CSC384
Introduction to Artificial Intelligence:
October 28th

November 4, 2014

Classical Planning

Heuristics

Using first order logic allows for domain independent heuristics

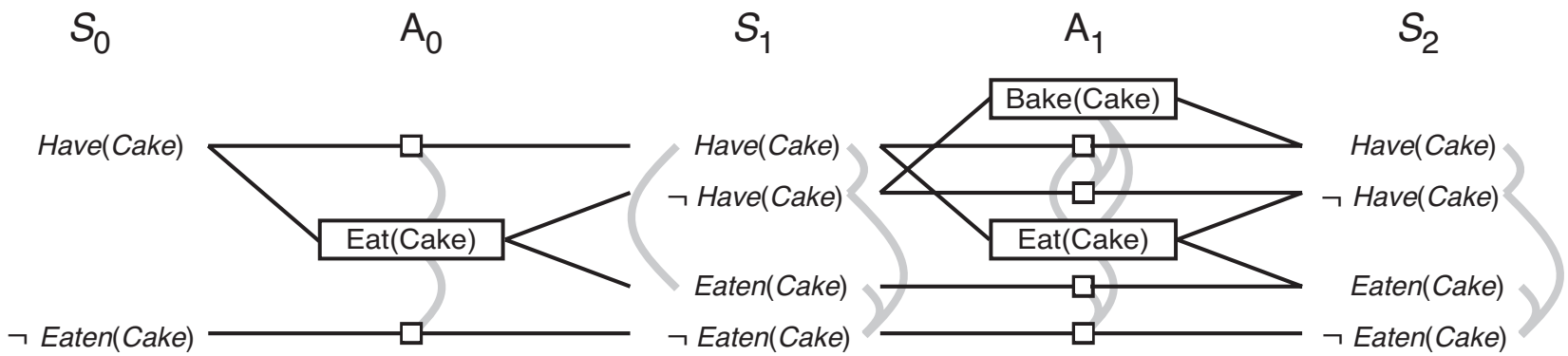
- Example: h_{STRIPS} = The number of fluents you need to modify to reach a goal
- Why is h_{STRIPS} not admissible?

The main class of heuristics we will talk about are *delete relaxation* heuristics. We will simplify the problem by assuming the delete list of all actions is empty. We will call this heuristic h^+.

- h^+ is hard to calculate (equivalent to set cover or hitting set problems)
- In practice we approximate h^+, although we lose admissibility often in doing so

Classical Planning

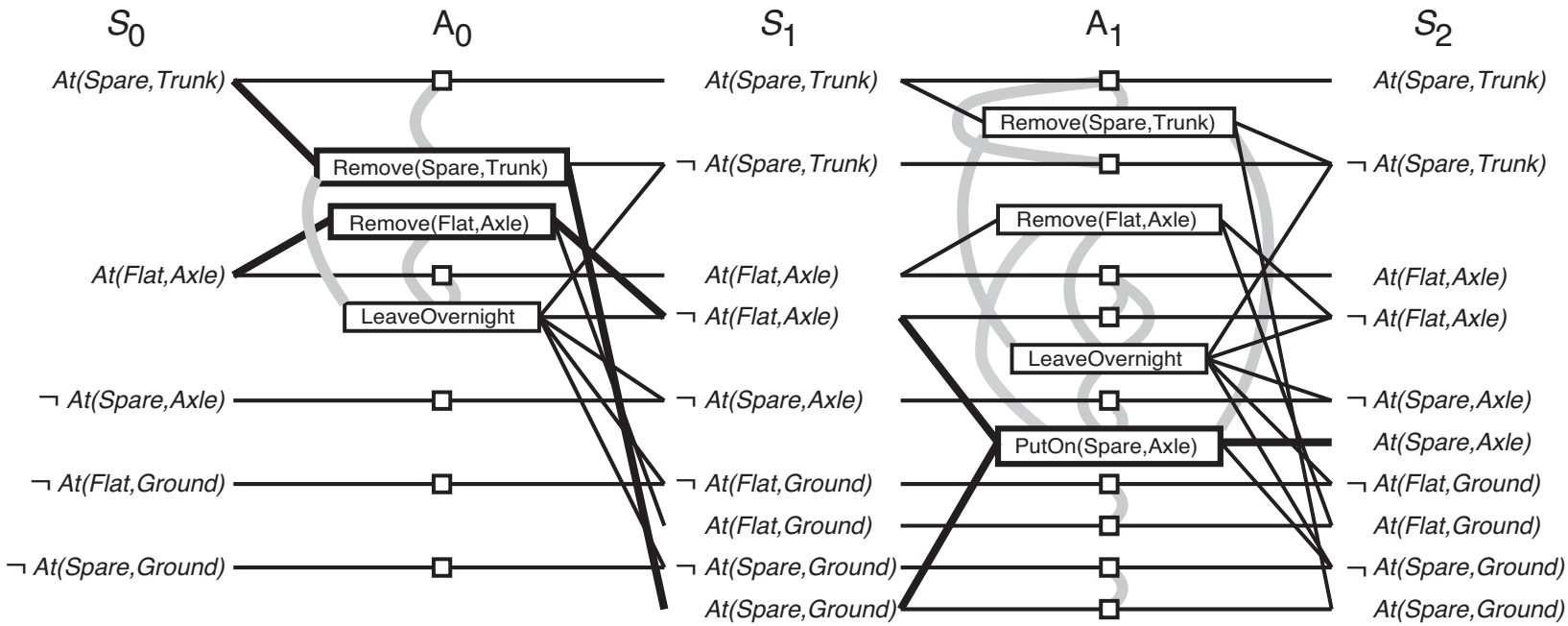
Planning Graphs



- Grey lines indicates mutexes
- Small squares indicate persistence actions

Classical Planning

Planning Graphs



- The planner GRAPHPLAN works by expanding planning graphs and trying to extract solutions from them

Classical Planning

Planning Graphs

Relaxed planning graphs:

- Ignore mutually exclusive fluents
- Fluent layers constantly expand
- Extracting a plan from these graphs can give an approximation to h^+

Classical Planning

Solvers

Some solvers of note:

- SATPLAN
- Fastforward (available on CDF)
- Fastdownward
- LAMA