INFO216 0 Advanced Modelling

Questions	Type	Grading
1 Introduction		Automatic score
2 Task 1: RDF	Writing assignment	Manual score
3 Task 2: OWL	Writing assignment	Manual score
4 Task 3: Vocabularies	Writing assignment	Manual score
5 Task 4: Ontology development	Writing assignment	Manual score
6 Task 5: JSON-LD	Writing assignment	Manual score

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Exam end time:	28.09.2016 12:00	Created by	Øygunn Friestad
		No. of pages	7

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Seksjon 1

Introduction

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

Task 1: RDF

The figure below shows an RDF graph that describes some facts about a university (in the graph, "rdf:li" is just an easier way to write "rdf:_1", "rdf:_2" and so on.)

a. Serialise a part of the graph in Turtle, so that you have at least 10 triples with different predicates.

b. What is the purpose of the "rdf:Bag" in the upper left corner of the graph? What are the properties of a bag in RDF?

c. "rdf:Bag" is a type of "rdfs:Container". Which other types of RDFS-containers do you know of and what is their purpose?

d. To the Turtle serialisation, add the following facts, using suitable standard vocabularies:
- Mark, Olivier and Maria are persons.
- All professors are persons.
- Mark knows Olivier and Maria.

e. Add domains and ranges to the ex:name and ex:age properties.

f. Write a SPARQL query that lists the names of Garcia's friends along with their nationalities.

g. Write a SPARQL update that re-schedules the spanishCourse from Tuesday to Wednesday.

This question includes a PDF. See next page.

xmlns:ex="http://lsirwww.epfl.ch/courses/dis/2007ws/exercises/rdf/www/schema.txt#"
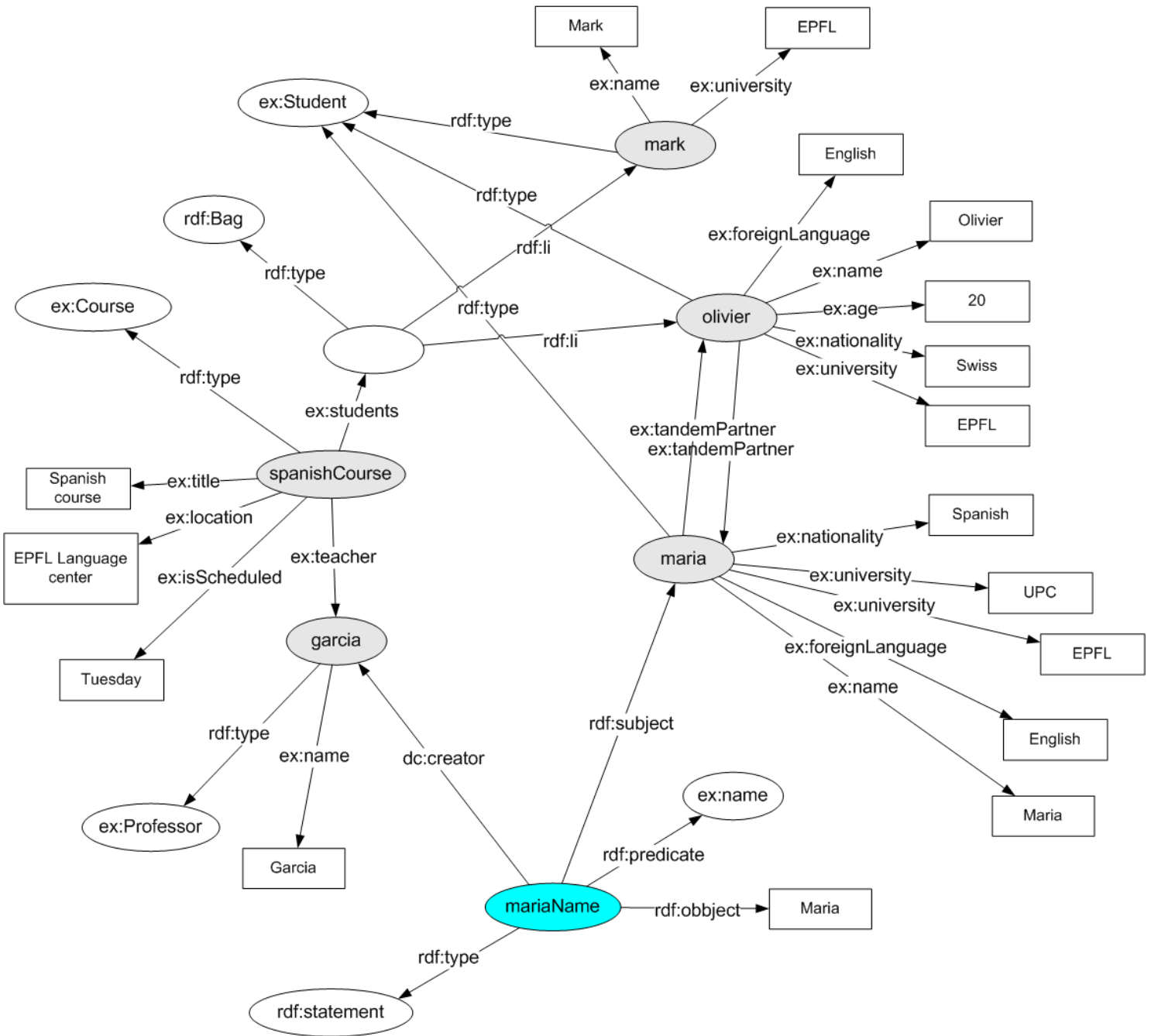
Task 2: OWL

Write the following statements in OWL (for example serialised in Turtle or in Manchester syntax) using the underlined terms as classes and properties.

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.

Fill in your answer here

Task 3: Vocabularies

a. Why is RDFS needed in addition to RDF? What do you think are the most important additional features of RDFS compared to RDF?
b. Why is OWL needed in addition to RDFS? What do you think are the most important additional features of OWL compared to RDFS?
c. What is the purpose of the Provenance (prov) vocabulary?
d. List 3-5 of the main classes in the Provenance (prov) vocabulary, and list 3-5 of the most used properties.
e. What is the purpose of the SKOS vocabulary?
f. List 2-3 of the main classes in the SKOS vocabulary, and list 5-6 of the most used properties.

g. Explain how the DBpedia ontology has been created and how it is being maintained

Fill in your answer here

Task 4: Ontology development

a. Outline the main steps of the Ontology Development 101 method.

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 want to develop a vocabulary for information about labs; lab locations and sizes; lab equipment; lab engineers and assistants, along with their contact information, expertise and responsibilities; etc.

b. Give examples of classes and properties you think such a vocabulary should include (up to 20).

c. Which other vocabularies do you know of that define terms that can be reused by the new vocabulary?

d. Give examples of terms in these vocabularies that you could reuse or specialise in your vocabulary?

e. Outline a plan for how the IT department should proceed to start using semantic technologies in this area.

Fill in your answer here

Task 5: JSON-LD

a. What is a Web API (Web Service)?

b. What is JSON-LD? How does it extend regular JSON?

c. What is a @context in JSON-LD?
A semantic web API for music information returns the following information about a song: the title is "Warrior", the artist is "Aurora", it is from an album from "2016" called "All My Demons Greeting Me as a Friend", it is written by "Aurora Aksnes" and "Alex Knolle" (we leave out the others here), the preceding track on the album is "Through the Eyes of a Child" and the following track is "Murder Song (5, 4, 3, 2, 1)".

d. Write the above output from the semantic Web API in JSON-LD, using terms from standard vocabularies where possible.

e. What does it mean to expand a JSON-LD object?

f. What does it mean to compact a JSON-LD object?

Fill in your answer here