

Tutorial 4: Datalog queries

In the following let $\tau = \{E\}$ with $\text{ar}(E) = 2$, i.e., we consider only graphs as input databases. Write the a datalog program that output the following.

- (1) The set of vertices from which there is a walk of even length.
- (2) The set of vertices from which there is a walk of odd length.
- (3) The set of vertices from which there is a walk of even length, as well as a walk of odd length.
- (4) The set of vertices through which there is a cycle.
- (5) The set of vertices through which there is a cycle, as well as a walk of odd length.

In the following let $\tau = \{E, \text{Red}, \text{Blue}\}$ with $\text{ar}(E) = 2$, $\text{ar}(\text{Red}) = \text{ar}(\text{Blue}) = 1$. In other words, as inputs, we consider graphs in which each vertex has is coloured with red or blue. Here we assume that a vertex can only be coloured with either red or blue, i.e., **Red** and **Blue** are disjoint. Write the a datalog program that output the following.

- (6) The set of pairs (u, v) such that u, v are red vertices, and there is a walk from u to v with alternating colours.
- (7) The set of vertices through which there is a cycle with alternating colours.

A walk/cycle with alternating colours is a walk/cycle such that two consecutive vertices have different colours.