

# Semantic Web

## Assignment 9

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Submission by: July 4, 2021

Tutorial on: July 8, 2021

Please submit your solutions to your group's OLAT folder.  
Always list all group members contributing to the solution!  
Do not plagiarize from others!

For all the assignment questions that require you to code, make sure to include the code in the answer sheet, along with a separate Python file.

Team Name: XXXX

- 1.
- 2.

## 1 Ontology-based Data Access

**15 points**

Consider the following Global Schema  $\mathcal{G}$ :

$$\mathcal{G} = \{ \begin{array}{ll} \text{Book} & \sqsubseteq \exists \text{hasTitle}.\top \sqcap \exists \text{publishedInYear}.\top \sqcap \exists \text{hasAuthor}.\top \sqcap \exists \text{hasPrice}.\top \\ \text{Reader} & \sqsubseteq \exists \text{reads}.\text{Book} \sqcap \exists \text{hasAge}.\top \\ \text{Novel} & \sqsubseteq \text{Book} \end{array} \}$$

Also consider the two data sources  $\mathcal{S} = \mathcal{S}_1\mathcal{S}_2$  with:

- $\mathcal{S}_1 = \{R1(\text{bookTitle}, \text{author}, \text{year}, \text{price})\}$ , which contains novels published after 1990
- $\mathcal{S}_2 = \{R2(\text{bookTitle}, \text{reader})\}$ , which contains books read by people who are under the age of 30

### 1.1 GAV

**3 points**

Formalize GAV mappings for the global schema ( $\mathcal{G}$ ) and data sources ( $\mathcal{S}$ ).

### 1.2 LAV

**4 points**

Formalize LAV mappings for the global schema ( $\mathcal{G}$ ) and data sources ( $\mathcal{S}$ ).

### 1.3 Query Formalism

**8 points**

Formalize the following queries.

#### 1.3.1

**2 points**

Show readers who read books by Goethe.

#### 1.3.2

**2 points**

Show all novels that cost more than \$30 and that are read by people under the age of 20.

#### 1.3.3

**2 points**

Show novels that were published in 1999 and that cost at least \$40.

**1.3.4****2 points**

Show readers under 30 who read books which were published before 1990.

## Important Notes

### Submission

- Solutions have to be submitted to your group's OLAT folder.
- The name of the group and the names of all participating students must be listed on each submission.
- Solution format: all solutions as *one* PDF document. Programming code has to be submitted as Python code to the OLAT folder. Upload *all* `.py` files of your program! Use **UTF-8** as the file encoding. *Other encodings will not be taken into account!*
- Check that your code compiles without errors.
- Make sure your code is formatted to be easy to read.
  - Make sure you code has consistent **indentation**.
  - Make sure you comment and document your code adequately in English.
  - Choose consistent and intuitive names for your identifiers.
- Do *not* use any accents, spaces or special characters in your filenames.

### Acknowledgment

This pdfLaTeX template was adapted by Isabelle Kuhlmann based on the LuaLaTeX version by Lukas Schmelzeisen.

### **LaTeX**

Use `pdflatex assignment_X.tex` to build your PDF.