

Assignment 1 - Ontology Modeling (10 pt)

Instructions

Deadline

Make sure to upload your results **by November 4th, 2022!**

What you should hand in

Please upload your work to TUWEL by November 4th, 2022. Please name all your files with the following format: A[x]_[family name]_[student number], where x represents the number of the assignment. Your submission should follow the specified naming convention and include:

1. A Turtle file of your self-descriptive ontology, including labels and comments (filename should be of the form A1_Mustermann_1234_Ontology.owl).
 - Make sure that the ontology can be opened by the Protégé tool. Ontologies that are syntactically incorrect and cannot be loaded will be sent back for revision.
 - Use Protégé/File/Save As/Turtle Syntax to save the ontology in Turtle format (note that the file extension will be “.owl”).
2. A short report (2-3 pages, e.g., A1_Mustermann_1234_Report.pdf) listing:
 - A description of your semantic application idea in prose (2-3 paragraphs).
 - A set of 5-10 interesting competency questions on the selected topic that you want to answer using your knowledge graph-based application.
 - A brief description of the steps followed to build your ontology (about 1 paragraph per step).
 - An enumeration and exemplification of the OWL features that were used to enrich the initial RDF(S) ontology.
 - (optional) Reflection on lessons learned, challenges encountered

Questions

Please post general questions in the TUWEL discussion forum of the course. You can also discuss problems and issues you are facing there. We appreciate it if you help other students out with general problems or questions regarding the tools used. For obvious reasons, however, please do not post any solutions there.

You can also contact Filip Kovacevic and Laura Waltersdorfer directly (with specific questions) at:

filip.kovacevic@tuwien.ac.at

laura.waltersdorfer@tuwien.ac.at

Please use subject line ISS_2022_<your subject> to minimize the probability that your Email gets lost in our inbox.

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Introduction

In this assignment, you will exercise important skills and technologies needed for developing a basic semantic application enabled by a knowledge graph. In particular, you will follow these two tasks (each task is described in detail in the next section):

1. Suggest a semantic application that could be built on top of knowledge graphs.
2. Create an ontology that models the domain of the application data and covers the needs of the application.

Tasks description

Task 1: Suggest a Semantic Application

Start your work by deciding on an application that could be built with the help of semantic technologies. This could be a web or mobile app or some service created on top of your knowledge graph. You will **not** need to build this application as part of the project, however, having such a potential application in mind will help you in making several important choices during the creation of the knowledge graph.

We encourage you to suggest a semantic application in one of the following **domains**: Music, Movies, University, Tourism (e.g., points of interest, transportation) as these are generally well understood domains for which several relevant data sets can be found online. However, should you wish to choose a domain that is more familiar to you (it could be about one of your hobbies, or related to other projects you work on), you can also choose that domain. The figure on the right depicts further domains you might consider.



Formulate a set of **5-10** competency questions that you would like to answer for the selected domain with the envisioned application.

Task 2: Create an ontology that models the selected domain and enables the specified application

Create an ontology that represents the selected domain and would be needed to realize the envisioned application. Make sure to model the basic relationships between the concepts you introduce. It is not necessary to model all relationships and use complex class constructors to facilitate sophisticated reasoning, but the basic relations necessary to represent the data in a connected graph should exist.

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The ontology should have at least **15 concepts and 20 relations**. Within these 20 relations please make sure to include both relations of type **data properties** (which take values in a data range, i.e., they have a data type as range, e.g., Person -> hasAge -> Int) and **object properties** (which take as values instances of other concepts, i.e., they have a type as range, e.g., Person -> knows -> Person). All ontology elements should be briefly defined (by adding label and comments to them). Start by defining your ontology by means of the modeling primitives offered by RDF(S). Afterwards, extend the ontology with at least **5 OWL constructs** (e.g., class expressions, disjointness, logical connectors, property constraints on values and cardinalities, property types). You do not need to add instances to your ontology at this stage - this will be part of assignment A4.

You can follow the not quite recent, but still very good tutorial on the general process of building an ontology [1]. For the purpose of this assignment, you are not asked to reuse existing ontologies, but rather to build your ontology from scratch, therefore, you can ignore the suggested ontology reuse step in the ontology engineering process.

Tools:

For ontology editing, consider using Protégé: <http://protege.stanford.edu/>.

Resources:

[1] http://protege.stanford.edu/publications/ontology_development/ontology101.pdf