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 – 16th of June, 2025

Available time: 1h.

1) Define a predicate `split/3` that takes as input a list `L` of integers and returns in output two lists containing the odds and the even integers, respectively.

   For example, if invoked with goal:
   ```
   % split(List, Odd, Even)
   :- split( [1,2,3,4,5,6,7,8,9,0], Odd, Even).
   ```
   The expected output is:
   ```
   Yes, Odd = [1,3,5,7,9], Even = [2,4,6,8,0].
   ```

   To this end, the candidate should remember that the arithmetic modulus operation in Prolog is provided by the operator `mod/2`.

2) The candidate is invited to define a Prolog meta-interpreter `solve/2` that computes the maximum depth of the SLD resolution tree associated with a solution.
   For example, given the program:
   ```
   p(X)  :- q(X), r(X).
   q(X)  :- t(X).
   t(X)  :- s(X).
   s(1).
   r(1).
   ```
   The goal `solve(p(X), Depth)` should provide as answer:
   `Yes, X/1, Depth/4`. (notice that solve(s(1)) would return 1)

3) The candidate is invited to introduce the Distribution Semantics for Probabilistic Logic Programs, and to provide a simple example using the LPAD language.

4) The candidate is invited to briefly introduce the concepts of Open World Assumption and Close World Assumption, mentioning two short examples of logics where such concepts are adopted.