# Fundamentals of Artificial Intelligence and Knowledge Representation

## Mod. 2

academic years 2022/2023, 2023/2024, 2024/2025: Module 2 (Chesani)

previous academic years: Module 2 (ex-Gaspari) + Module 4 (Chesani)

## Prof. Federico Chesani – 17th of July 2025

Available time: 1h.

1) Define a predicate **mult/3** that receives as input an integer **N** and a list of lists of integers named **TheList**. The predicate returns in output (by means of the third parameter) a new list of lists of integers. Each "sublist" of integers in the result will be obtained by applying the parameter **N** to each element of **TheList**, in the following way:
   - By definition each element of **TheList** is a list of integers; the new "sublist" will be obtained by multiplying by **N** all the integers in the sublist;
   - If an element of **TheList** is an empty list, then nothing will be inserted in the resulting list.

   For example, the query:

```
% mult/3: mult(N, TheList, Result)
?- mult(3, [ [1,2,3], [], [4,5,6] ], Result).
```

   The expected answer is:

```
Yes, Result = [ [3,6,9], [12,15,18] ]
```

   Remember to define all the predicates used in the solution.

2) The candidate is invited to describe the Prolog "vanilla" meta-interpreter, providing an explanation for the meaning of each clause.

3) The candidate is invited to briefly introduce the RETE algorithm.

4) The candidate is invited to briefly introduce the Event Calculus approach, by citing and explaining the reserved predicates and the domain-independent axioms that characterize the EC approach.