



# **CSE488**

## **Ontologies and semantic web**

### **Hospital Project**

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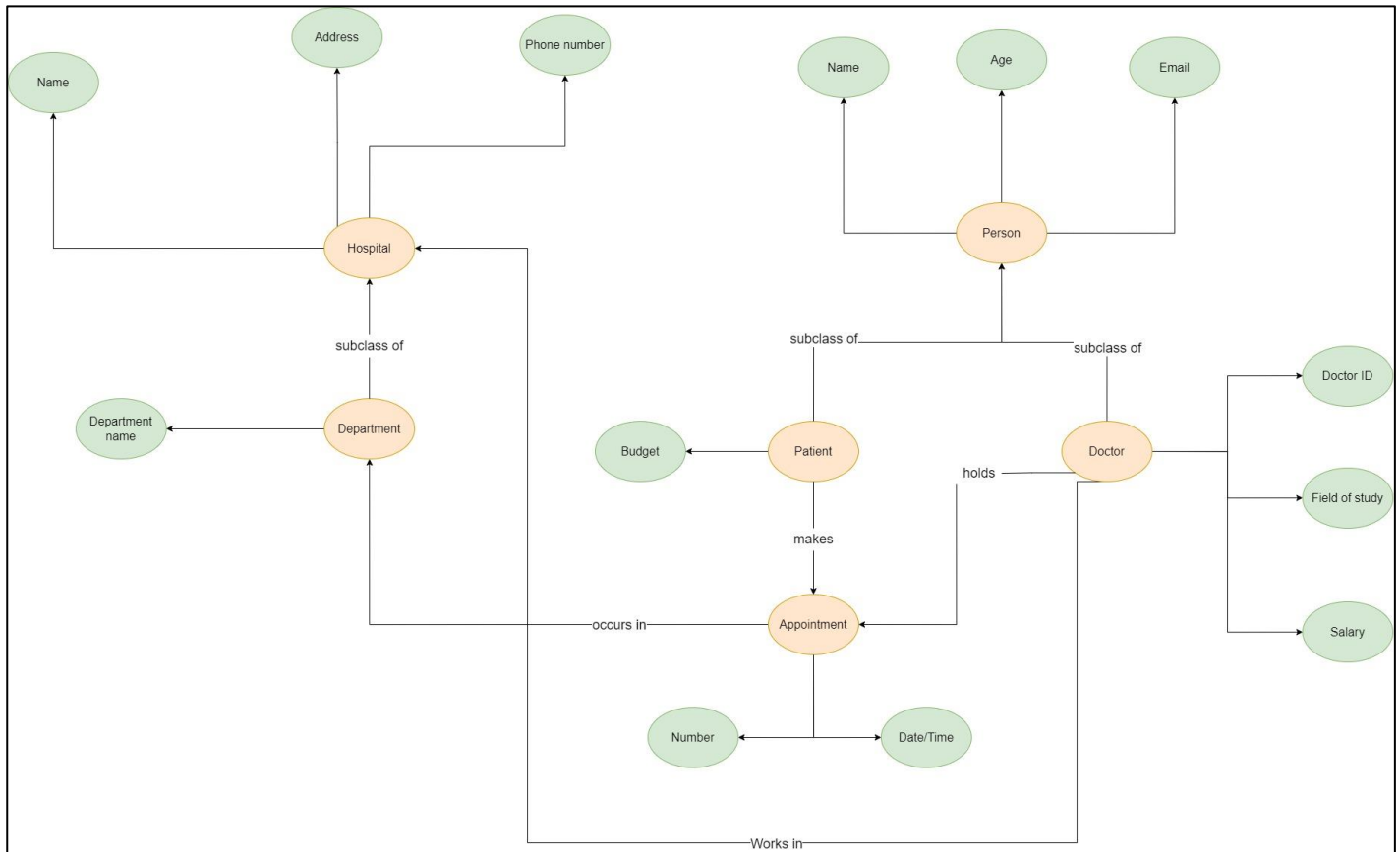
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# Problem statement

In this project we aim to apply a Resource Description Framework (RDF) in order to design a data model for a hospital management system. First of all, we create the classes needed for the system as well as adding their data properties and object properties in a model called RDF graph. In the following part, we use the data from the graph to create an owl file using Protégé tool containing all the previous classes and their properties to be able to add some constraints on each entity while also adding domain and range for each property. In the last part of the project, we add some instances from each class for testing that the system is working right. We use SPARQL queries to perform this action. Examples of these queries will be shown in the following report.

# RDF Graph for Hospital management system



- **Classes:**

- 1) Person
- 2) Doctor
- 3) Patient
- 4) Hospital
- 5) Department
- 6) Appointment

- **Data properties:**

- 1) Person: Name, Age, E-mail
- 2) Doctor: Doctor ID, Field of study, Salary
- 3) Hospital: Name, Address, Phone number
- 4) Appointment: Number, Date/Time
- 5) Department: Department Name
- 6) Patient: Budget

- **Object properties:**

- 1) Holds
- 2) Makes
- 3) Occurs in
- 4) Works in

## SPARQL Queries Examples:

- 1) Execute a SPARQL Query to get one doctor in the hospital and his salary.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX uri: <http://www.semanticweb.org/mark/ontologies/2022/4/untitled-ontology-3#>

Select ?person ?Salary
where {?person a uri:Doctor.
      ?person uri:Salary ?Salary.}
LIMIT 1
```

## Output:

SPARQL query:		
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX owl: <http://www.w3.org/2002/07/owl#> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> PREFIX xsd: <http://www.w3.org/2001/XMLSchema#> PREFIX uri: <http://www.semanticweb.org/mark/ontologies/2022/4/untitled-ontology-3#> Select ?person ?Salary where {?person a uri:Doctor. ?person uri:Salary ?Salary.} LIMIT 1		
	person	Salary
Dr2		"8000"^^<http://www.w3.org/2001/XMLSchema#integer>

## 2) Execute a SPARQL Query to list all the patients in the hospital and their names.

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

PREFIX owl: <http://www.w3.org/2002/07/owl#>

PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>

PREFIX uri: http://www.semanticweb.org/mark/ontologies/2022/4/untitled-ontology-3#

SELECT ?person ?Name

WHERE {

?person a uri:Patient.

?person uri:Name ?Name.

}

### Output:

SPARQL query	
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> PREFIX owl: <http://www.w3.org/2002/07/owl#> PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#> PREFIX xsd: <http://www.w3.org/2001/XMLSchema#> PREFIX uri: <http://www.semanticweb.org/mark/ontologies/2022/4/untitled-ontology-3#> SELECT ?person ?Name WHERE { ?person a uri:Patient. ?person uri:Name ?Name. }	
person	Name
Patient3	"Karim"
Patient2	"Ahmad"
Patient1	"Mark"

### 3) Execute a SPARQL Query to get all the appointments made and their numbers.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX uri: <http://www.semanticweb.org/mark/ontologies/2022/4/untitled-ontology-3#>
```

```
SELECT ?Appointment ?Number
WHERE {
  ?Appointment a uri:Appointment.
  ?Appointment uri:Number ?Number.
}
```

### Output:

SPARQL query:	
<pre>PREFIX rdf: &lt;http://www.w3.org/1999/02/22-rdf-syntax-ns#&gt; PREFIX owl: &lt;http://www.w3.org/2002/07/owl#&gt; PREFIX rdfs: &lt;http://www.w3.org/2000/01/rdf-schema#&gt; PREFIX xsd: &lt;http://www.w3.org/2001/XMLSchema#&gt; PREFIX uri: &lt;http://www.semanticweb.org/mark/ontologies/2022/4/untitled-ontology-3#&gt;  SELECT ?Appointment ?Number WHERE {   ?Appointment a uri:Appointment.   ?Appointment uri:Number ?Number. }</pre>	
Appointment	Number
Appoin2	"2032"^^<http://www.w3.org/2001/XMLSchema#integer>
Appoin3	"20"^^<http://www.w3.org/2001/XMLSchema#integer>
Appoin1	"106"^^<http://www.w3.org/2001/XMLSchema#integer>