

**ICS 271**  
**Fall 2017**  
**Instructor : Kalev Kask**  
**Homework Assignment 7**  
**Due Tuesday, December 5**

1. (10) Define PDDL action schema for the problem of putting on shoes and socks and a hat and a coat.
2. (10) Explain how backward search using regressions based on PDDL rules would solve the Sussman anomaly.
3. (10) Consider the problem of devising a plan for a kitchen-cleaning robot.
  - (a) (5) Write a set of PDDL action schema that might be used. When you describe the action schema, take into account the following considerations:
    - i. Cleaning the refrigerator generates garbage and messes up the counters.
    - ii. Cleaning the microwave or the refrigerator will get the floor dirty.
    - iii. The microwave must be clean before covering the drip pans with tin foil.
    - iv. Washing the counters or the sink gets the floor dirty.
  - (b) (5) Write a description of an initial state of a kitchen that has a dirty microwave, refrigerator, and sink, and a clean floor and counters. Also write a description of the goal state where everything is clean, there is no trash, and the microwave drip pans have been covered with tin foil.
4. (15) Construct levels 0, 1, and 2 of the planning graph for the problem in Figure 10.3 in RN.
5. (20) Assume a blocks world planning problem with 3 blocks  $A$ ,  $B$ ,  $C$ . Given initial state  $On(A, Table) \wedge On(B, Table) \wedge On(C, Table)$  and a goal state  $On(A, B) \wedge On(B, C)$ , translate this problem into a SATplanning problem. Note that we know that this problem has a shortest length plan of 2. Find a model for your SATplan formulation and extract a plan from the model.