

ICS 271

Fall 2008

Prof. R. Dechter

Homework Assignment 7

due: Wednesday, November 26th

1. (10) Define the operator schemata for the problem of putting on shoes and socks and a hat and coat, assuming that there are no preconditions for putting on the hat and the coat. Give a partial order plan, and show that there are 180 different linearizations of this solution.
2. (10) Show how a STRIP planner will work on the above problem.
3. (10) (Problem 22.4 in Nilsson) Explain how backward search using regressions based on STRIPS rules would solve the Sussman anomaly.
4. (20) (Problem 11.4 from RN) The monkey-and-bananas problem is faced by a monkey in a laboratory with some bananas hanging out of reach from the ceiling. A box is available that will enable the monkey to reach the bananas if he climbs on it. Initially, the monkey is at A , the bananas at B , and the box at C . The monkey and box have height *Low*, but if the monkey climbs onto the box he will have height *High*, the same as the bananas. The actions available to the monkey include *Go* from one place to another, *Push* an object from one place to another, *ClimbUp* onto or *ClimbDown* from an object, and *Grasp* or *Ungrasp* an object. Grasping results in holding the object if the monkey and object are in the same place at the same height.
 - (a) (5) Write down the initial state description.
 - (b) (5) Write down STRIPS-style definitions of the six actions.
 - (c) (5) Suppose the monkey wants to fool the scientists, who are off to tea, by grabbing the bananas, but leaving the box in its original place. Write this as a general goal (i.e., not assuming that the box is necessarily at C) in the language of situation calculus. Can this goal be solved by a STRIPS-style system?
 - (d) (5) Your axiom for pushing is probably incorrect, because if the object is too heavy, its position will remain the same when the *Push* operator is applied. Is this an example of the ramification problem or the qualification problem? Fix your problem description to account for heavy objects.
5. (10) (Problem 11.8 from RN) Construct levels 0, 1, and 2 of the planning graph for the problem in Figure 11.2.
6. (10) Question 11.7 in RN, parts a and b. Part c optional.