

# (TR-102)

# MASTERING THE SEMANTIC WEB

## Training Day 12 Report:

27 June 2024

The twelfth day of the training focused on SPARQL queries and their implementation using Apache Jena Fuseki.

### SPARQL Queries:

SPARQL (SPARQL Protocol and RDF Query Language) is the query language used for querying and manipulating RDF (Resource Description Framework) data. It allows to extract information stored in RDF format by writing queries.

1. **SELECT:** Used to retrieve specific variables from the data.

eg.

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT ?name
```

```
WHERE {
```

```
    ?person foaf:name ?name.
```

```
}
```

2. **WHERE:** Specifies the pattern to match in the dataset.

eg.

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT ?name
```

```
WHERE {
```

```
    ?person foaf:name ?name.
```

```
}
```

3. **LIMIT:** Limits the number of results returned.

eg.

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
```

```
SELECT ?name
```

```
WHERE {
```

```
    ?person foaf:name ?name.
```

```
}
```

LIMIT 10

**4. OFFSET:** Skips a specified number of results.

eg.  
 PREFIX foaf: <http://xmlns.com/foaf/0.1/>  
 SELECT ?name  
 WHERE {  
     ?person foaf:name ?name.  
 }  
 OFFSET 5

**5. ORDER BY:** Orders the results based on specified variables.

eg.  
 PREFIX foaf: <http://xmlns.com/foaf/0.1/>  
 SELECT ?name  
 WHERE {  
     ?person foaf:name ?name.  
 }  
 ORDER BY ?name

**6. FILTER:** Restricts the results to meet specified conditions.

eg.  
 PREFIX ex: <http://xmlns.com/foaf/0.1/>  
 SELECT ?person ?credit  
 WHERE {  
     ?person ex:credit ?credit.  
     FILTER(?credit > 500)  
 }

**7. FILTER NOT EXISTS:** Ensures certain patterns do not exist in the result set.

eg.  
 PREFIX foaf: <http://xmlns.com/foaf/0.1/>  
 SELECT ?person  
 WHERE {  
     ?person foaf:name ?name.  
     FILTER NOT EXISTS {  
         ?person foaf:age ?age.  
     }  
 }

**8. DESCRIBE:** Returns an RDF graph containing resources related to the query.

eg.  
 PREFIX foaf: <http://xmlns.com/foaf/0.1/>  
 DESCRIBE ?person  
 WHERE { ?person foaf:name "Alice".  
 }

**9. SELECT \* WHERE:** A variant of SELECT to return all variables that match the pattern.

eg. PREFIX ex: <http://example.org/schema/>  
 PREFIX foaf: <http://xmlns.com/foaf/0.1/>

```
SELECT *WHERE {  
    ?subject ?predicate ?object.  
}
```

**10. OPTIONAL:** Returns results including optional patterns if they exist.

eg.

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>  
SELECT ?person ?name ?age  
WHERE {  
    ?person foaf:name ?name.  
    OPTIONAL {  
        ?person foaf:age ?age.  
    }  
}
```

- Participants asked to perform the tasks using the SPARQL queries learnt on the dataset imported on the previous day.

## **Conclusion:**

The twelfth day of the training focused on mastering SPARQL queries using Apache Jena Fuseki. Participants gained practical knowledge in querying RDF data with them. Hands-on sessions enabled them to import datasets, execute queries, and troubleshoot effectively. This session prepares participants for advanced topics in semantic web technologies.