

Exercises for the book

Semantic Web Databases

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Chapter 7 – Streams

1. The prefix *sensor* is given by the namespace *<http://www.example.org/sensor#>*, and *rdf* and *xsd* are the usual prefixes for the RDF and XML Schema namespace. Let us assume that an RDF stream generated by sensors first provide static information of the deployed sensors. For example, the triples

```
sensor:sensorA rdf:type sensor:TemperatureSensor.  
sensor:sensorB rdf:type sensor:TemperatureSensor.  
sensor:sensorC rdf:type sensor:AtmosphericHumiditySensor.
```

are first transmitted in an opened RDF stream to declare *sensorA* and *sensorB* to be sensors for the temperature and *sensorC* to be a sensor for the atmospheric humidity. Afterwards, the measured values from the sensors are continuously transmitted by e.g. the triples

```
sensor:sensorA sensor:value "20"^^xsd:integer.  
sensor:sensorB sensor:value "21"^^xsd:integer.  
sensor:sensorA sensor:value "19"^^xsd:integer.  
sensor:sensorA sensor:value "20"^^xsd:integer.  
sensor:sensorC sensor:value "18"^^xsd:integer.  
sensor:sensorB sensor:value "20"^^xsd:integer.  
...
```

Please formulate streaming SPARQL queries to

- a) retrieve the average of all sensors of the last hour,
 - b) retrieve the average temperature of all temperature sensors together of the last hour,
 - c) retrieve the minimum and maximum temperature of the last day of each temperature sensor, and
 - d) all information of a), b) and c) in one query,
- each query result updated every minute.