



INFO216 0 Advanced Modelling

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Answer 4 of the 5 tasks. Each counts 25%.



Introduction

Answer 4 of the 5 tasks. Each counts 25%

1 OPPGAVE

Task 1: Turtle (25%)

(The exam consists of five tasks, of which you only need to answer four. Each task counts 25% of the final grade.)

The figure shows an almost complete RDF graph that describes the population of some municipalities ("kommuner") and boroughs ("bydeler") in the Bergen area (a municipality can consist of several boroughs).

- Seven of the arrows in the figure only have "???" as an IRI. What is the most suitable IRI? (They should all have the same one.)
- One of the nodes in the figure only has "???" as an IRI. What is the most suitable IRI?
- Write the graph as a Turtle serialisation. You can skip Samnanger and Vaksdal, and all the boroughs except Arna and Bergenhus.
- To the Turtle serialisation, add the following data about areas, using the property :area. (Again, you can skip Samnanger and Vaksdal, and all the boroughs except Arna and Bergenhus.)

Bergen	464,71
Osterøy	255,12
Vaksdal	715,34
Samnanger	269,07
Arna	99,71
Bergenhus	25.41
Fana	150,99
Fyllingsdalen	17.94

Laksevåg	29.96
Ytrebygda	38,45
Årstad	14,11
Åsane	68,82

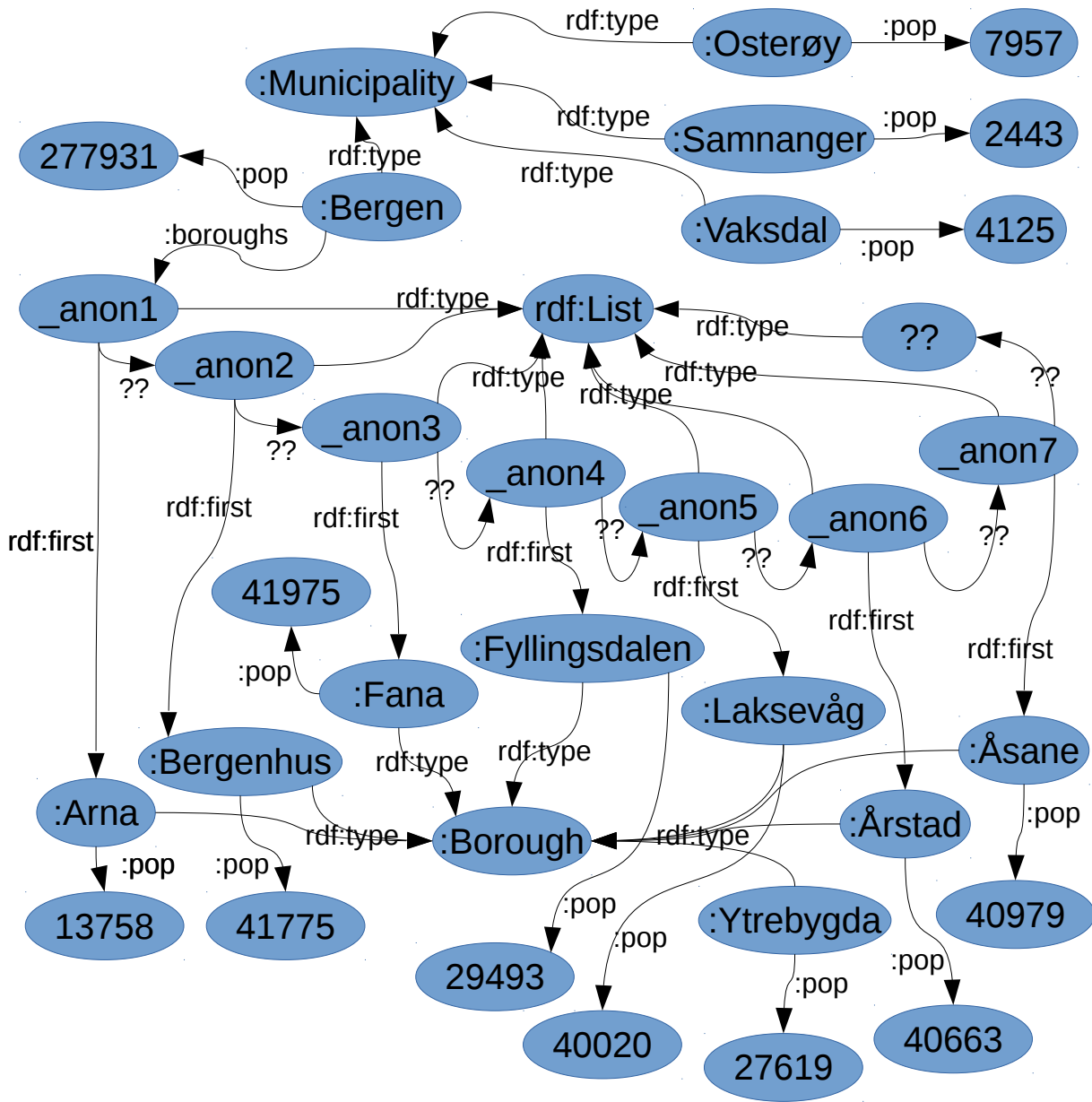
e. Extend the Turtle serialisation with the following information: The :pop property has the label "Population". The :area property has the label "Label (km2)" and is measured in the unit square kilometers.

f. Add domains and ranges to the :pop and :area properties.

g. Assume that the municipalities of Bergen and Osterøy shall be merged. The new municipality will have the same IRI (and name) as the former :Bergen. In the new municipality, the Arna borough will merge with Osterøy to form the new borough named Oster and with the IRI :Oster. Write one or more DELETE / INSERT updates in SPARQL to effect these changes. Remember to update the appropriate populations and areas.

Write your answer here....

Denne oppgaven inneholder en PDF. Se neste side.



Task 2: DL (25%)

(The exam consists of five tasks, of which you only need to answer four. Each task counts 25% of the final grade.)

Write the following statements in Description Logic (DL) using the underlined terms as concepts and roles.

Note: Writing the special DL characters in Inspera may not be possible, so you can use words instead of the special characters, for example, you can write ALL or ONLY instead of \forall , EXISTS or SOME instead of \exists , SUBSETEQ instead of \sqsubseteq , == instead of \equiv , >= instead of \geq , AND instead of \sqcap , OR instead of \sqcup , BOTTOM instead of \perp , TOP instead of \top , and so on.

- a. A Student is either a BachelorStudent, MasterStudent or PhDStudent.
- b. No Student is more than one of these: BachelorStudent, MasterStudent and PhDStudent.
- c. A Student takes at least one Course.
- d. A Course is either a BachelorCourse, MasterCourse or PhDCourse.
- e. A BachelorStudent takes only BachelorCourses.
- f. The MasterThesis is a MasterCourse.
- g. A MasterStudent takes at least five Courses.
- h. A MasterStudent takes exactly one MasterThesis and at least four Master- or PhDCourses.
- i. VladTempes is a Student.
- j. VladTempes takes his MasterThesis.

Fill in your answer here

Task 3: LOD and vocabularies (25%)

(The exam consists of five tasks, of which you only need to answer four. Each task counts 25% of the final grade.)

- a. Explain the principles of Linked Open Data

- b. Which other best practices for data provisioning do you know of?
- c. What is the purpose of the FOAF vocabulary?
- d. List the 3-5 main classes in the FOAF vocabulary, and list 3-5 of the most used properties.
- e. What is the purpose of the QUDT vocabulary?
- f. List a few main concepts in the QUDT vocabulary.
- g. Explain how the DBpedia ontology has been created and how it is being maintained.

Fill in your answer here

4 OPPGAVE

Task 4: Putting it into practice (25%)

(The exam consists of five tasks, of which you only need to answer four. Each task counts 25% of the final grade.)

You are brought in as an advisor for the IT department at the University of Bergen. The IT department wants to start using semantic technologies to manage more of their data. They consider starting with information about courses, study programmes, departments and faculties / schools.

- a. Present your main arguments for and against using semantic technologies for these purposes.
- b. Outline a plan for how the IT department should proceed to use semantic technologies in one or more of these areas.
- c. The IT department wants to develop a vocabulary or ontology for information about university courses. Outline how such a vocabulary / ontology can be developed using the Ontology Development 101 method.
- d. Which other vocabularies do you know that define terms that can be reused by the vocabulary in task 4c?

Fill in your answer here

Task 5: Visualisation (25%)

(The exam consists of five tasks, of which you only need to answer four. Each task counts 25% of the final grade.)

- What is the difference between Data visualisation and Visual analysis?
- The lecture and Shneiderman's paper on visualisation both list several different types of data visualisation: name and explain each of them briefly.
- What is the purpose of sgVizler?
- List the main components in sgVizler's architecture, and explain briefly what each of them does.
- You want to show as a pie chart the results of executing this SPARQL query:

```
SELECT ?class (count(?instance) AS ?noOfInstances)
WHERE{ ?instance a ?class }
GROUP BY ?class
ORDER BY ?class
```

You want to use this SPARQL endpoint: <http://sws.ifi.uio.no/sparql/npd>. Outline (by writing the HTML and other markup as accurately as you can) how a web page can show such a pie chart dynamically using sgVizler.

Fill in your answer here