UNIVERSITY OF INNSBRUCK
MASTERSTUDIUM INFORMATIK VERTIEFUNGSMODUL (WM 9)
Automatic Planning
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Tutor: Adina Sirbu
Exercises Nr. 1. **To be returned on Wednesday, Oct 17**

Exercise 1. (2=1+1 points)

Give a polynomial time algorithm to construct solutions to instances of

1. Blocksworld ("planning formalisms" slide 18)
2. Logistics ("planning formalisms" slide 21)

Pseudo code in natural language suffices, no mathematical notation needed; keep things simple (sentences a la "drive a truck to a not-yet transported package" are fine).

Exercise 2. (6 points)

Formulate the "house" example, "introduction" slide 17, in PDDL as a domain file containing the operators, and a problem file containing the initial state and goal. Use the predicates $at(.,.)$, $adjacent(.,.)$, $holding(.)$, $closed(.)$, $iskeyfor(.,.)$, and $open(.)$. Use the operators $go(.,.)$ (possible between adjacent rooms), $take(.,.)$, $drop(.,.)$, and $open(.,.,.)$ (a room from an adjacent room). We assume the cupboard is large enough to go into it, i.e., treat it like another room. The goal is to have $at(dirtyclothes, cellar)$ and $holding(keytocar)$.

Test your domain and problem files using the Fast-Forward (FF) planning tool. An archive containing the FF executable and an example (a domain and a problem file for the Gripper problem) is available on the course page:

http://www.deri.at/teaching/courses/ws200708/details/automatic-planning/

What to turn in: a printout of your domain and problem, plus a printout of the output from FF.

Exercise 3. (2 points)

Prove that Poly-Bounded-PLANSAT is **NP**-hard. Hint: the proof can be done by a reduction from 3SAT.