STRIPS Planning

**Joseph Sackett**

**CSC 480- Artificial Intelligence I**

**Mar. 2, 2014**

This was a great project with which to develop a good understanding of STRIPS in particular and planning in general. The goal was to build a problem-agnostic solution into which different problems could be plugged and solved. This document will describe the general solution and how it was applied to the specific problems.

## General Solution

This provided a problem definition language (PDDL) interface which could be implemented for different solutions. It contained the initial state, goal state, actions as well as the heuristic for use in the A\* algorithm. The propositions and actions specific to the solution extend abstract classes Action and Proposition respectively. This software architecture keeps the solution completely reusable to different problem domains.  
Another powerful reuse element comes from the search capabilities built for the 8-puzzle project. These search algorithms were kept completely separate from the puzzle and were reusable verbatim and unchanged for the STRIPS problem solver.

## Tower of Hanoi

This was the first solution plugged into the STRIPS problem solver. It had a number of Proposition and Action customized for the domain. The heuristic assigned weights to the disks and used these to factor the estimated number of moves to solve the problem. It allows the user to select the number of disks to use in the problem.

## Shakey’s World

This domain was a bit involved with the robot being able to move, move boxes, and flip switches. The initial state and goal state in the problem statement did not exercise the full domain so more can be done here. As it was, the solution framework worked well for Shakey.

## Key In Box

This was the simplest of the problem domains as it did not need to bind any variables. The propositions and actions were thus more involved. STRIPS solved this without placing the key in the box before opening the door; a success.

## Air Cargo

This was a more advanced domain in both the propositions and actions. It successfully extended the framework to move the cargo to their destinations.

## Conclusion

This worked for all of the problem definitions and likely will for any domain that can be express in conjunctive predicates. This was an all-around success, both in terms of the STRIPS problem solver working and its great learning opportunity.