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Querying Description Logics

Petr Křemen

1 SPARQL and Ontology Querying

SPARQL Language is aimed at querying RDF(S) documents. As OWL is an extension of RDF(S), we will use it here as a syntax for OWL conjunctive queries. We will use SPARQL queries of the form

```
PREFIX <prefix1>:<URI1>
PREFIX <prefix2>:<URI2>
SELECT <vars>
WHERE {
    <triple1> .
    <triple2> .
    ...
    <tripleN> .
}
```

where <vars> is a list of variables (identifier started with a sign “?”) delimited with spaces and <tripleI> is a triple of the form `subj pred obj`, where each `subj`, `pred` and `obj` is either a variable, or individual URI (also in a shortened form using a PREFIX). Additionally, `obj` can be literal (string in double-quotes). A query example might be

```
PREFIX u: <http://krizik.felk.cvut.cz/university.owl#>

SELECT ?X
WHERE {
    ?X a u:Professor .
    ?X u:worksFor u:CVUT .
    ?X u:name _:Y .
}
```

This SPARQL query expresses a conjunctive query (without full URIs) $Q(?X) \leftarrow Professor(?X), worksFor(?X, CVUT), name(?X, ?Y)$.

2 Conjunctive Queries Practically

1. Download the Pellet system from the seminar web pages.
2. In `pellet.bat` setup proxy:
 - delete the line
`if "%pellet_java_args%"==" " set pellet_java_args=-Xmx512m`
 - in the last row replace `%pellet_java_args%` with the string
`-Xmx512m -Dhttp.proxyHost=proxy.felk.cvut.cz -Dhttp.proxyPort=80`
3. Download the wine ontology from <http://www.w3.org/TR/owl-guide/wine.rdf> and save it into the Pellet home directory.
4. Using Protege, insert a new instance of `Wine` into the ontology.
5. Download an example query from the seminar web pages. This query finds all regions (instance of `Region`) :

```
pellet.bat query -q <file-with-query> <file-with-ontology>
```

6. In the file with a query, replace the distinguished variable `?Y` with an undistinguished variable `_:Y` and compare results (use the `-bnode` switch for Pellet)
7. Check that you got the same result as in the DL-query tab (How to formulate such query ?).
8. Formulate and evaluate a query that
 - finds all regions in USA together with dry wines produced in these regions.
 - finds all regions in USA that produce both dry and sweet wines.
9. Insert a new type `locatedIn` some `Region` to the individual `ItalianRegion`. Then, formulate a query that finds all wines that are produced in some (arbitrary) super-region of Italy (i.e. region in which `ItalianRegion` is located in (`locatedIn`)). Use the `--bnode` parameter in the Pellet command line to correctly evaluate the query.



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