

### Exercise Sheet 3: SPARQL and Wikidata

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**Exercise 3.1.** Write a SPARQL query that counts the number of directed triangles along `eg:edge` edges. Which answer do you expect on the following graph?

```
_:1 eg:edge _:1, _:2, _:3, _:4 .
_:2 eg:edge _:1, _:3 .
_:3 eg:edge _:1, _:2 .
_:4 eg:edge _:1, _:4 .
```

**Exercise 3.2.** Consider the following graph.

```
eg:Arrival      eg:actorRole eg:aux1, eg:aux2 ;
                 eg:director  "Denis Villeneuve" .
eg:aux1         eg:actor      eg:Adams ;
                 eg:character "Louise Banks" .
eg:aux2         eg:actor      eg:Renner ;
                 eg:character "Ian Donnelly" .
eg:Gravity     eg:actorRole [ eg:actor eg:Bullock ;
                              eg:character "Ryan Stone" ] ;
                 eg:actorRole [ eg:actor eg:Clooney ;
                              eg:character "Matt Kowalski" ] ;
                 eg:director  "Alfonso Cuarón" .
eg:AmericanHustle eg:actorRole eg:aux3, eg:aux4 ;
                 eg:director  "David Russell" .
eg:aux3         eg:actor      eg:Adams ;
                 eg:character "Sydney Prosser" .
eg:aux4         eg:actor      eg:Renner ;
                 eg:character "Carmine Polito" .
```

Write a SPARQL query that finds all pairs of actors that have co-starred in two movies. Which results do you expect?

**Exercise 3.3.** Inspect the Wikidata page of item Q323270 (“Saxon State and University Library”), and download its RDF-encoded data in Turtle format from <https://www.wikidata.org/wiki/Special:EntityData/Q323270.ttl>. Find out how the statement for the property “coordinate location” is encoded in the RDF graph, and draw the subgraph containing all triples in the representation, including all auxiliary nodes introduced for this statement (you may abbreviate URIs and labels).

**Hint:** The mapping from Wikidata statements to RDF is described in detail in the online documentation “RDF Dump Format”<sup>1</sup> (and in this paper <sup>2</sup>)

**Exercise 3.4.** Using the Wikidata query service,<sup>3</sup> find the people that have received more than one Nobel Prize. Does your query find all five persons that have won two Nobel prizes? Why/Why not?

<sup>1</sup>[https://www.mediawiki.org/wiki/Wikibase/Indexing/RDF\\_Dump\\_Format](https://www.mediawiki.org/wiki/Wikibase/Indexing/RDF_Dump_Format)

<sup>2</sup><https://iccl.inf.tu-dresden.de/web/Inproceedings3044>

<sup>3</sup><https://query.wikidata.org/>

**Exercise 3.5.** Is it possible to count the number of triangles in the P47 (“shares border with”) property using the Wikidata query service<sup>3</sup>? Why? Why not? Is it possible to count the number of triangles of federal states?