ontology does not include any axiom on it, so it is certain that no super-property of owl:topDataProperty has been defined.
2. The two restrictions on datatypes are satisfied because the ontology only uses datatypes from the OWL 2 datatype map and does not define any data range.
3. The restriction on simple roles is satisfied because no composite object property is used in an axiom of the forbidden kinds.
4. The restriction on the property hierarchy is satisfied because in the ontology there is only one property chain, so no cycle can be caused.
5. The restrictions on anonymous individuals are satisfied because there are no anonymous individuals in the ontology.

Q11. **Write the following queries in SPARQL:**

Q11.1. **Find how many events occurred in real locations, grouped by location.**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX :
<http://www.semanticweb.org/robertocannarella/ontologies/2021/1/ontologynarratives#>


SELECT ?realLocation (COUNT(?event) as ?nEvents)

WHERE {

  ?event rdf:type :Event .

  ?realLocation rdf:type :RealLocation .

  ?event :occursIn ?realLocation .

}

GROUP BY ?realLocation
```

Q11.2. **Find all the books with the ID of the publisher lower than 5000.**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX :
<http://www.semanticweb.org/robertocannarella/ontologies/2021/1/ontologynarratives#>


SELECT ?book ?id

WHERE {

  ?book rdf:type :Book .

  ?book :hasPublisher ?publisher .

  ?publisher :hasID ?id .
```

```
  FILTER (?id < 5000)
}
```

***Q11.3*. Find all the events that do not have any human participants.**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX :
<http://www.semanticweb.org/robertocannarella/ontologies/2021/1/ontologynarratives#>

SELECT ?event
WHERE {
  ?event rdf:type :Event .

  MINUS {
       ?event :hasParticipant ?participant .
       ?participant rdf:type :HumanCharacter .
    }
}
```

Q11.4. Find the number of the narratives that are published in a book, along with the title of the book, the ISBN code of the book and the publisher of the book.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX :
<http://www.semanticweb.org/robertocannarella/ontologies/2021/1/ontologynarratives#>

SELECT ?book ?title ?isbn ?publisher (COUNT(?narrative) AS ?nNarratives)
WHERE {
  ?book rdf:type :Book ;
        :hasTitle ?title ;
        :hasISBNCode ?isbn ;
        :hasPublisher ?publisher ;
        :reports ?narrative .
}
GROUP BY ?book ?title ?isbn ?publisher
```

Q11.5. **Find all the distinct events that have a human participant or occur in a real location.**

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>

PREFIX :
<http://www.semanticweb.org/robertocannarella/ontologies/2021/1/ontologynarratives#>


SELECT DISTINCT ?event

WHERE {

  ?event rdf:type :Event .


  {

    ?event :hasParticipant ?participant .

    ?participant rdf:type :HumanCharacter .

    }

  UNION

  {

    ?event :occursIn ?location .

    ?location rdf:type :RealLocation .

    }

}
```