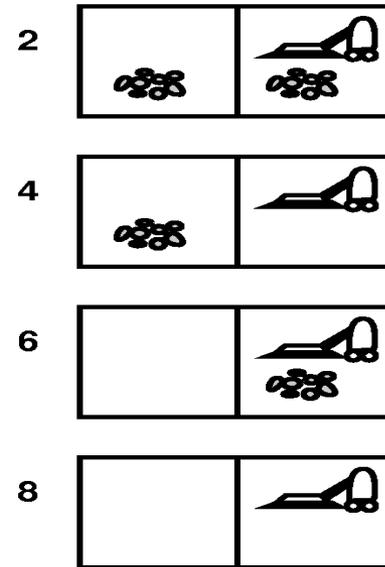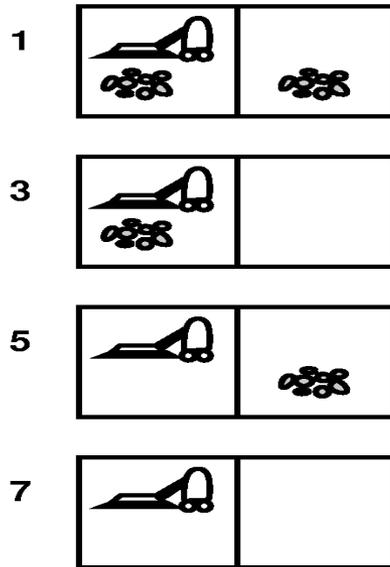# Sensorless (conformant) problems


1. Single-state problems

- World is accessible, sensors give all information, actions are exactly known
- Steps to goal can be calculated (e.g. state 5, action [Right,Suck]).

2. Multiple-state problems

- Actions are known, world partially accessible (extreme: no sensors).
- Initial state one of {1,2,3,4,5,6,7,8}. With [Right] we would get {2,4,6,8} and with [Right, Suck, Left, Suck] we would reach the goal
- Agent infers over set of states (Belief states)

Contingent Problems

- Problems during execution (Exp.: {1,3} --> {7,8}).

- Assume: Agent is in either {1,3}, he could formulate sequence [suck, right, suck], sucking goes in {5,7}, moving right into {6,8}, if he is in {6}, action successful, if in {8} action fails.

- Solution: from {1,3} via {5,7} in {6,8} and then [suck] only, **if dirt exists.**

- I.e., solution of problem means consideration of sensor data during execution!

- Agent needs to test not only single sequences but whole tree.

- Adversarial problems, if uncertainty by opponent agent.
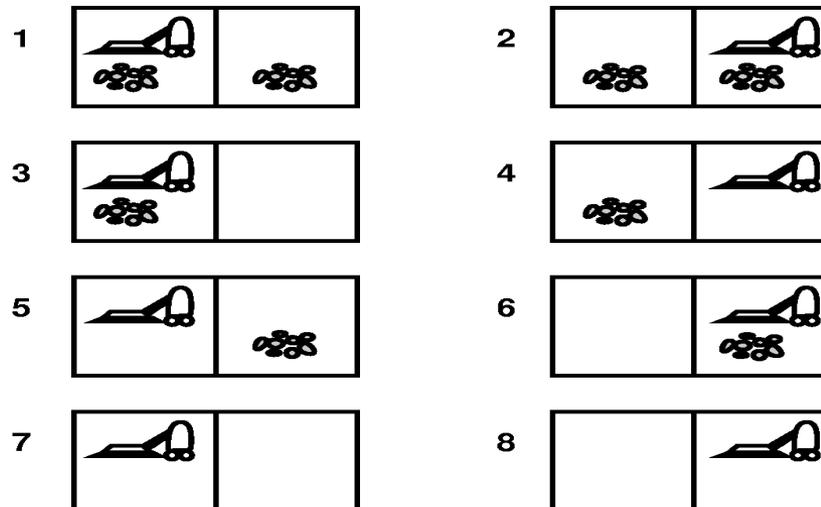
Exploration problems

- Assumption: Agent has no information about effect of his actions (most difficult situation).

- Agent needs to experiment, this is a kind of search, but search in real world not in model world.

- If agent "survives", learns his world like through a map that he can use later.

- Single-state and multiple-state problems are solvable with similar search techniques, contingency problems need more complex techniques.