Principles of AI Planning

Dr. J. Rintanen, M. Ragni   University of Freiburg
SS 2005   Department of Computer Science

Exercise Sheet 6

To be submitted Monday, May 30

Exercise 6.1 (Invariants – 5 credits)

Find 2-literal invariants for the problem instance $\langle A, I, O, G \rangle$ where
  (a) $A = \{a, b, c\}$,
  (b) $I \models a \wedge b \wedge c$,
  (c) $O = \{o_1, o_2, o_3\}$ where
        • $o_1 = \langle c, \neg b \wedge \neg c \rangle$
        • $o_2 = \langle a \wedge \neg c, \neg a \wedge b \rangle$
        • $o_3 = \langle \neg a, a \wedge c \rangle$
  (d) $G = a \vee b \vee c$.
Use the algorithm presented in the lecture. Explain which calls to the procedure *simplepreserved* are made (it suffices to consider only those calls that correspond to applicable operators.)

Exercise 6.2 (Representation – 5 credits)

Three actions are represented by the following three objects, a formula, a matrix and an operator. Represent a as a matrix, b as an operator, and c as a formula.
  (a) $(\neg(A \wedge B)) \leftrightarrow A'$
  (b) $\begin{pmatrix} 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{pmatrix}$
  (c) $\langle \neg(A \wedge B), (A \rhd B) \wedge (A|\neg A) \rangle$

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%**).