SI5, MAM5, Polytech Nice Sophia - Master Informatique Ingénierie, UCA - Master EIT

Final Examination of Course "Web of Data"

05/01/2021 – Duration: 2h30

Personal notes authorized – computer and internet connection non authorized

Indication: the questions are independent

1. RDF and RDFS

1. Represent in RDF Turtle/N3 syntax, the following:

   EN: Tim Berners-Lee is the inventor of the Web, graduated from Queen's College in Oxford in UK, and is a professor at MIT in Cambridge in the USA. He received the Turing Award awarded by the Association for Computing Machinery (ACM) in USA in 2016 and the Queen Elizabeth Prize in 2013 awarded by the Queen of UK.

   EN: Tim Berners-Lee est l'inventeur du Web, diplômé du Queen's College à Oxford au Royaume-Uni, et professeur au MIT à Cambridge aux États-Unis. Il a reçu le prix Turing décerné par l'Association for Computing Machinery (ACM) aux États-Unis en 2016 et le prix Queen Elizabeth décerné par la reine du Royaume-Uni en 2013.

2. Describe as precisely as possible in RDFS the classes and properties used in the RDF description you propose to answer the previous question.
3. Write two "interesting" SPARQL queries enabling to find information in an RDF dataset comprising the above description of *Tim Berners-Lee* and descriptions of other famous scientists, and indicate in natural language what your queries enable to retrieve.
4. Draw the RDF graph given in appendix.
5. Bonus: Express the RDF graph given in appendix in RDF/XML ***OR*** JSON-LD.

2. SPARQL

Write a SPARQL query for each question below.

1. Find resources having a property with `foaf:Person` as domain and `xsd:string` as range.
2. Find resources having grand parents and for each such resource, compute the average age of its grand parents.
3. Find resources that travel by car, for each such travel, replace car by bus in the graph.
4. What does this query return ?

```
select * where {
  ?x a h:Human
  minus { ?x foaf:knows/foaf:name "JohnDoe" }
}
```

3. SHACL

Write a SHACL constraint to express that Instances of class `ex:Vehicle` must have a property `ex:name` the value of which is a string and a property `ex:carbonEmission` the value of which is an integer between 95 and 150 (by the way, the unit is g/km).

Write a SHACL property path (that would come as the value of a property `sh:path`) corresponding to each of the SPARQL property paths below:

```
skos:prefLabel | skos:altLabel
```

```
rdf:rest*/rdf:first
```

4. General Culture

1. What is the smallest element of knowledge that can be represented in RDF?
2. What is the status of a W3C standard?
3. How would you define the Web of Data? The Semantic Web? What difference do you make between both?
4. Do you think there is a continuity or rupture between the Web and the Semantic Web? Justify your answer.
5. Do you think that XML and RDF are complementary or alternatives? Justify your answer.
6. Do you think that RDFS and SHACL are complementary or alternatives? Justify your answer.

Appendix: a mysterious RDF graph

```
@prefix tutu: <http://www.woua.fr/wo#> .
@prefix titi: <http://www.w3.org/2001/XMLSchema> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

<http://www.wiii.fr/#Mya> a tutu:Ma, tutu:Mi ;
   tutu:me <http://www.wiii.fr/Mya> ;
   tutu:mi <http://www.wiii.fr/Mou>, <http://www.woui.fr/Mya> .
<http://www.woui.fr/Mya> a tutu:Mu ; tutu:t "17"^^xsd:int .
[] a tutu:Ma, tutu:Mi ;
   tutu:me [ a tutu:Ma ], <http://www.woui.fr/Mya> ;
   tutu:mi [ a tutu:Mu ; tutu:t "17"^^xsd:int ] .
```