Principles of AI Planning

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SS 2005

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Exercise Sheet 5

To be submitted Monday, May 23

Exercise 5.1 (Davis-Putnam – 3 credits)

Use the Davis-Putnam procedure to find a model for each of the following formulae or prove that a formula has no model.

- $(A \vee B) \wedge (\neg A \vee \neg D) \wedge (C \vee D) \wedge (B \vee C) \wedge (A \vee \neg C) \wedge (\neg B \vee D) \wedge (\neg A \vee \neg C)$
- $(\neg C \vee \neg A) \wedge (\neg A \vee \neg B \vee \neg C) \wedge (A \vee \neg B) \wedge B$

Exercise 5.2 (Planning as satisfiability – 7 credits)

Consider the following problem $\langle A, I, O, G\rangle$ with

- $A = \{a, b, c\}$,
- $I \models a \wedge b \wedge c$,
- $O = \{o_1, o_2\}$ where
  - $o_1 = \langle c, \neg b \wedge \neg c\rangle$
  - $o_2 = \langle a \wedge \neg c, \neg a \wedge b\rangle$
- $G = \neg a$.

(a) Translate the operators into propositional formulae.
(b) Represent the first operator as a matrix (cf. Planning as satisfiability, slide 8/47)
(c) Apply the Davis-Putnam procedure to test for satisfiability.

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%**).