project/paper

Optimal FONDPs

The aim of this project is to study the theoretical and practical problem of finding optimal solutions to fully-observable non-deterministic planning (FOND) problems.

Given a FOND planning domain, define

- the *cost of a plan* to be the sum of the costs of the actions up until the plan reaches the goal (and ∞ if the goal is never reached).
- the *cost of a policy* to be the sup of the costs of all plans generated by the policy (i.e., no matter what the environment does).
- *policy A is better than policy B* if the cost of policy A is smaller than the cost of policy B.

Such planning domains amount to "min-cost reachability games" from the verification literature [1]. That paper shows that such games have values that can be computed. In particular, the cost of a given finite-state policy can be computed, and thus one can decide the "better than" relation between finite-state policies.

[1] http://dblp.org/rec/conf/concur/BrihayeGHM1

What is there to do:

1. do full literature search
2. formalise the above, give examples, supply tight-complexity bonds
3. reduce the search for optimal plans to the search for non-optimal plans, and run experiments using FOND planners.