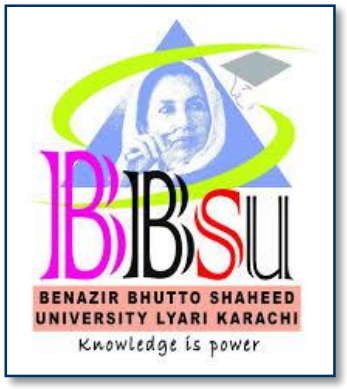


BENAZIR BHUTTO SHAHEED UNIVERSITY

LYARI, KARACHI

WEB SEMANTICS ASSIGNMENT # 05

Submitted to:

Ma'am Ambreen

Submitted by:

Name: Salman Abdul Rahim

Department: Computer Science

Semester: 7th – B

Roll #: 616

Q1: Translate the following sentences into RDF:

1. **Mary is a woman.**

```
<rdf:RDF>
 <rdf:Description about="woman ">
  <s:is a>Mary</s:is a >
 </rdf:Description>
</rdf:RDF>
```

2. **Every mother is a woman.**

```
<rdf:RDF>
 <rdf:Description about="woman ">
  <s:is a>Mother</s:is a >
 </rdf:Description>
</rdf:RDF>
```

3. **Mary is John's wife.**

```
<rdf:RDF>
 <rdf:Description about="John's Wife ">
  <s:is>Mary</s:is>
 </rdf:Description>
</rdf:RDF>
```

4. **Mothers are women who are also parents.**

```
<rdf:RDF>
 <rdf:Description about="women ">
  <s:are>Mothers</s:are >
 </rdf:Description>
   <rdf:Description about="parents">
```

```
    <s:are>Mothers</s:are >
  </rdf:Description>
</rdf:RDF>
```

5. **At least one child of a grandparent has also a child.**

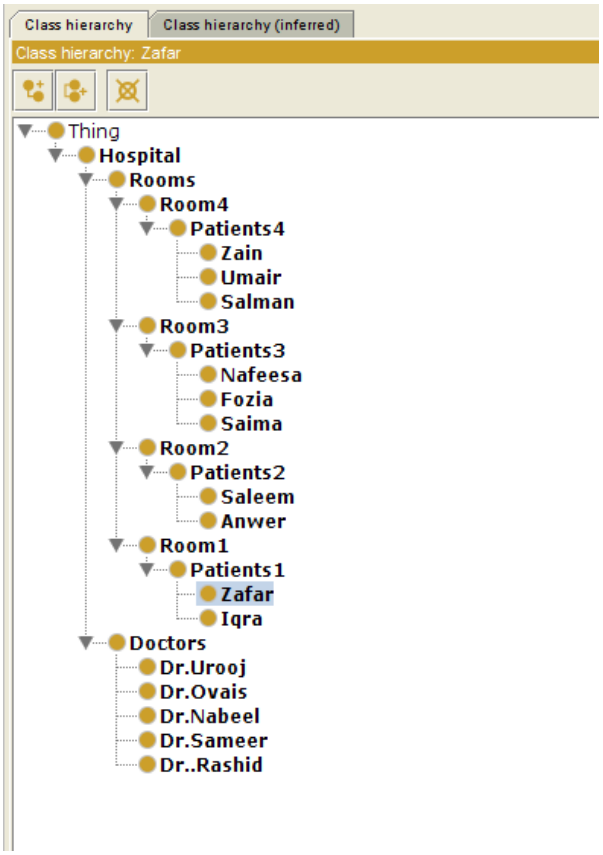
```
<rdf:RDF>
  <rdf:Description about="grandparent">
    <s:is of>child</s:is of>
  </rdf:Description>
  <rdf:Description about="child">
    <s:has a>child</s:has a>
  </rdf:Description>
</rdf:RDF>
```

Q2: Define a RDFS file for a hospital that includes:

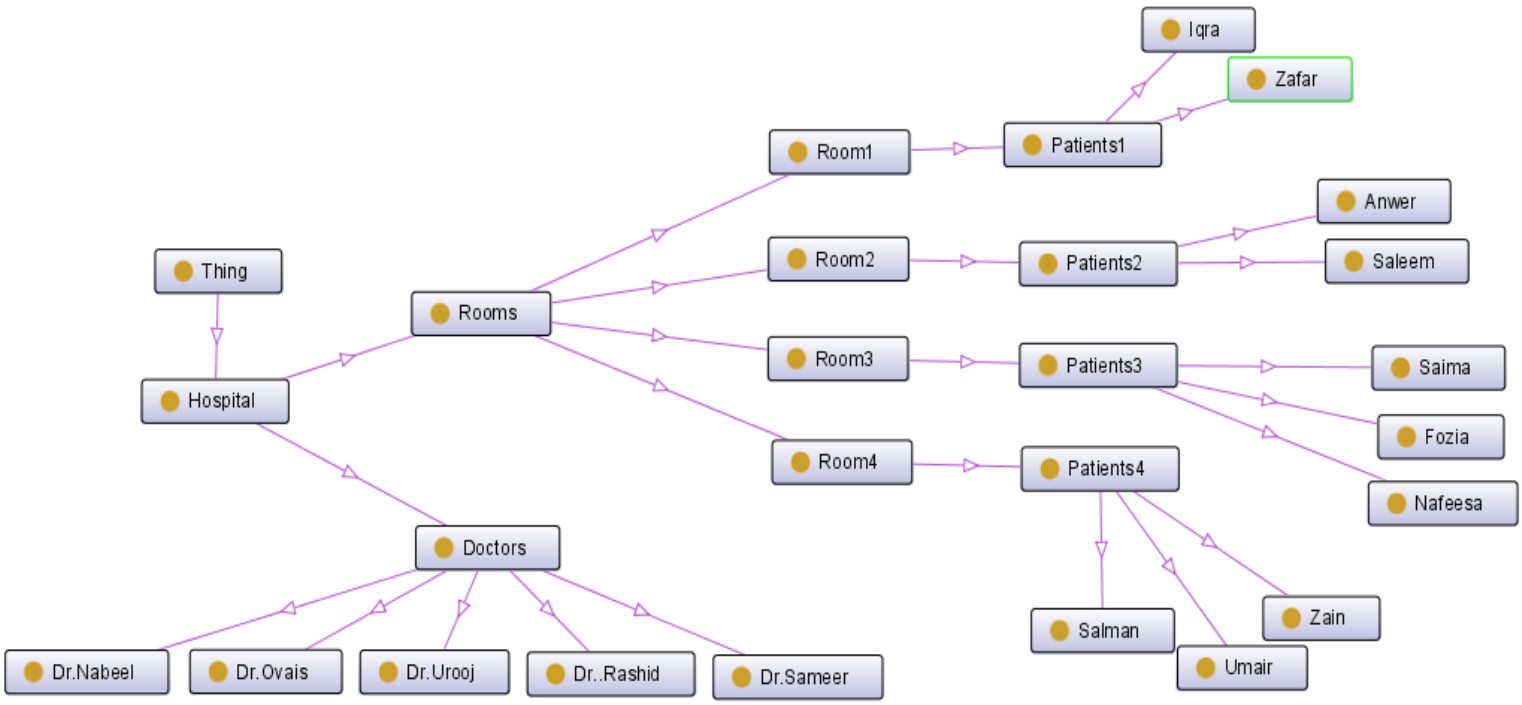
(a) four rooms, five doctors, ten patients, and three employees.

(b) Also each room has at least one patient and utmost three patients. Then transform your file with protégé tool to graphical model.

Classes:



Graphical Representation:



Q4: Write SPARQL query for given questions.

1- Which course(s) does a student take?

```
SELECT ?Courses ?Student
        WHERE { ?Course rdfs:CanTake ?Student }
```

2- Which lecturer(s) teach a specific student?

```
SELECT ?Lectures ?Student
        WHERE { ?Lecturer rdfs:Teach ?Student }
```

3- What are the courses offered in first semester?

```
SELECT ?Courses ?Semester
        WHERE { ?Course rdfs:OfferedIn ?Semester }
        FILTER(Semester == First)
```

4- What are the degree awarding institutes?

```
SELECT ?Institute ?Degree
        WHERE { ?Institute rdfs:Awarding ?Degree }
```

5- Which teacher teaches more than 3 courses?

```
SELECT ?Teacher ?CoursesCount
        WHERE { ?Teacher rdfs:Teaches ?CourseCount }
        FILTER(CourseCount == 3)
```

Q3: Open file in Protégé then write and execute the following queries with SPARQL language. Attach queries and the output of them in your report.

a- (label) of the type (e.g., article, book chapter, etc.) and year of the paper.

```
SELECT ?Label ?Year
        WHERE { ?Label  rdfs:Type ?Year }
```

b- Find all papers that appear in a venue with"ABC" in the name (using partial string matching), and return a list of title, venue, year and topic label (i.e., not the URI of the topic), sorted by year in descending order, followed by topic in ascending order (for those papers in the same year).

```
SELECT ?Name ?Title ?Venue ?Year
        WHERE {         ?Name  rdfs:Venue ?"ABC"
                        ?Title  rdfs:Venue ?"ABC"
                        ?Venue  rdfs:Venue ?"ABC"
                        ?Year  rdfs:Venue ?"ABC"
                                }
        ORDER BY (?Year)
        ORDER BY (?Name)
```

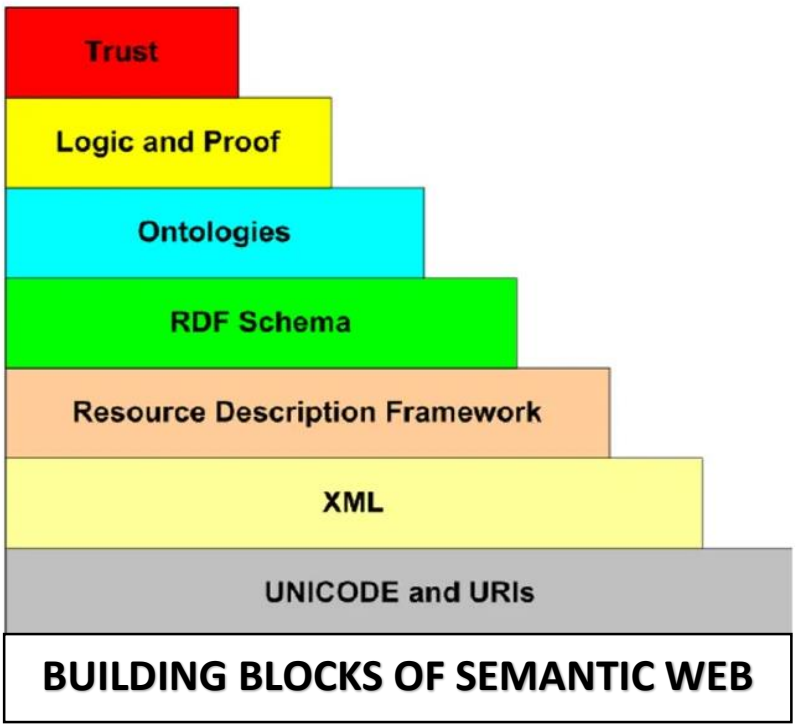
c- For each author, retrieve their name and a count of the number of papers they have authored.

```
SELECT (COUNT (?Papers) as ?Name
        WHERE { ?Paper  rdfs:Author ?Name }
```

d- Sort the result by author name. You should assume that two authors are the same if and only if their full names match exactly. For sorting purposes, just use the name as it appears, do not worry about first name or last name distinctions.

```
SELECT ?Name ?Author
        WHERE { ?Name  rdfs:is_a ?Author }
        ORDER BY (?Name)
```

Q5: Define major building blocks of semantic web



- **Unicode and URI:**

Unicode, the Standard for computer character representation, and URIs, the standard for identifying and locating resources (such as pages on the Web), provide a baseline for representing characters used in most of the languages in the world, and for identifying resources.

- **XML:**

XML and its related Standards, such as Namespaces, and Schemas, form a common means for structuring data on the Web but without communicating the meaning of the data. These are well established within the Web already.

- **Resource Description Framework:**

RDF is the first layer of the Semantic Web proper. RDF is a simple metadata representation framework, using URIs to identify Web- based resources and a graph model for describing relationships between resources. Several syntactic representations are available, including a standard XML format. RDF Schema: a simple type modeling language for describing classes of resources and properties between them in the basic RDF model. It provides a simple reasoning framework for inferring types of resources.

- **Ontologies:**

A richer language for providing more complex constraints on the types of resources and their properties.

- **Logic and Proof:**

An (automatic) reasoning system provided on top of the ontology structure to make new inferences. Thus, using such a system, a software agent can make deductions as to whether a particular resource satisfies its requirements (and vice versa).

- **Trust:**

The final layer of the stack addresses issues of trust that the Semantic Web can support. This component has not progressed far beyond a vision of allowing people to ask questions of the trustworthiness of the information on the Web, in order to provide an assurance of its quality.