

Principles of AI Planning

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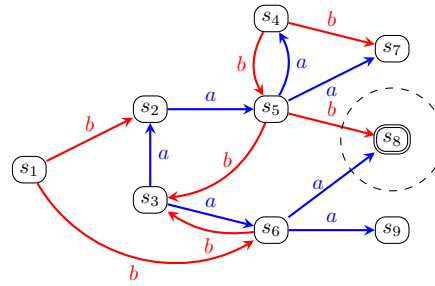
Exercise Sheet 13

Due: Friday, February 1st, 2019

Send your solution to drexlerd@tf.uni-freiburg.de or submit a hardcopy before the lecture.

Exercise 13.1 (Strong cyclic planning, 3+3 points)

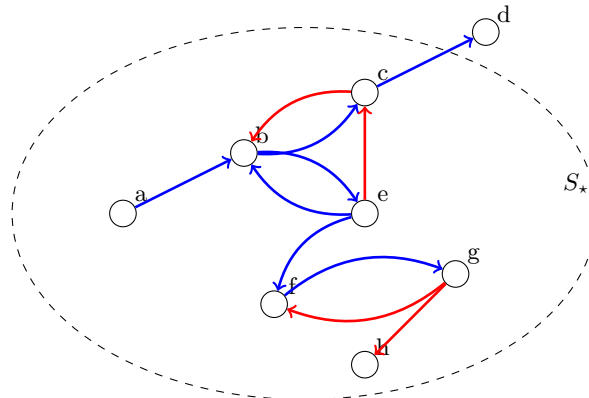
Consider the nondeterministic planning task that induces the following nondeterministic transition system.



- (a) Apply the nested fixpoint algorithm presented in the lecture, and specify the candidate good state sets C_i as well as, for each iteration of the outer loop, the sets of states W_j from which a goal state can be reached in at most j steps without the danger of leaving the current set of candidate good states C_i . Extract a strong cyclic plan π for all good states.
- (b) Apply the determinization-based incremental algorithm presented in the lecture for the initial state s_1 . Assume that the deterministic search algorithm computes the optimal plan in the determinization (e.g. that it finds a shortest path to the goal). For each iteration, specify $fail$, s , π' , π and choose the node with smallest index when selecting a node from $fail$.

Exercise 13.2 (Maintenance Goals, 4 points)

Simulate the computation of the algorithm for maintenance goals for the following nondeterministic transition system with two operators o_{red} and o_{blue} .



Specify the sets $Safe_i$ and a resulting plan for maintenance π .

Exercise 13.3 (Question Time, 5 additional points)

Question Time will take place on 8 February. Your task: Repeat the planning lecture and write, as an answer to this exercise, two questions that we should discuss.

You may and should solve the exercise sheets in groups of two. Please state both names on your solution.