SPARQL Query Language

Constraints

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Outline (Slides based on F. Freitas, Cin/UFPE, Brazil)

1. Basic queries
2. **Constraints**
3. Aggregation
4. Graphs
5. Query Forms
6. SPARQL in Fuseki

Value Constraints

Data:

```
@prefix dc: <http://purl.org/dc/elements/1.1/> .
@prefix : <http://example.org/book/> .
@prefix ns: <http://example.org/ns#> .
:book1 dc:title "SPARQL Tutorial" .
:book1 ns:price 42 .
:book2 dc:title "The Semantic Web" .
:book2 ns:price 23 .
```

Query:

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX ns: <http://example.org/ns#>
SELECT ?title ?price
WHERE { ?x ns:price ?price .
        FILTER ?price < 30 .
        ?x dc:title ?title . }
```

Result:

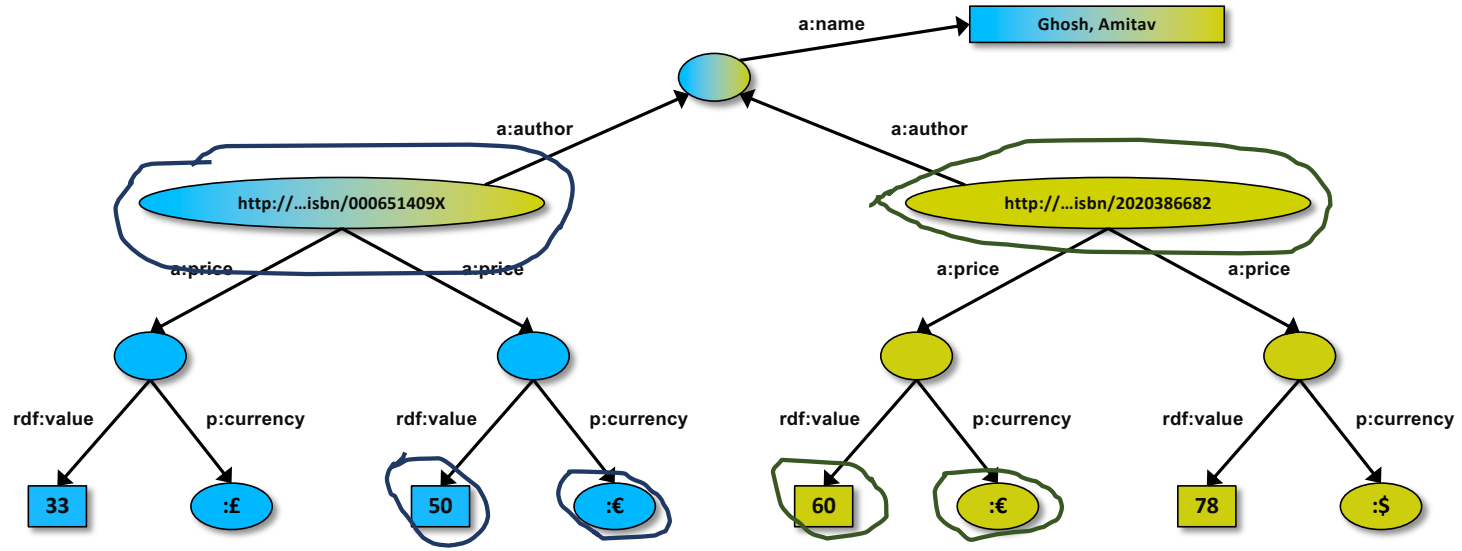
title	price
"The Semantic Web"	23

FILTER: applies a constraint on a variable.

Book Example

```
SELECT ?isbn ?price ?currency # note: not ?x!
WHERE { ?isbn a:price ?x. ?x rdf:value ?price. ?x p:currency ?currency.
        FILTER(?currency == :€) }
```

Returns: [<…409X>,50,:€], [<…6682>,60,:€]



Regular expressions can be used

- "Find the name and email addresses of authors of a paper about SPARQL"

```
PREFIX dc:    <http://purl.org/dc/elements/1.1/>
PREFIX ldap:  http://ldap.hp.com/people#

SELECT ?name ?email
{
    ?doc          dc:title     ?title .
    FILTER regex(?title, "SPARQL") .
    ?doc          dc:creator   ?reseacher .
    ?researcher   ldap:email      ?email .
    ?researcher   ldap:name       ?name
}
```

Optional Graph Patterns

Data:

```
@prefix dc: <http://purl.org/dc/elements/1.1/> .
@prefix : <http://example.org/book/> .
@prefix ns: <http://example.org/ns#> .
:book1 dc:title "SPARQL Tutorial" .
:book1 ns:price 42 .
:book2 dc:title "The Semantic Web" .
:book2 ns:price 23 .
```

Query:

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX ns: <http://example.org/ns#>
SELECT ?title ?price
WHERE { ?x dc:title ?title .
        OPTIONAL { ?x ns:price ?price .
                   FILTER ?price < 30 }}
```

Query Result:

title	price
“SPARQL Tutorial“	
"The Semantic Web"	23

Multiple Optional Blocks

Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> . @prefix
rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
_:a foaf:name "Alice" .
_:a foaf:homepage <http://work.example.org/alice/> .
_:b foaf:name "Bob" .
_:b foaf:mbox <mailto:bob@work.example> .
```

Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?name ?mbox ?hpage
WHERE { ?x foaf:name ?name .
        OPTIONAL { ?x foaf:mbox ?mbox }.
        OPTIONAL { ?x foaf:homepage ?hpage } }
```

Query Result:

name	Mbox	hpage
“Alice“		<http://work.example.org/alice/>
“Bob“	<mailto:bob@example.com>	

Alternative Graph Patterns

Data:

```
@prefix dc10: <http://purl.org/dc/elements/1.0/> .
@prefix dc11: <http://purl.org/dc/elements/1.1/> .
_:a dc10:title "SPARQL Query Language Tutorial" .
_:b dc11:title "SPARQL Protocol Tutorial" .
_:c dc10:title "SPARQL" .
_:c dc11:title "SPARQL (updated)" .
```

Query:

```
PREFIX dc10: <http://purl.org/dc/elements/1.0/>
PREFIX dc11: <http://purl.org/dc/elements/1.1/>
SELECT ?x ?y
WHERE { { ?book dc10:title ?x } UNION { ?book dc11:title ?y } }
```

Query Result:

x	y
	"SPARQL (updated)"
	"SPARQL Protocol Tutorial"
"SPARQL"	
"SPARQL Query Language Tutorial"	