

# Knowledge Graphs

## Exercise 4: LOD (Linked Open Data)

### 4.1. Familiarizing with Linked Data sets

In order to start to familiarize yourself with some linked data sets, you should start by browsing DBpedia, which can be visualized with a browser. You can start, for example, with the entity Mannheim (<http://dbpedia.org/page/Mannheim>). By clicking the links, you can access other entities and navigate through DBpedia's RDF graph.

Find a way Mannheim and the film Foreign Correspondent ([https://dbpedia.org/page/Foreign\\_Correspondent\\_\(film\)](https://dbpedia.org/page/Foreign_Correspondent_(film))) are related, and draw the RDF graph with the entities and links separating them.

### 4.2. Linked Open Data

Peter published a FOAF File with the following triples

```
@prefix : <http://peter.de/> .  
@prefix foaf: <http://xmlns.com/foaf/0.1/> .  
:Peter a foaf:SemanticWebBeginner .
```

But the class `SemanticWebBeginner` is not contained in the FOAF specification.

Which rule of publishing Linked Open Data has Peter violated?

Propose a solution to resolve the issue.

### 4.3. Setting up Jena or RDFLib

Jena is a Java framework for building Semantic Web and Linked Data applications. RDFLib is a Python library for working with RDF.

Create a Java program or Python program which uses Jena or RDFLib to load the DBpedia ontology, which can be downloaded at [http://downloads.dbpedia.org/2016-10/dbpedia\\_2016-10.nt](http://downloads.dbpedia.org/2016-10/dbpedia_2016-10.nt).

Information about how to load an ontology in Jena can be found at:

<https://jena.apache.org/documentation/ontology/>.

Information about how to load an ontology in RDFLib can be found at:

[https://rdflib.readthedocs.io/en/stable/intro\\_to\\_parsing.html](https://rdflib.readthedocs.io/en/stable/intro_to_parsing.html).

## 4.4. Inference with Jena or RDFLib

Now add the following statements to a model:

```
@prefix dbr: <http://dbpedia.org/resource/> .  
@prefix dbo: <http://dbpedia.org/ontology/> .  
dbr:Albert_Bassermann dbo:birthPlace dbr:Mannheim .  
dbr:2012_Summer_Olympics dbo:goldMedalist dbr:Usain_Bolt .
```

Create an OWL reasoner to perform inference on the created facts with the DBpedia ontology model:

- For Jena: <https://jena.apache.org/documentation/inference/>
- For RDFLib: <https://github.com/RDFLib/OWL-RL>

Report the facts inferred by the DBpedia ontology.