Principles of AI Planning

Dr. J. Rintanen, M. Ragni
SS 2005

University of Freiburg
Department of Computer Science

Exercise Sheet 8

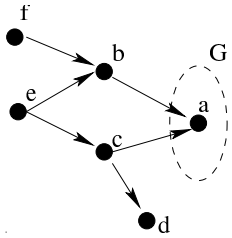
To be submitted Monday, June 13

Exercise 8.1 (Procedure Prune – 5 credits)

Consider the procedure *prune* (from the lecture notes, with numbering for S and W corresponding to the iterations).

procedure prune(O,W,G);
$i := 0$;
$W_0 := W$;
repeat
  $i := i + 1$;
  $k := 0$;
  $S_0 := \emptyset$; *(* States from which G is reachable with 0 steps. *)*
  repeat
    $k := k + 1$; *(* States from which G is reachable with k steps. *)*
    $S_k := S_{k-1} \cup \bigcup_{o \in O}(wpreimg_o(S_{k-1} \cup G) \cap spreimg_o(W_{i-1} \cup G))$;
  until $S_k = S_{k-1}$; *(* States that stay within W_{i-1} and eventually reach G. *)*
  $W_i := W_{i-1} \cap S_k$;
until $W_i = W_{i-1}$; *(* States in W_i stay within W_i and eventually reach G. *)*
return W_i;

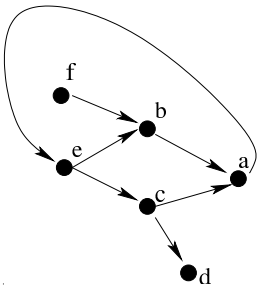
Consider the following transition graph (only one action o, which is nondeterministic in states e and c.)



Simulate the computation of *prune* when it is called with the following parameters: prune($\{o\}$, $\{a, b, c, d, e, f\}$, $\{a\}$). List the values of S_k and W_i for different values of k and i.

Exercise 8.2 (Algorithm – 5 credits)

Simulate the computation of the algorithm for maintenance goals for the following graph (there is only one action) and $G = \{a, b, c, d, e, f\}$.



You may work on these assignments and submit your results **in groups of two students**. Make sure to clearly indicate both names on your work. **You may write your answers in English or German.** Please return your homework on monday **before** 14:15.
Exercise marks count towards your final grade for this course, which is calculated from exercise marks (**15%**) and exam marks (**85%**).