

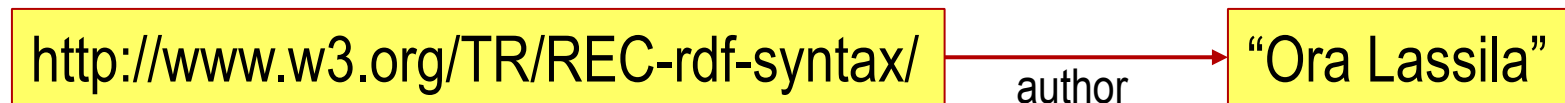
RDF & SPARQL

RDF: Resource Description Framework

- Framework for **resources on the Web** = very simple assertion language
 - Conceptual model: directed, labeled graphs
 - designed for **computers**, **not** people
 - part of W3C's Semantic Web Activity
- RDF **statement** = **resource** with **properties** with **values**

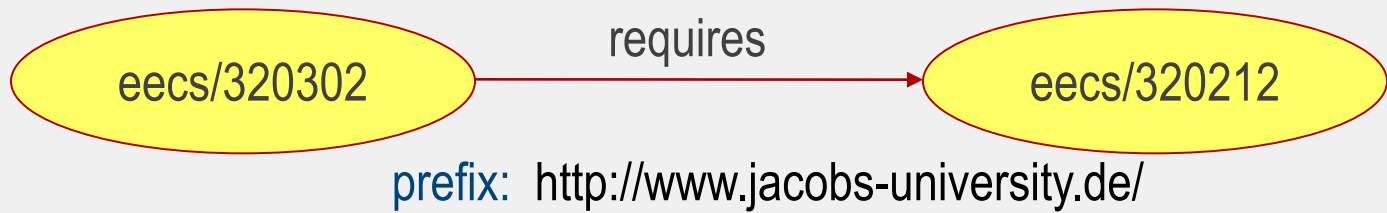


- Ex: “*<http://www.w3.org/TR/REC-rdf-syntax/> has the author Ora Lassila*”



Alternative RDF Representations

Graphs:



Notation3:

@prefix in:<http://www.iu-bremen.de/> .
in:eecs/320302 in:requires in:eecs/320212 .

compact & readable
alternative to RDF's
XML syntax

XML:

```

<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:in="http://www.iu-bremen.de/">
  <rdf:description rdf:about="http://www.jacobs-university.de/eecs/320302">
    <in:requires rdf:resource="http://www.jacobs-university.de/eecs/320212"/>
  </rdf:description>
</rdf:RDF>
  
```

RDF doc root

{ }:

```

{ "http://www.jacobs-university.de/eecs/320302", requires,
  "http://www.jacobs-university.de/eecs/320212" }
  
```

SPARQL

- = Simple Protocol and RDF Query Language
 - W3C recommendation
- = QL for RDF
 - extract information in the form of URIs, blank nodes, plain and typed literals
 - extract RDF subgraphs
 - construct new RDF graphs based on information in the queried graphs
- *Let's taste the flavor...*

From SQL To SPARQL

```
SELECT name, email  
FROM Person
```

From SQL To SPARQL

```
SELECT ?name ?email
WHERE {
    ?person    rdf:type    foaf:Person.
    ?person    foaf:name   ?name.
    ?person    foaf:mbox   ?email.
}
```

From SQL To SPARQL

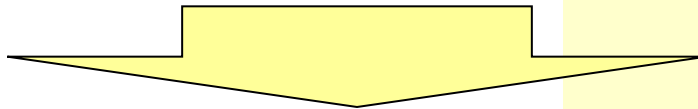
```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?name ?email
WHERE {
    ?person      rdf:type      foaf:Person.
    ?person      foaf:name     ?name.
    ?person      foaf:mbox     ?email.
}
```

SPARQL Example

- Data
(1 triple):

```
<http://example.org/book/book1>
<http://purl.org/dc/elements/1.1/title>
"SPARQL Tutorial" .
```

- Query:



```
SELECT ?title
WHERE
{
  <http://example.org/book/book1>
  <http://purl.org/dc/elements/1.1/title>
  ?title .
}
```

```
title
"SPARQL Tutorial" .
```

Summary

- Graphs important data category
 - Small: ontologies, aka „knowledge graphs“
 - Large: social networks
- Essential capabilities:
 - graph traversal
 - graph pattern matching
- Languages:
 - SPARQL
 - Cypher, ...
 - ISO Graph Query Language (GQL)

