Semantic Data

Ontology of the University of Liège

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May 13, 2020

University of Liège

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Imported Ontologies

In our `uliege` ontology, we imported the ontology `time`.

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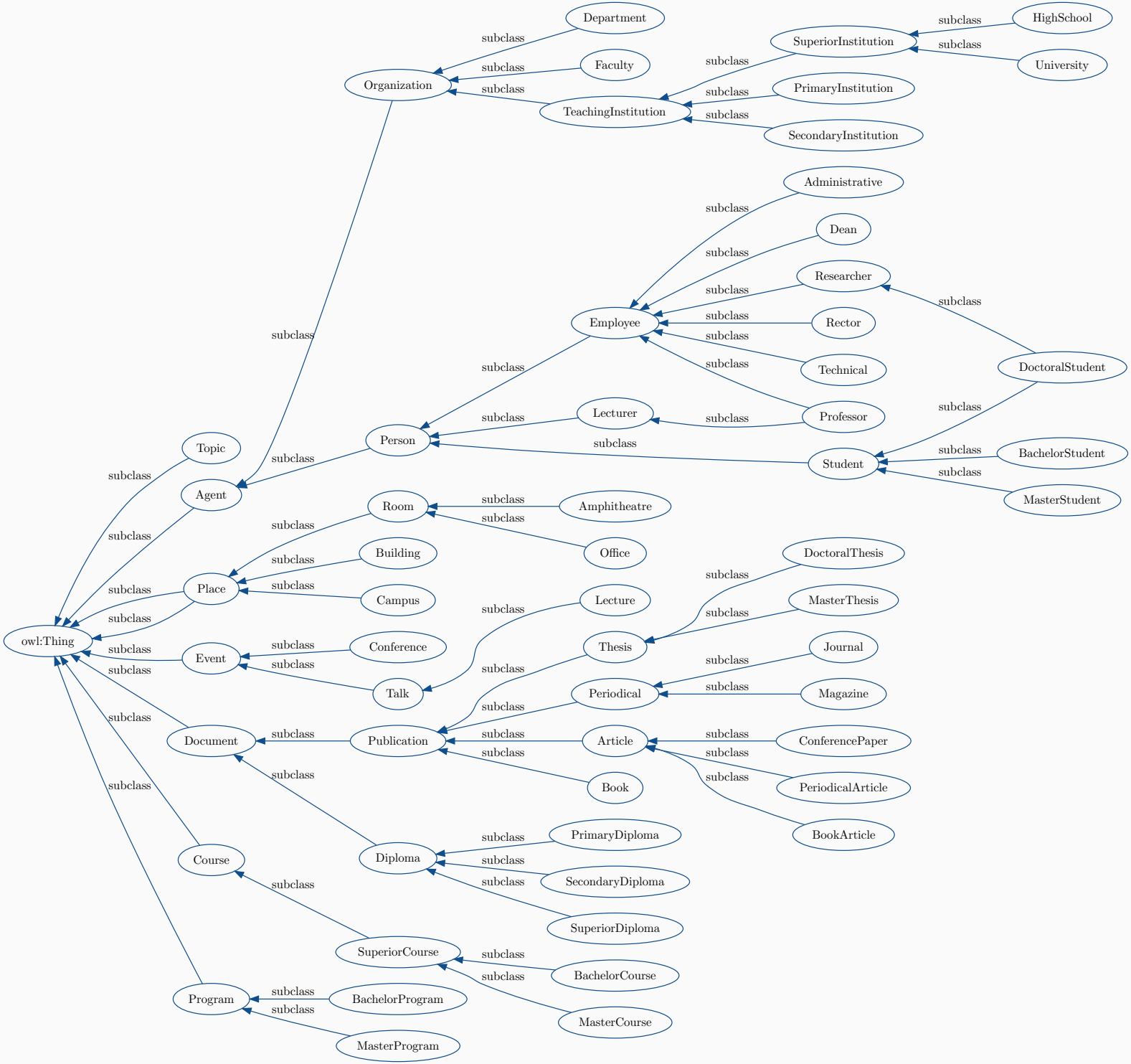
Our ontology articulates around 5 main classes:

- `Agent`, containing anything with a name that can act
- `Course`, covering the concept of a course
- `Document`, referring to any official document that can be published
- `Event`, containing anything that happens in time
- `Place`, covering the spatial domain


owl:Thing
Agent
Topic
Person
Organization
Department
Faculty
TeachingInstitution
SuperiorInstitution
HighSchool
University
PrimaryInstitution
SecondaryInstitution
Employee
Administrative
Dean
Researcher
Rector
Technical
Professor
Lecturer
Student
DoctoralStudent
BachelorStudent
MasterStudent
Place
Room
Amphitheatre
Office
Building
Campus
Event
Conference
Talk
Lecture
Document
Publication
Thesis
DoctoralThesis
MasterThesis
Periodical
Journal
Magazine
Article
ConferencePaper
PeriodicalArticle
BookArticle
Book
Course
Diploma
PrimaryDiploma
SecondaryDiploma
SuperiorDiploma
SuperiorCourse
BachelorCourse
MasterCourse
Program
BachelorProgram
MasterProgram
subclass

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We tried to satisfy the required expectations of the guidelines, *i.e.* modeling :

- Courses, programs and roles (student, professor, rector, etc.)
- The main components of a university (faculties, departments, campuses, etc.)
- Relate to other institutions and education levels (high schools, primary and secondary education)

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On top of that, we tried to add sufficient complexity or ramifications in our classes definition.

For that purpose, we used, *where appropriate*, role restrictions, equivalent classes definitions (with intersections, unions, etc.)

Limitations of the ontology i

- We wanted to include some axioms of the type

$$\forall x, y, z \quad P_1(x, y) \wedge P_2(y, z) \Rightarrow P_3(x, z),$$

but unfortunately, it was not possible.
For instance, we wanted to introduce the axiom

$$\forall x, y, z \quad \mathit{followsCourse}(x, y) \wedge \mathit{hasAsPrerequisite}(y, z) \Rightarrow \mathit{hasPassed}(x, z)$$

- Our ontology corresponds to a snapshot in time. We haven't represented relations such has `wasRegisteredAt` or `wasStudent`.

Limitations of the ontology ii

- It is not possible to infer that a `Lecture` was given in a specific day because it is positioned in time only by its starting and ending date-time and also because it is not possible to perform arithmetic inference in OWL.

  For instance, it is not possible to imply that "2020-05-06T09:00:00" is within "2020-05-06".

Population

Populating the ontology

When populating our ontology, we tried to create instances for as many classes as possible, if they were considered relevant.

Hence, some subclasses, such as `PrimaryInstitution`, `Periodical` or `Book`, have no corresponding instances.

Populating the ontology

Furthermore, when creating the individuals, we tried to instantiate them from particular classes and to assign them particular properties in order to have interesting inferences to retrieve.

For example, the course *Semantic Data* was asserted to be *included in* the *Master of Data Science and Engineering*. Hence, he was inferred to be a *Master Course*.

Competency questions

Examples of competency questions i

- Which students follow a course where at least one lecture has been given by Pr. Binot ?
- Which papers have been written by a certain student's professors ?
- Which students were following a lecture that started at 9am on 2020-05-06 ?
- Is the office of a professor located in a certain building / campus ?
- Which students have not been encoded as having attended all lectures of the courses they follow ? *Note: in the OWA, we can't infer that these students have not attended*
- Which students follow courses for which they are not encoded as having passed all the prerequisites ? *Note: idem.*

Examples of competency questions ii

- Which students follow courses taught by a professor that has written publications about the topic *Electrical Power Systems* ?
- Which students are enrolled in a master program but already have a superior diploma ?
- For all students enrolled at the university of Liege, do they have a secondary diploma ? *Note: answer is always yes thanks to some axioms.*
- Get all the persons that have their office in the same building.

Let's move to the demonstration !