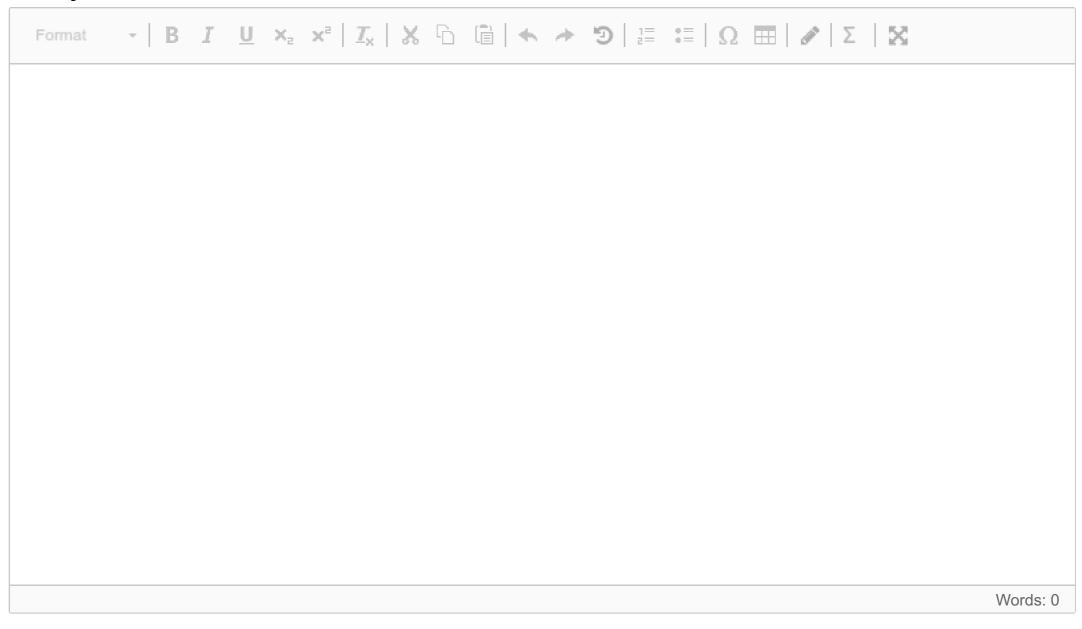
### i Instructions

The exam consists of five tasks, of which you only need to answer four. Each task counts 25% of the final grade. Note that when submitting your exam, the system might warn you that you have not answered all of the five questions.

# 1 Task A: Linked Open Data

- 1. Explain the Linked Open Data principles.
- 2. What is the LOD Cloud? List five of its most important parts.
- 3. How is the LOD Cloud similar and how does it differ from the original semantic web vision?
- 4. What does LOV stand for, and what is it?

#### Fill in your answer here



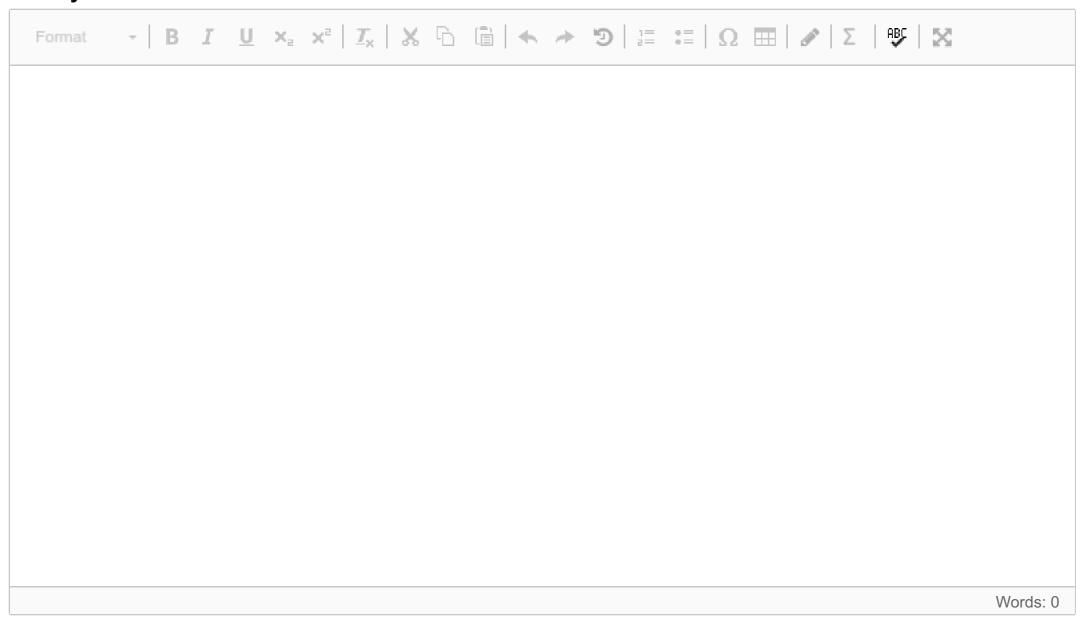
Maximum marks: 25

### 2 Task B: Jena

- 1. What is Jena?
- 2. Draw an architecture overview of Jena (use a separate paper sheet if you want). Explain each of the components carefully.
- 3. Below you will find a description of a scenario. Write Java code or pseudocode that uses Jena's core API to create the corresponding OWL ontology. Reuse terms from common vocabularies when you can.
- 4. For the same problem description, write Java code or pseudocode to create the OWL ontology with one or more SPARQL INSERT statements.

**Scenario:** A parking house is a kind of building and has unique (one and only one) capacity for a specific number of cars. CityGarage is a Parking House. It can take 225 cars. All buildings and cars have unique locations. SV27564 is a car that is currently parked in the CityGarage.

### Fill in your answer here

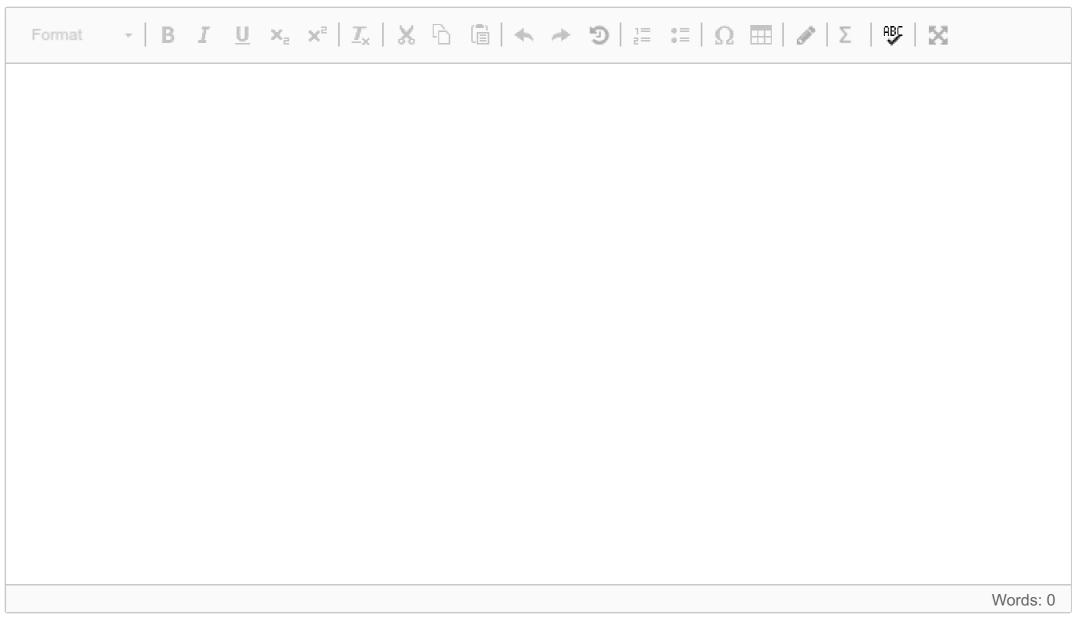


Maximum marks: 25

## 3 Task C: RDFS semantics

- 1. What is an axiom in RDFS? Provide an example (for example written in Turtle).
- 2. What is an entailment rule (or implication rule) in RDFS?
- 3. What does it mean that the rdfs:subClassOf property is transitive and reflexive?
- 4. Write the entailment rule that states that rdfs:subClassOf is transitive (for example using SPARQL CONSTRUCT or INSERT).

#### Fill in your answer here

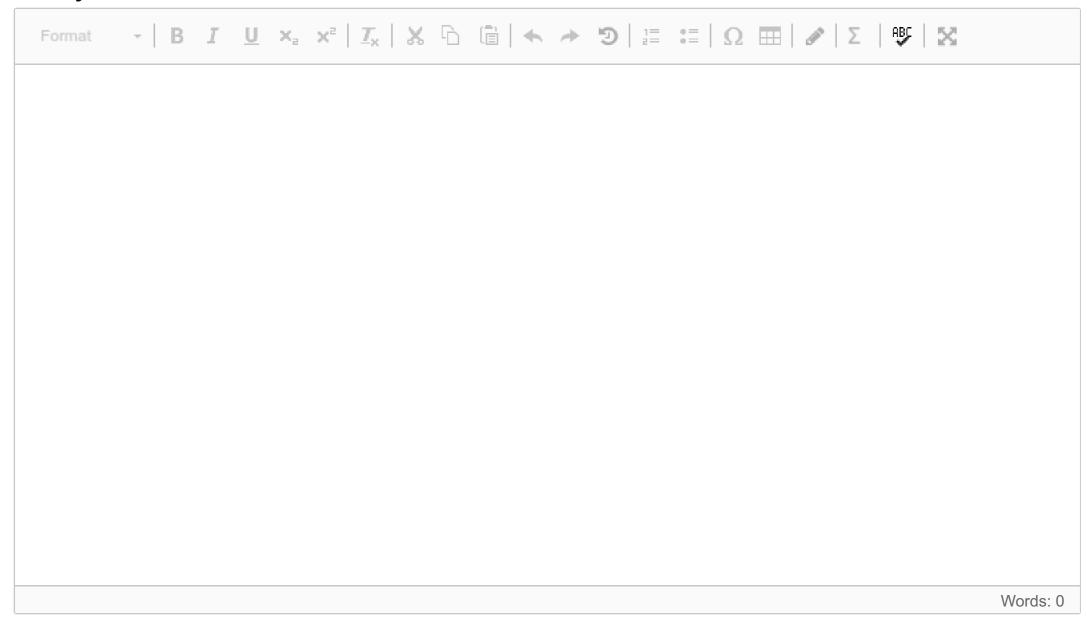


Maximum marks: 25

# 4 Task D: Wikidata

- 1. What is Wikidata?
- 2. Where do the data in Wikidata come from?
- 3. Explain how data is structured in Wikidata.
- 4. Compare Wlkidata and DBpedia. What are the main similarities and differences?

#### Fill in your answer here



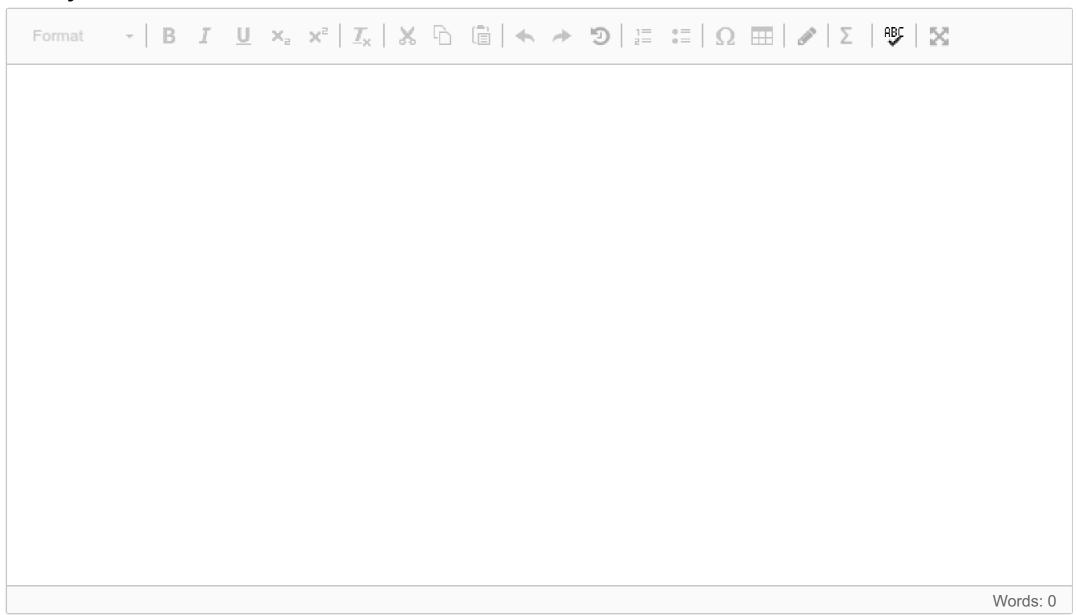
Maximum marks: 25

# 5 Task E: Ontology

- Model the scenario described below as an OWL ontology. You can draw some of it as a graph (use a separate paper sheet if you want) and write other parts in Turtle or using Description Logics. Reuse terms from common vocabularies when you can.
- 2. Assume that your ontology is stored in a database that supports RDFS and OWL entailment. Write a SPARQL query that lists all buses that currently have too many passengers.
- 3. Write a SPARQL query that identifies the following inconsistency: a person is in a vehicle, but the location of the person is different from the location of the vehicle.

**Scenario:** A location has a longitude, a latitude and an altitude. A vehicle can be a bicycle, bus or a car. A car can be a private car or a taxi. A building has a unique (one and only one) location. A parking house is a kind of building and has capacity for a specific number of cars. Bicycle stands, bus stops and taxi stops are locations. A person can use a vehicle. A car can be inside a parking house. A bicycle can be in a stand. A bus can be at a bus stop. A taxi can be at a taxi stop. Bicycles, buses and cars are disjoint. A person and a vehicle has a unique (one and only one) location at any particular time. A taxi can have up to 4 passengers, whereas a bus can have up to a specific number of passengers.

## Fill in your answer here



Maximum marks: 25