Master 2 – Data Science
Paris Saclay University

Web of Data
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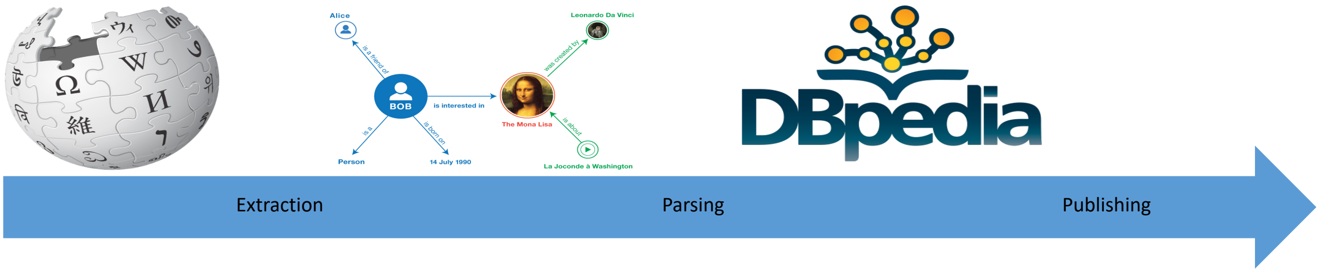
# Practical session: Linked Open Data

## Part 1 - Introduction of DBpedia Dataset

DBpedia represents the factual cross-domain knowledge extracted from Wikipedia infoboxes.



The English version of the DBpedia knowledge knowledge graph represents more than 228 million entities described using the cross-domain [DBpedia ontology](#) that contains more than 768 classes and 3000 properties. In 2022, DBpedia contains 1,592,912 instances of persons, 190,369 species and 967,491 places.

In addition, localized versions of DBpedia in 125 languages are provided. (See https://www.dbpedia.org/)

### 1. Look at one DBpedia page ….

URL http://dbpedia.org/page/Paris is the RDF description of Paris.

- This instance belongs to which classes of the DBPEDIA ontology?

- Are there some ontology mappings declared with other classes?

- Are there any sameAs links to other knowledge graphs ?

- What is the property **dbo:abstract** in Wikipedia?

**2. A *SPARQL endpoint*** is a SPARQL protocol service, which enables users (human or application) to query a knowledge base via the SPARQL language. Results are returned in one or more machine-processable formats. Different *SPARQL endpoint* can be used to query DBpedia: Virtuoso, OpenLink, Disco.

At this address, you can find a list of available SPARQL endpoints for various LOD datasets:

https://www.w3.org/wiki/SparqlEndpoints

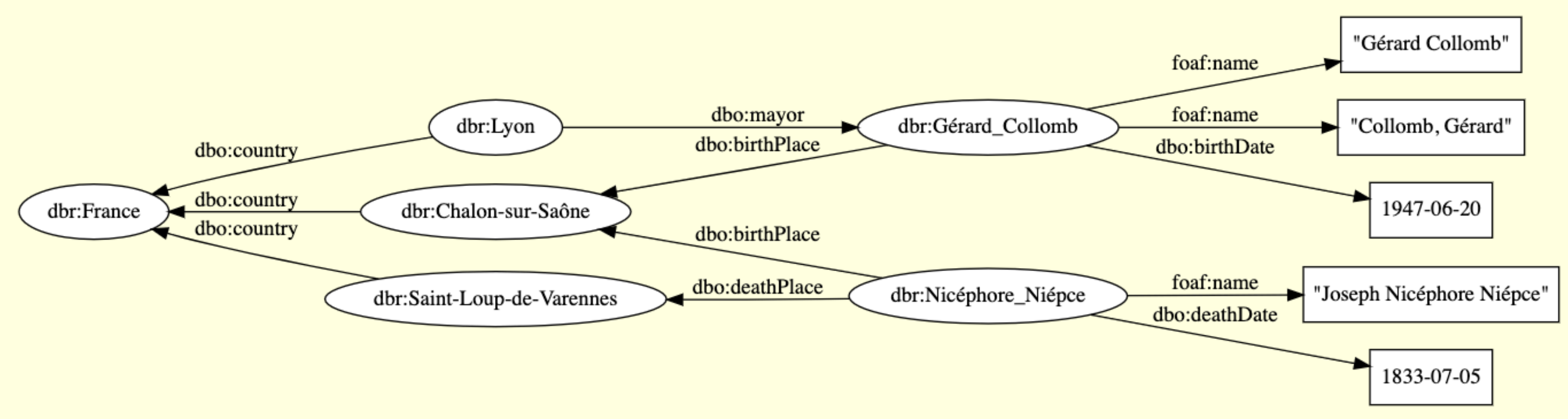
# Part 2 - Querying DBpedia Dataset

For this practical session, we will use the DBPedia SPARQL access point, and to access it, we will use the Yasgui online client. By default, Yasgui (http://yasgui.triply.cc/) is configured to query DBPedia (https://www.dbpedia.org/), which is appropriate for our tutorial, but keep in mind that:

- Yasgui is not linked to DBpedia, it can be used with any SPARQL access point;
- DBPedia is not related to Yasgui, it can be queried with any SPARQL compliant client (in fact any HTTP client that is not very configurable).

## Vocabulary

An excerpt of a dbpedia dataset



The vocabulary of DBPedia is very large, but in this tutorial we will only need the IRIs below.

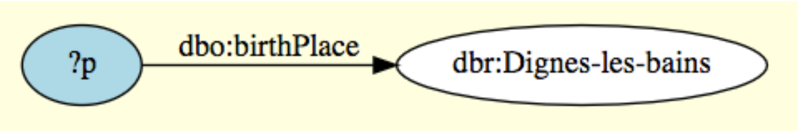
| | | |
|---|---|---|
| foaf:name | Property | A person name |
| dbo:birthDate | Property | Birth of date |
| dbo:birthPlace | Property | Place of Birth |
| dbo:deathDate | Property | Date of Death |
| dbo:deathPlace | Property | Place of Death |
| dbo:country | Property | Country |
| dbo:mayor | Property | City Mayor |
| dbr:Digne-les-Bains | Instance | The City of Digne les bains |
| dbr:France | Instance | France |

/!\ Warning: IRIs are case-sensitive.

/!\ Warning: There is an error in the patterns Dignes should be written without an ‘S’.

## Exercises

1. Give the IRIs of all people born in Digne-les-Bains

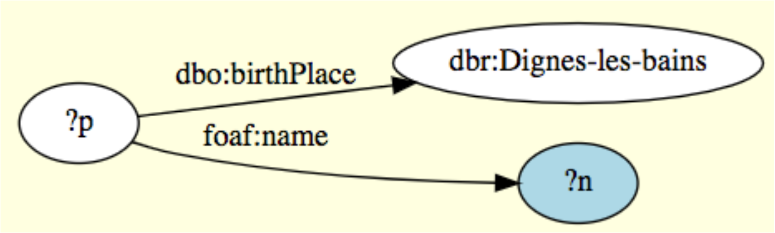


Graph Pattern

Answer:

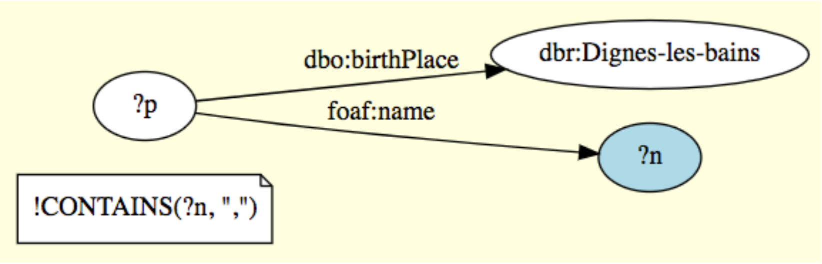
```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX dbo: <http://dbpedia.org/ontology/>
PREFIX dbr: <http://dbpedia.org/resource/>
PREFIX db: <http://dbpedia.org/>


SELECT * WHERE {
  ?p dbo:birthPlace dbr:Digne-les-Bains .
}
LIMIT 100
```

2. Show the names of the original people from Digne-les-Bains



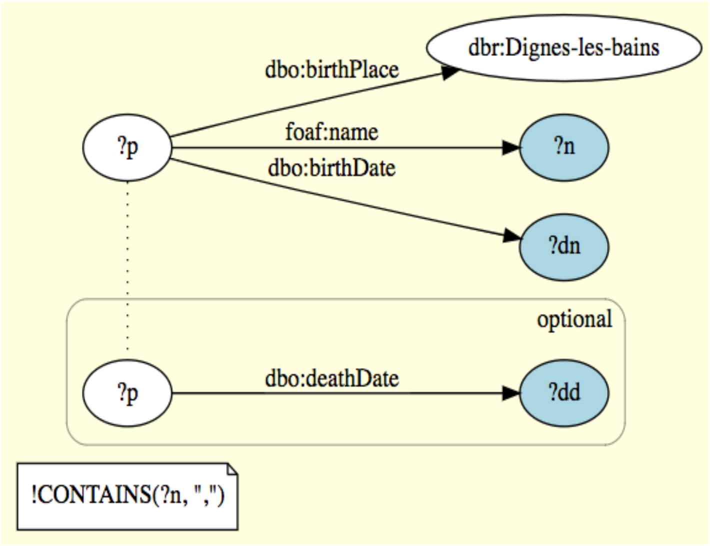
Graph Pattern

3. Give the names (without commas) of people from Digne-les-Bains (you will need a filter and the contains function)
   If it does not work, try with an another character (e.g. '-').



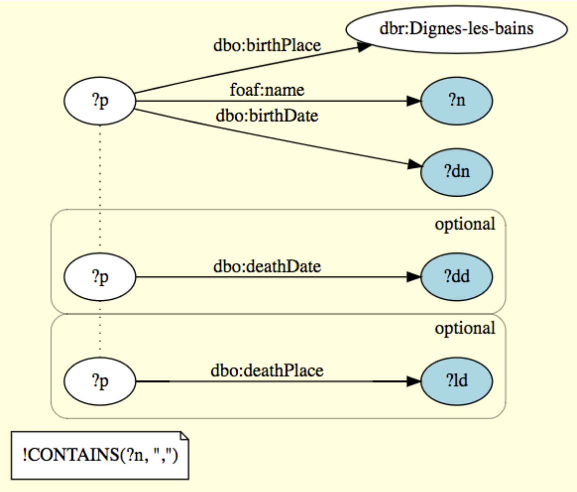
Graph Pattern

4. Give the names (without commas) of people from Digne-les-Bains with their date of birth, and **if applicable** (OPTIONAL), their date of death



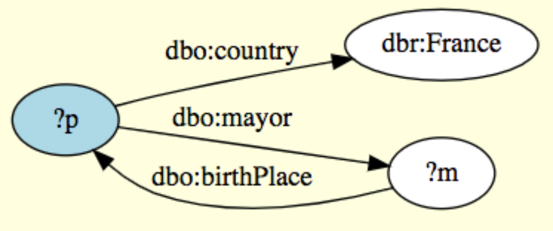
Graph Pattern

5. Give the names (without commas) of people from Digne-les-Bains with their date of birth, and **if applicable** (OPTIONAL), their date and place of death (pay attention to Paul Duqueylar)



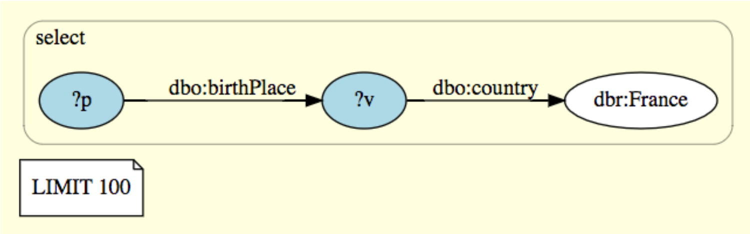
Graph Pattern

6. Show the IRIs of all French cities whose mayor is native



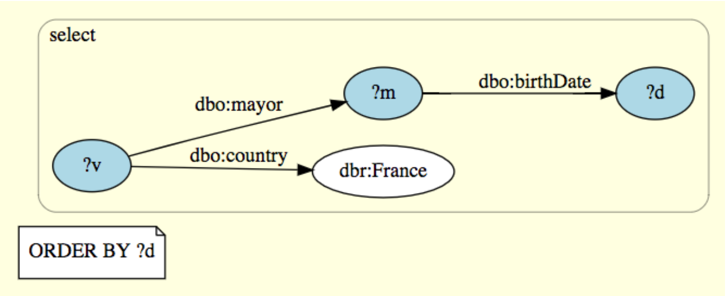
Graph Pattern

7. Give the IRIs of people born in a French city, as well as the IRI of the city, limiting (LIMIT) the number of results to 100.



Graph Pattern

8.Give the IRIs of the French cities sorted by (ORDER BY) the date of birth of their mayor (we exclude in fact cities whose mayor, or his date of birth, are not informed in DBPedia). Also post the Mayor's IRI and date of birth.



Graph Pattern

9.Show for each French city its IRI, and the number of natives of that city listed in DBPedia. This will be done using the COUNT aggregation function.

```
SELECT ?city (COUNT(?
person) as ?nb_persons)
{ ... }
GROUP BY ?city
```

# Part 3 - Querying DBpedia ontology

1. What are the children of the class dbo:Place?
2. What are the parents of the class dbo:School?
3. What are the parents of the children dbo:School?
4. What are the properties that involve dbo:School as a domain (rdfs:domain) or a as a range (rdfs:range) ?
5. What are the equivalent classes mappings (owl:equivalentClass) declared in the ontology for dbo:School?
6. What are the class subsumption paths of length 2?
7. What are the class subsumption paths of length 3?
8. What are the property subsumption paths of length 2?