Knowledge Representation & Reasoning - Quiz 2 - Solution

Name: _____

Roll No: _____

Section: _____

1. What is the key idea of Semantic web? List three benefits of achieving this idea.

- The meaning of information (Semantics) is made explicit by formal (structured) and standardized knowledge representations (Ontologies).
  - To process the meaning of information automatically.
  - To relate and integrate heterogeneous data
  - To deduce implicit (not evident) information from existing (evident) information in an automated way.

2. What is the purpose of semantics based metadata?

Attaching/ adding understanding, comprehension, meaning to data for machines
Or
To make the data/content understandable or comprehensible or meaningful or intelligible for the machines.
Or
Making data machine-understandable

3. ____ denotes the intention/purpose used to communicate content:

a. **Pragmatics**
b. Experience
c. Semantics

4. ____ denotes any past/present/personal information used to interpret content:

a. **Experience**
b. Pragmatics
c. Syntax

5. A triple in RDF is also called a:

a. Sentence
b. Statement
c. Fragment
d. Element

5. An RDF graph:

a. Has three elements called the subject, the predicate and the object.
b. Is contained in an XML element.
c. Has three elements called the IRI, the blank node, and the literal.
d. Does not correspond to any of the other answers.
e. Is a part of a Web page.

6. Successful communication depends primarily on:

a. **Syntax, Semantics being transmitted and interpreted correctly**
b. Context, Pragmatics of the sender and receiver
c. Symbol, Object of the concept

7. Amna is attempting to develop SiriKiSister, which is meant to be an intelligent agent using RDF. SiriKiSister is given only the following information in RDF: A hasSister B. Would SiriKiSister be capable of answering "Who is the sister of B"? Clearly explain why or why not?

No, because it is not explicitly described

8. What is the difference between a URI and URL? What is the role of URI in RDF and Linked Data?

1. URI = ID but not location
2. URL = ID + a Location
3. URIs for naming things

9. RDF stands for

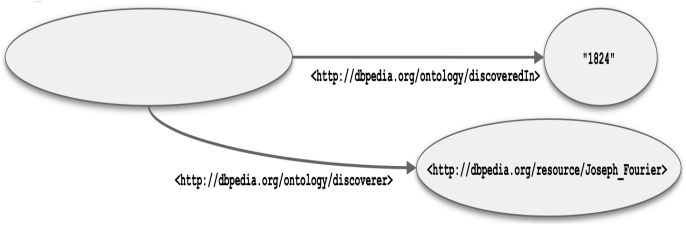
a. Resource Description Framework
b. Resource Definition Framework
c. Resource Discovery Framework
d. Resource Data Framework

10. What is RDFS meant for? What are the key enhancements RDFS adds to RDF? [4]

RDF Schema, officially called “RDF Vocabulary Description Language”
Enhancing the expressivity of RDF

1. **Class/SubClass**
2. **Property/subproperty**
3. **Domain/Range**

11. Translate the semantics of the following graph into natural language, or mention there’s something wrong with the following RDF Graph?



What is the purpose of semantics based metadata?

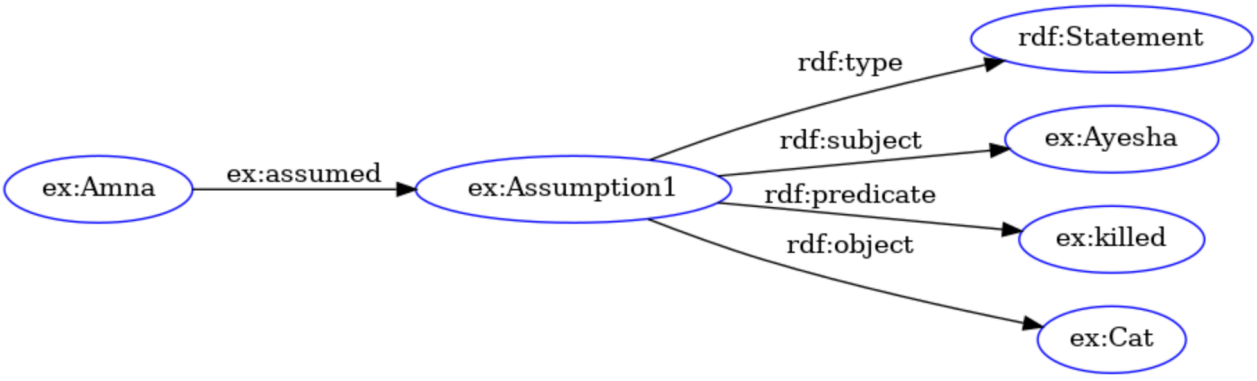
A resource is discovered in 1824, whose discoverer was Joseph Fourier.

12. How would you say the following in RDF? Write proper triples in RDF/XML or Turtle notation and also draw a corresponding RDF Graph. [4]

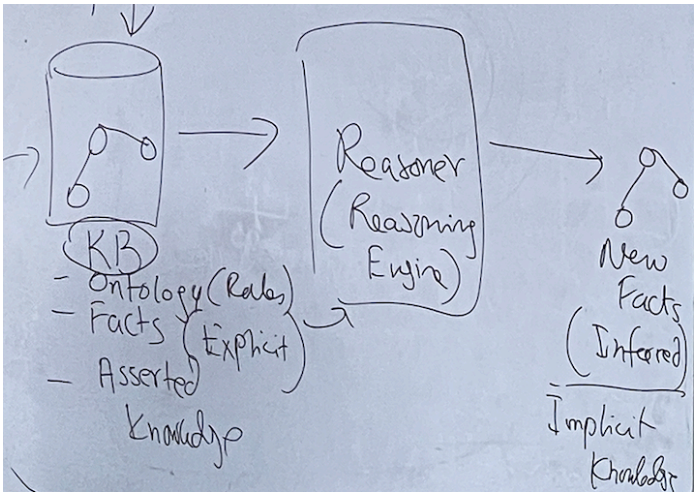
`Amna assumed that Ayesha killed the cat.`

```
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix ex: <http://example.org/> .

ex:Amna ex:assumed ex:Assumption1 .
ex:Assumption1 a rdf:Statement ;
   rdf:subject ex:Ayesha ;
   rdf:predicate ex:killed ;
   rdf:object ex:Cat .
```

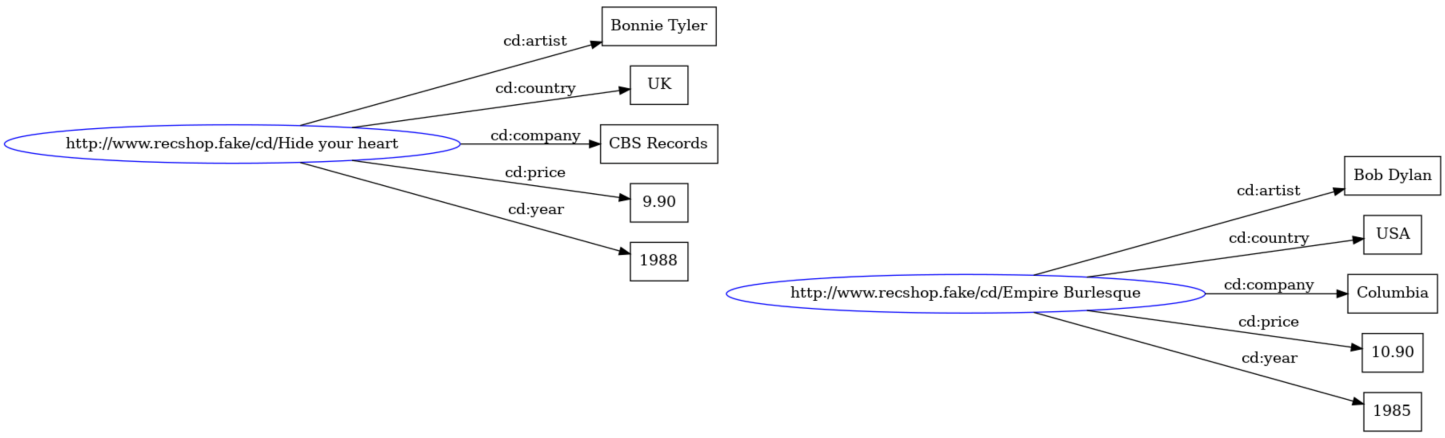


13. What is the key difference between a data driven vs a knowledge driven application architecture. Explain with the help of a schematic/conceptual architecture diagram.



14. Draw RDF Graph for the following RDF Document.

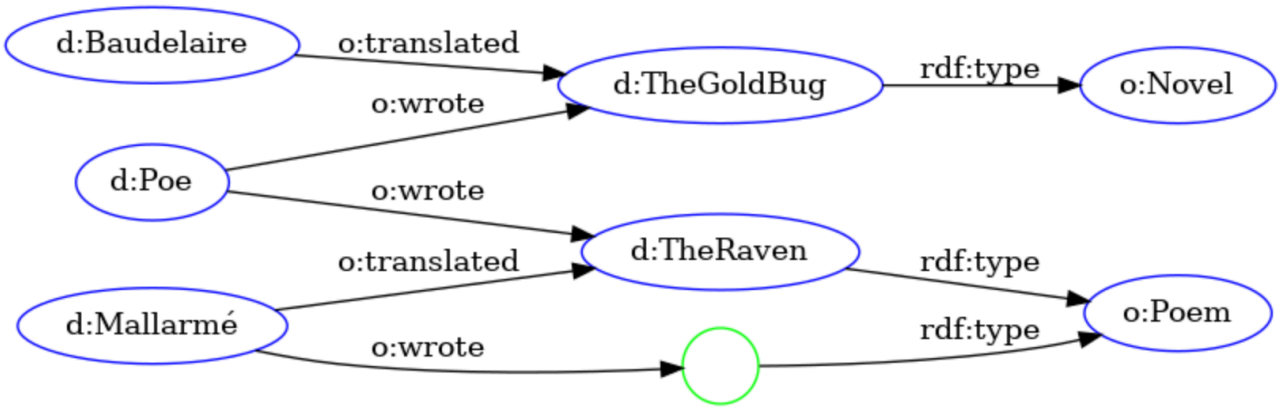
```
<?xml version="1.0"?>
<rdf:RDF
xmlns:rdf="http://www.w3.org/
1999/02/22-rdf-syntax-ns#"
xmlns:cd="http://www.recshop.fake/
cd#">
<rdf:Description
rdf:about="http://www.recshop.fake/
cd/Empire Burlesque">
  <cd:artist>Bob Dylan</cd:artist>
  <cd:country>USA</cd:country>
  <cd:company>Columbia</cd:company>
  <cd:price>10.90</cd:price>
  <cd:year>1985</cd:year>
</rdf:Description>
<rdf:Description
rdf:about="http://www.recshop.fake/
cd/Hide your heart">
  <cd:artist>Bonnie Tyler</
cd:artist>
  <cd:country>UK</cd:country>
  <cd:company>CBS Records</
cd:company>
  <cd:price>9.90</cd:price>
  <cd:year>1988</cd:year>
</rdf:Description>
</rdf:RDF>
```



15. Here are the 8 triples of an RDF graph G about writers and their works: (all identifiers correspond in fact to URIs, _:b is a blank node):

⟨d:Poe, o:wrote, d:TheGoldBug⟩
⟨d:Baudelaire, o:translated, d:TheGoldBug⟩
⟨d:Poe, o:wrote, d:TheRaven⟩
⟨d:Mallarmé, o:translated, d:TheRaven⟩
⟨d:TheRaven, rdf:type, o:Poem⟩
⟨d:Mallarmé, o:wrote, _:b⟩
⟨_:b, rdf:type, o:Poem⟩
⟨d:TheGoldBug, rdf:type, o:Novel⟩

a. Draw an RDF graph corresponding to these statements



b. Express in English the meaning of these statements.

Poe wrote the Poem "The Raven" translated by Mallarmé and the novel "The Gold Bug" translated by Baudelaire. Mallarmé wrote a poem.

c. Consider the RDFS ontology o containing, in addition to those of G, the following statements:

⟨o:Novel, rdfs:subClassOf, o:Literature⟩
⟨o:Poem, rdfs:subClassOf, o:Literature⟩
⟨o:translated, rdfs:range, o:Literature⟩
⟨o:wrote, rdfs:domain, o:Writer⟩

Does this allow to conclude that d:Poe, d:Baudelaire or d:Mallarmé is a o:Writer? Explain why.

The only assertion that would allow to conclude that someone is a o:Writer is the last one related to the domain of the o:wrote predicate. Nothing allows for inferring triples with the o:wrote predicate, so the only assertions with it are those asserted. Hence, the only writers are d:Poe and d:Mallarmé.