Queries used in the paper "$\mathcal{ELKG}_{app}$: An Alternative Approach to Represent Multi-dimensional Meta-knowledge in the Web of Data"

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1 Queries in EMSPARQL for the BKR dataset

Q1 **Find out the triples which are derived from <http://mor.nlm.nih.gov/bkr/PUBMED_99992-INST>.**

```
select ?s ?p ?o where { ?s ?p ?o ?i[,,(,)] ?i2. ?i <http://knoesis.wright.edu/provenir/derives_from>
<http://mor.nlm.nih.gov/bkr/PUBMED_99992-INST> ?i1[,,(,)] ?i3 .}
```

Q2 **Find out the property value for the entity <http://mor.nlm.nih.gov/umls/META_C0543467> connected with relationship <http://mor.nlm.nih.gov/umls/SEMNET_TREATS> and find out the causes responsible for that property value. Also find out the sources of these statements.**

```
select ?o1 ?o2 ?i ?pmid2 where { <http://mor.nlm.nih.gov/umls/META_C0543467>
<http://mor.nlm.nih.gov/umls/SEMNET_TREATS> ?o1 ?i[,,(,)] ?i2 . ?i <http://knoesis.wright.edu/provenir/derives_from>
?o ?i1[,,(,)] ?i5 .
?o1 <http://mor.nlm.nih.gov/umls/SEMNET_CAUSES> ?o2 ?i3[,,(,)] ?i6 .
?i3 <http://knoesis.wright.edu/provenir/derives_from> ?pmid2 ?i4[,,(,)] ?i7 .}
```

Q3 **Find out the property value for the entity <http://mor.nlm.nih.gov/umls/META_C0543467> connected with relationship <http://mor.nlm.nih.gov/umls/SEMNET_TREATS> and find out the causes responsible for that property value. After that find out how those causes affects the entities. Find out the sources of these statements.**

```
select ?o1 ?o2 ?i ?pmid2 ?o3 ?pmid3 where { <http://mor.nlm.nih.gov/umls/META_C0543467>
<http://mor.nlm.nih.gov/umls/SEMNET_TREATS> ?o1 ?i[,,(,)] ?i9 . ?i <http://knoesis.wright.edu/provenir/derives_from>
?o ?i1 [,,(,)]?j1 . ?o1 <http://mor.nlm.nih.gov/umls/SEMNET_CAUSES> ?o2 ?i3[,,(,)] ?j2 . ?i3
<http://knoesis.wright.edu/provenir/derives_from> ?pmid2 ?i4[,,(,)] ?j3 .
?o2 <http://mor.nlm.nih.gov/umls/SEMNET_AFFECTS> ?o3 ?i5[,,(,)] ?j4 .
?i5 <http://knoesis.wright.edu/provenir/derives_from> ?pmid3 ?i6[,,(,)] ?j5 .} LIMIT 10
```

Q4 **Find out the property value for the entity <http://mor.nlm.nih.gov/umls/META_C0006307> connected with relationship <http://mor.nlm.nih.gov/umls/SEMNET_TREATS>. Find out the sources of these statements.**

```
select ?o ?i where { <http://mor.nlm.nih.gov/umls/META_C0006307> <http://mor.nlm.nih.gov/umls/SEMNET_TREATS>
?o ?i[,,(,)] ?i5 . ?i <http://knoesis.wright.edu/provenir/derives_from> ?o1 ?i1[,,(,)] ?i6 .}
```

Q5 **Find out the source of the triple <http://mor.nlm.nih.gov/umls/META_C0012963> <http://mor.nlm.nih.gov/umls/SEMNET_STIMULATES> <http://mor.nlm.nih.gov/umls/META_C0598981>.**

```
select ?o1 where { <http://mor.nlm.nih.gov/umls/META_C0012963>
<http://mor.nlm.nih.gov/umls/SEMNET_STIMULATES> <http://mor.nlm.nih.gov/umls/META_C0598981>
?i[,,(,)] ?i1 . ?i <http://knoesis.wright.edu/provenir/derives_from> ?o1 ?i2[,,(,)] ?i3 .}
```

Q6 **Find out resource name and property name whoes property value is <http://mor.nlm.nih.gov/umls/META_C0598981>.**

select ?sub ?pred where { ?sub ?pred <http://mor.nlm.nih.gov/umls/META_C0598981> ?i[,,(,)] ?i1 .}

Q7 **Check the presence of the sources for the triples connected with <http://mor.nlm.nih.gov/umls/SEMNET_CAUSES>.**

ASK{ ?o1 <http://mor.nlm.nih.gov/umls/SEMNET_CAUSES>[,,(,)] ?o2 ?i3 ?j2 .
?i3 <http://knoesis.wright.edu/provenir/derives_from>[,,(,)] ?pmid2 ?i4 ?j3 .}

2 Queries in EMSPARQL for the Gov-track dataset

Q8 **Find out all the bills and their actions with timestamp.**

select ?s1 ?t1 ?o1 where { ?s1 <http://www.rdfabout.com/rdf/schema/usbill/hadAction> ?o1 ?i1[,?t1,(,)] ?i2 . } LIMIT 10

Q9 **Find out all the US congress members and their role between the year 1975 to 1976.**

select ?s1 ?o1 where { ?s1 <http://www.rdfabout.com/rdf/schema/politico/hasRole> ?o1 ?i1[,,(1975,1976)] ?i2 .}

Q10 **Find out the actions of the bill <http://www.rdfabout.com/rdf/usgov/congress/106/bills/h1139> having timestamp 1999.**

select ?o1 where { <http://www.rdfabout.com/rdf/usgov/congress/106/bills/h1139>
<http://www.rdfabout.com/rdf/schema/usbill/hadAction> ?o1 ?i1[,1999,(,)] ?i2 . }

Q11 **Find out the period of existance for the triple <http://www.rdfabout.com/rdf/usgov/congress/people/K000064> <http://www.rdfabout.com/rdf/schema/politico/hasRole> <http://strabon.di.uoa.gr/blank_node/_node17cn1754hx23627>.**

select ?t1 ?t3 where { <http://www.rdfabout.com/rdf/usgov/congress/people/K000064>
<http://www.rdfabout.com/rdf/schema/politico/hasRole>
<http://strabon.di.uoa.gr/blank_node/_node17cn1754hx23627> ?i1[,,(?t1,?t3)] ?i2 . }

Q12 **Find out the action of the bill <http://www.rdfabout.com/rdf/usgov/congress/106/bills/hr168> in the year 1999 and describe the action.**

select ?o1 ?o2 where { <http://www.rdfabout.com/rdf/usgov/congress/106/bills/hr168>
<http://www.rdfabout.com/rdf/schema/usbill/hadAction> ?o2 ?i1[,1999,(,)] ?i2 .
?o2 <http://purl.org/dc/elements/1.1/description> ?o1 ?i3[,,(,)] ?i4 . }

Q13 **Find out the bill which has action <http://strabon.di.uoa.gr/blank_node/_node17d3oknm3x29796> in the year 1999.**

select ?s1 where { ?s1 <http://www.rdfabout.com/rdf/schema/usbill/hadAction>
<http://strabon.di.uoa.gr/blank_node/_node17d3oknm3x29796> ?i1[,1999,(,)] ?i2 . }

Q14 **Find out all the subjects and objects connected with <http://www.rdfabout.com/rdf/schema/politico/hasRole> predicate.**

select ?sub ?obj where { ?sub <http://www.rdfabout.com/rdf/schema/politico/hasRole> ?obj
?i1[,,(,)] ?i2 . }

3 Queries in EMSPARQL for the Synthetic dataset

1. **Queries for Synthetic dataset without nested MK.**

Q15 **Find out the name, nick name of the entity who knows <http://example.org/objects/o1000020> and also find out the source of the triple.**

select ?i5 ?s1 ?o1 ?o3 ?o2 where { ?s1 <http://xmlns.com/foaf/0.1/knows>] <http://example.org/objects/o1000020> ?i5[,,(,) ?i6 . ?s1 <http://xmlns.com/foaf/0.1/name> ?o1 ?i[,,(,)] ?i1 . ?s1 <http://xmlns.com/foaf/0.1/nick> ?o2 ?i2[,,(,)] ?i3 . ?i5 <http://purl.org/biotop/biotop.owl#derivesFrom> ?o3 ?i7[,,(,)] ?i4 . }

Q16 **Find out the triples where entities know each other. Also find out the sources of the triples.**

select ?s1 ?o1 ?i5 where { ?s1 <http://xmlns.com/foaf/0.1/knows> ?o1 ?i5[,,(,)] ?i6 . ?i5 <http://purl.org/biotop/biotop.owl#derivesFrom> ?o3 ?i7[,,(,)] ?i4 . }

Q17 **Find out the period of existance and source of the triple <http://example.org/subjects/s1> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000013>.**

select ?o3 ?i5 ?t1 ?t3 where { <http://example.org/subjects/s1> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000013> ?i5[,,(?t1,?t3)] ?i6 . ?i5 <http://purl.org/biotop/biotop.owl#derivesFrom> ?o3 ?i7[,,(,)] ?i4 . }

Q18 **Find out the certainty value, period of existance and source of the triple <http://example.org/subjects/s2> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000020>.**

select ?c ?i5 ?t1 ?t3 ?o3 where { <http://example.org/subjects/s2> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000020> ?i5[?c,,(?t1,?t3)] ?i6 . ?i5 <http://purl.org/biotop/biotop.owl#derivesFrom> ?o3 ?i7[,,(,)] ?i4 . }

2. **Queries for Synthetic dataset with nested MK.**

Q19 **Find out the certainty value and the source of the triple <http://example.org/subjects/s0> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000006>.**

select ?c ?i ?o2 where { <http://example.org/subjects/s0> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000006> ?i[?c,,(,)] ?i1 . ?i <http://purl.org/biotop/biotop.owl#derivesFrom> ?o2 ?i2[,,(,)] ?i3 . }

Q20 **Find out the entities who know each other and the source of the statements.**

select ?s1 ?o1 ?o2 where { ?s1 <http://xmlns.com/foaf/0.1/knows> ?o1 ?i[,,(,)] ?i1 . ?i <http://purl.org/biotop/biotop.owl#derivesFrom> ?o2 ?i2[,,(,)] ?i3 . }

Q21 **Check the presence of the source of the triple <http://example.org/subjects/s0> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000006>..**

ASK { <http://example.org/subjects/s0> <http://xmlns.com/foaf/0.1/knows> <http://example.org/objects/o1000006> ?i[,,(,)] ?i1 . ?i <http://purl.org/biotop/biotop.owl#derivesFrom> ?o2 ?i2[,,(,)] ?i3 . }

4 Queries in EMSPARQL for the dataset1 dataset

Q22 **Find out the causes and the type of the diseases for the entities.**

select ?disease where { ?s <http://rdf.ncbi.nlm.nih.gov/pubchem/vocabulary#causes> ?disease ?i[,,(,)] ?i1 . ?disease <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> ?o1 ?i6[,,(,)] ?i7 . } LIMIT 10

Q23 **Find out the causes and the type of diseases for the entity <http://rdf.ncbi.nlm.nih.gov/pubchem/compound/CID4946>. Also find out the relation which provides assertion for the statement.**
select ?rela1 ?i where { <http://rdf.ncbi.nlm.nih.gov/pubchem/compound/CID4946> <http://rdf.ncbi.nlm.nih.gov/pubchem/vocabulary#causes> ?disease ?i[,,(,)] ?i1 . ?disease <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> ?o1 ?i6[,,(,)] ?i7 . ?rela1 <http://purl.org/spar/cito/providesAssertionFor> ?i ?i2[,,(,)] ?i3 . } LIMIT 10

Q24 **Check the presence of the causes and the type of the diseases for the entities.**

ASK { ?s <http://rdf.ncbi.nlm.nih.gov/pubchem/vocabulary#causes> ?disease ?i[,,(,)] ?i1 . ?disease <http://www.w3.org/1999/02/22-rdf-syntax-ns#type>?o1 ?i6[,,(,)] ?i7 . }

Q25 **Find out the causes of the diseases for an entity <http://rdf.ncbi.nlm.nih.gov/pubchem/compound/CID4946>.**

select ?disease where { <http://rdf.ncbi.nlm.nih.gov/pubchem/compound/CID4946> <http://rdf.ncbi.nlm.nih.gov/pubchem/vocabulary#causes> ?disease ?i[,,(,)] ?i1 . }