Artificial Intelligence 2022 - 2023

Assignment – 1

Datalog and ASP

Complete the Music KB 2 exercise and compare your KB with the solutions provided by the teachers (see files: **music-rules2.txt** + **music-facts2.txt**); extend solutions provided by the teachers (files: **music-rules2.txt** + **music-facts2.txt**) by creating two extensions as specified below.

1. music-rules2-*your_surname*.txt [warm-up]

These specifications must be satisfied in ensemble in the final KB; the order in which they are listed here below does not need to reflect the optimal order for a sequential implementation.

- Add two more branches to the subgenre taxonomy using at least:
  - One high-level genre of choice (same level as black music)
  - Two middle-level genre of choice (subgenre of the previous genre)
  - Four low-level genre of choice (subgenres of the previous genres)
- Add artists and music works in such a way that each low-level subgenre is associated at least at one music work.
- Check that the inferences behave as expected.
- Add at least **one rule** using the datalog subset of ASP plus, if needed, true negation (but no disjunction, no NOT), which has the (abstract) form:
  - **(p(X) and q(X)) if Z(X)**, where p and q are predicates of arbitrary ariety, X is an arbitrary list of variables, and Z(X) is any conjunction of literals that uses the variables of the list X.
- Add **a rule of choice** using the datalog subset of ASP plus, if needed, true negation (but no disjunction, no NOT):
  - explain the intended interpretation of the rule in the program using the comments;
  - make sure it produces inferences that you can show and discuss when presenting the exercise; to do so feel free to extend the KB as needed (a few, e.g., 2-4, inferred facts are enough to comply to this one).

2. music-rules2plus-*your_surname*.txt [core exercise]

Modify the **music-rules2-*your_surname*.txt** KB you have developed introducing

- a new rule of choice that implements some nonmonotonic inference using **NOT** in the body. If needed, you can minimally extend the fact base to support inferences based on this rule.

- a new rule of choice such that makes use of **disjunction** in the head. If needed, you can minimally extend the fact base to support inferences based on this rule.
- For each rule:
    - Use one or more queries to show the consequences of this rule, and, in particularly, show the different results obtained under brave vs cautious reasoning.
    - Introduce a fact that modify the inferences (e.g., by preventing some of them to be inferred) to show how changes in the extensional KB impacts on the inferences with nonmonotonic and disjunctive reasoning