Question Paper

Exam Date & Time: 05-Jan-2023 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SEVENTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, DEC 2022-JAN 2023

Semantic Web [ICT 4036]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) With an example of Medical ontology, explain the main Stages in Ontology Development. (5)

A)

B) Given the following SPARQL query: (3)

```
PREFIX S: http://xmlns.com/Sports/0.1/
PREFIX m: http://mydomain.com/myExample#
PREFIX dc: http://purl.org/dc/elements/1.1/
PREFIX rdf: http://www.w3.org/1999/02/22-rdf-syntax-ns#
SELECT ?g
WHERE {
?x S:name "Vijay K".
?x ?r ?l.
?r rdf:type rdf:Property.
?l rdf:type S:team
?l S:name ?g.
}
```

1. What is the informal meaning of this query?
2. Draw the RDF graph corresponding to the graph patterns of the query.
3. What must be added to this query for returning the year of participation of the S:team if it is available?

C) How different ontologies can be mapped for integrating, articulating similarities. (2)

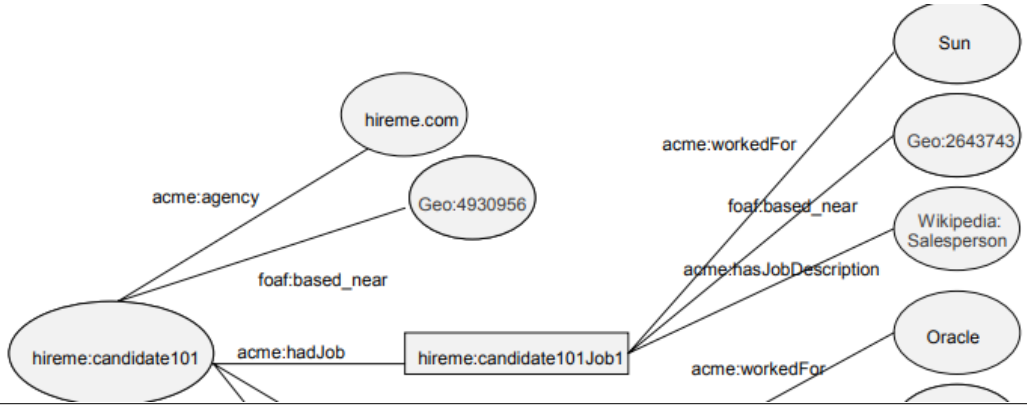
2) Consider the sample RDF graph shown in the Figure. Write SPARQL queries to (5)

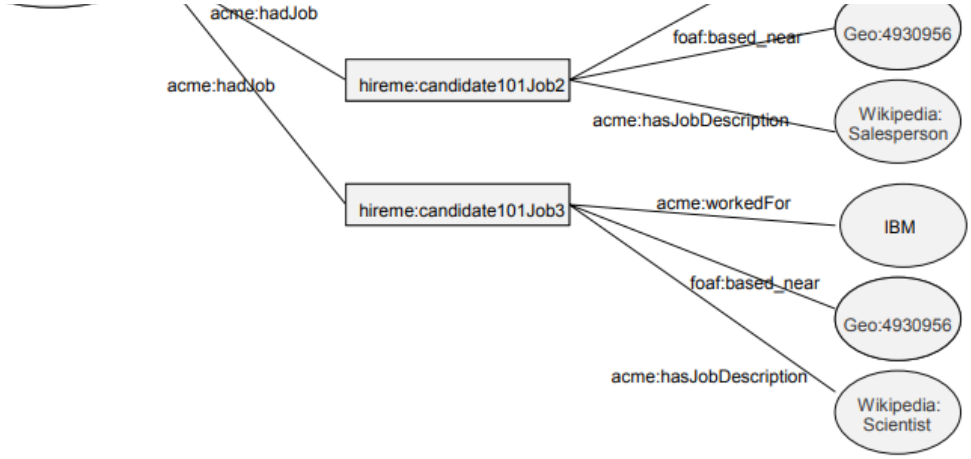
A)

a. List candidates who have worked for "Oracle".

b. Count the number of companies the candidates have worked for.

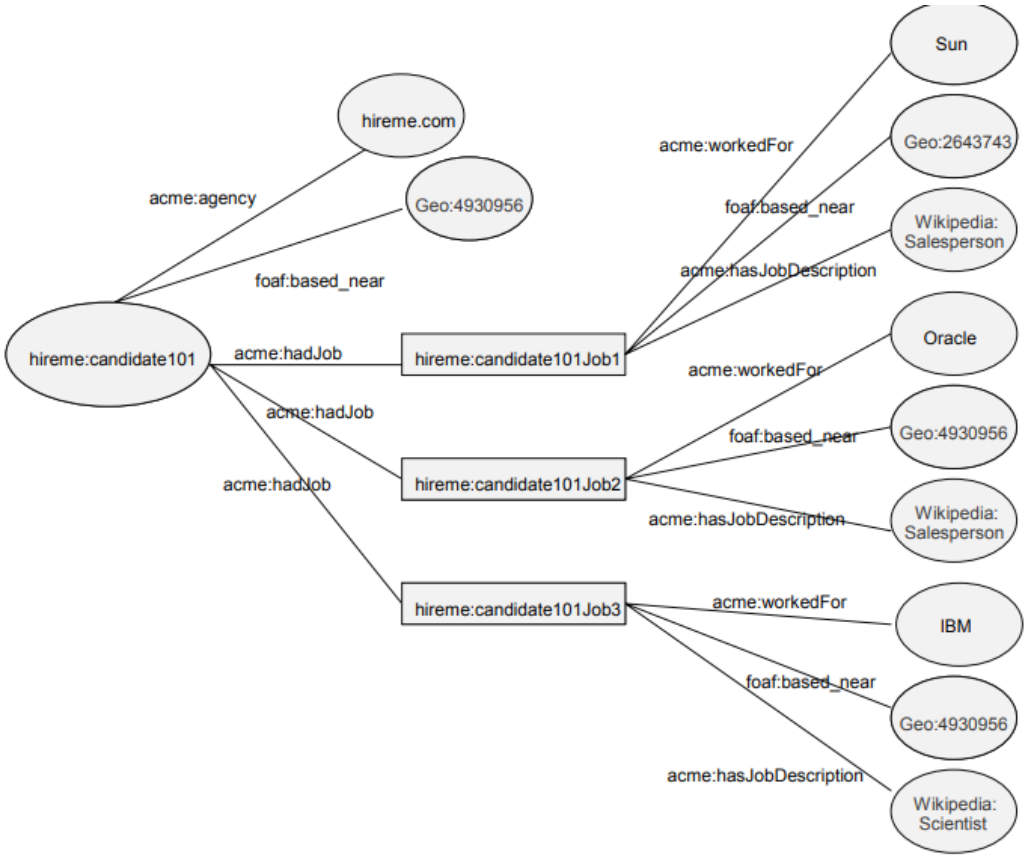
c. Give the Job Description of candidates who worked for either Oracle or Java.





B) Represent the Subclasses and Subproperties axiomatically using basic predicate logic along with suitable examples. (3)

C) Consider the RDF graph shown in the Figure. (2)



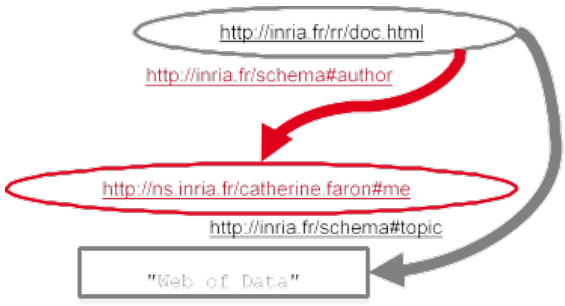
a. Give the rdf:type of the resource that resource "hireme:candidate101Job3" worked for.

b. Write an ASK query which checks whether the domain of acme:workedFor for the candidates "hereme:candidate201" and "hereme:candidate201" are the same resource. (Assume the candidate triples are added)

3) Illustrate RIF categorization of OWL2 RL rules with RIF Core presentation syntax. (5)

A)

B) Represent the RDF graph using RDF/XML and Turtle formats (3)



C) In OWL, logical constructors are used to create complex class descriptions from atomic classes. What can be asserted from the following description? (2)

```
: Guitar a owl:Class ;
  owl:equivalentClass [
    owl:unionOf (: Acoustic
                  : Electric
                  : Air)
  ] .
```

4) Represent the following using OWL/XML representation. Which axioms are used for representing? { Peter is Stewie's father. Stewie is a man. Peter is Chris's father. Chris and Stewie are different from each other. }. (5)

A)

B) Represent the following rule in Rule ML. PracticesAt(X, Y), Hospital(Y), Patient(Z), Treats(X,Z)→ DoctorOf(X,Z) (3)

C) Use RDF/XML notation to represent that somebody is a happy person exactly if all their children are happy persons. (2)

5) Write the Turtle serialization of the following RDF/XML triples: (5)

A)

```
<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:ns0="http://dbpedia.org/ontology/">
 <rdf:Description rdf:about="http://dbpedia.org/resource/Tom_Hanks">
  <ns0:birthDate rdf:datatype="http://www.w3.org/2001/XMLSchema#date">1956-07-
   09</ns0:birthDate>
  <ns0:residence rdf:resource="http://dbpedia.org/resource/California"/>
 </rdf:Description>
</rdf:RDF>
```

B) How do the semantics of following RDF and RDFS primitives represented with axiomatic semantics? (3)

1. Classes
2. The SubProperty
3. The Auxiliary *FuncProp* Property

C) Two principles of semantic web are Downward compatibility and Upward partial understanding, Relate and explain these principles considering any two layers. (2)

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