

# Artificial Intelligence Fundamentals

## Master in Artificial Intelligence

### Practicum 2: Ontologies

*Academic year 2025/26*

#### 1. Description of the problem

There are two tasks to solve: (1) edition of a defined ontology (OFFF, food ontology) and (2) query data from ontologies using SPARQL.

#### 2. General objectives

The main objectives of this work are the following:

1. Understanding the main concepts from an ontology: classes, properties, instances, etc.
2. Edition of an ontology by adding classes and properties.
3. Add data (instances) into ontology format.
4. Understanding basic keywords from SPARQL.
5. Query data from ontologies using SPARQL.

#### 3. Specific requirements

The task requires the editing of OFFF food ontology and SPARQL queries for different ontologies.

A written report will be submitted for evaluation along with the modified ontology. The report will include the following sections:

##### 3.1. Front page

It will indicate the title (Fundamentals of Artificial Intelligence. Practice 2: Ontologies. Master in Artificial Intelligence 2025-26), the authors, the reference to the corresponding practice group, and the date.

### 3.2. Results

#### 3.2.1. Editing an Ontology

##### Task description:

- 1) Use the list of the food allergens and chose 10 allergens to create subclasses of *Allergens* into the ontology OFFF by using WebProtégé tool:  
[https://en.wikipedia.org/wiki/List\\_of\\_allergens](https://en.wikipedia.org/wiki/List_of_allergens)  
<https://webprotege.stanford.edu/>
- 2) Create a new class in *Health\_Outcomes* named *Allergy* and define that the new allergens are causing allergy (Allergy is caused by your new allergens).
- 3) Create a new class in *Health\_Outcomes* named *Inflammation* and define that heart disease, hypertension, obesity and type II diabetes is caused by *Inflammation*.
- 4) Create an individual (add data into ontology format) entitled "My fish sandwich" as an instance of the class Fish Sandwich with 2 data properties: it contains gluten and has allergens as Peanut Oil.

**Your work:** Explain each modification of the ontology. Use print screens with the modifications (descriptions and/or entity graph) where we can see your username in WebProtégé. The print screens should include the username used to login at WebProtégé website.

#### 3.2.2. SPARQL queries on ontology databases

**Task description:** You will create 3 SPARQL queries:

- 1) Use <https://dbpedia.org/sparql/> interface with the endpoint <http://dbpedia.org> in order to run a SPARQL query that will print 10 artists names that starts with "Mado".
- 2) Use <https://dbpedia.org/snorql/> to make a SPARQL that will return the first 10 persons with their height (**dbo:height**) between 1.8 and 2.3 m (person that have a birth date after 1980). The results are ordered by the birth date.
- 3) Use <https://dbpedia.org/snorql/> to make a SPARQL that will return the list of people who have a height greater than or equal to 2.10 meters or a weight greater than or equal to 95 kilograms. Print the number of clubs each person is associated. The results are then grouped by person, ordered by the number of clubs in ascending order, and limited to the top 7 results.

**Your work:** For each query write the SPARQL query, present the results and explain the logic of the query.

### 4. Evaluation and deliverables

- The final memory report will contain the explanations for your tasks, print screens for ontology edits (class/property description/entity graph, hierarchy graph, etc.), SPARQL queries and the corresponding outputs with the explanation of the queries.
- Please send the modified ontology file too.
- The work will be carried out compulsorily in groups of maximum 3 people.
- The deadline for the delivery of this practice is **October, 29<sup>th</sup> 2025 23:59**.
- The evaluation process will include the delivered materials. If there is a question about

your understanding, your evaluation will be replaced by a face-to-face defense.

- Finally, it is recalled that the total or partial copying of the materials between different groups will automatically lead to qualification of 0 in the course.