



UNIVERSITY OF BERGEN
COURSE EXAM UNDER SOCIAL SCIENCE PROGRAMME

June 11th 9 – 12

Course exam under social science programme

No artificial aids allowed.

Answer four of the six questions below in Norwegian or English. Each question weighs 25%.

Question 1 (25%).

What are the main advantages of the web of data (or semantic web) compared to the plain old (non-semantic) web? What are the most important disadvantages or dangers, if any?

Question 2 (25%).

(a) Draw an RDF graph of the situation described below. Use RDFS and OWL/OWL2 terms where appropriate. Invent your own terms when you must, but reuse standard vocabulary terms as often as possible. You do not need to write out full URIs, but it is good if you can use standard prefixes for common predicates and other resources (*rdf:type*, *rdfs:label* etc).

“The small school in Littleton has three employees: the two teachers Mr. Baxter and Mrs. Lassier, and the schoolmaster Mrs. Muster. In addition to her administrative duties, Mrs. Muster also does some teaching. There is one class for each age from 6 to 9 years. Mr. Baxter teaches the first-graders, while Mrs. Lassier and Mrs. Muster teach the second-, third-, and fourth-graders together. Mr. Baxter has specialized in sports and therefore is assigned to physical education for all four grades of school. Each grade has a class representative and at least one pupil. All pupils and employees have birth dates and addresses. Employees also have personal numbers. Noone is both a pupil and an employee. Marie is a fourth-grader. Her favourite subjects in school are physical education, painting and mathematics.”

Question 3 (25%).

Assume you have an RDF graph that uses the *dc:title* predicate for all resource titles. Some of the resources represent workshops. They have the *rdf:type swc:WorkshopEvent*. Some workshop resources, but not all, also have acronyms/initialisms indicated using the *rdfs:label* predicate.

(a) Write a SPARQL query that lists the titles of all workshops, including their acronyms if available. (Here and below, you do not need to care about defining PREFIXes.)

The RDF graph also uses the *dc:subject* predicate to describe (as strings) what each workshop is about.

(b) Write a SPARQL query that produces an *ordered* list of all workshop subjects, without duplicates.

(c) Write a SPARQL query that lists all workshops with “*Linked Data*” or “*linked data*” as their subject. (Bonus: write the query so that spellings like “*LINKed Data*”, “*linked DATA*” etc. are also included.)

The RDF graph also uses an *swc:location* predicate to give the location where a workshop takes place. (The location is represented as a regular resource.) It also uses an *ical:dtstart* predicate to indicate the starting date for each workshop. The dates are represented in a string format that works with the '<' operator.

(d) Write a SPARQL query that lists all the workshops that took place before and in the same place as the workshop with acronym “SPIN2014”.

Many workshops take place year after year with the same title, but in different locations. Each location resource also has an *rdfs:label* giving the location name (e.g., “*Bergen*”).

(e) Write a SPARQL query to list, for every workshop title, the names of all the locations where a workshop with that title has taken place. Each workshop title shall only be listed once, along with all its locations on the same line.

Question 4 (25%).

(a) What is the Unique Name Assumption (UNA)?

(b) Is UNA used on the *web of data* (or *semantic web*) or not? Explain why.

(c) Which concepts in RDF/RDFS/OWL are most related to UNA (i.e., they are there either to support UNA or because there is no UNA)?

(d) What is the Open World Assumption (OWA)?

(e) In connection with SPARQL and RDF, what is SPIN?

Question 5 (25%).

A group of companies that produce feed for fish farms in Western-Norway has made a new vocabulary for fish-feed production and documented it using RDFS. They have asked you to lead the evaluation work, and suggest improvements if possible. Describe how you would go about evaluating the ontology. For example, which criteria would you use and/or which questions would you ask, who will you involve and which actions will you take?

Question 6 (25%).

Your department is going to develop a new database for keeping track of all kinds of production-related equipment and assets (production equipment, computers, software, transportation vehicles). A lot of the equipment and assets are rented from/to, and used in collaboration with, business partners, and the types of equipment and assets needed change from project to project. Your boss has asked you to consider whether the database should be built as an OWL DL ontology, storing the instance data as OWL individuals. Present the main arguments for building this type of system as an OWL DL ontology. You should also present any drawbacks or other risks you want your boss to know about.