CS360 – Homework #4

STRIPS

1) Formulate in STRIPS the planning problem of transforming the given start configuration of the eight-puzzle to the given goal configuration. (In the eight-puzzle, the empty tile can be swapped with its North, South, East or West neighbor.)

1	2	3
7		4
8	6	5

(a) Start configuration.

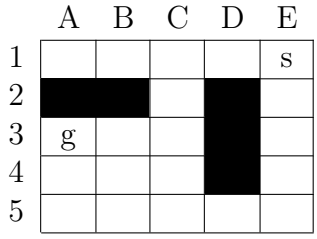
1	2	3
4	5	6
7	8	

(b) Goal configuration.

2) In the Tower of Hanoi game (`http://en.wikipedia.org/wiki/Tower_of_Hanoi`) there are three rods (pegs) and a number of disks of different sizes which can slide onto any rod. In the initial state, the disks are stacked on the first rod in ascending order of size, with the smallest on top. In the goal state, the disks are stacked on the third rod in the same order. At each turn, the player can take the topmost disk on a stack and place it on top of another stack. However, a disk may not be placed on top of a smaller disk. Formulate in STRIPS the Tower of Hanoi game played with three disks.

Breadth-First and Depth-First Search

3) A 4-neighbor gridworld is given below. In which order do depth-first search and breadth-first search (both with a sensible node prunig strategy) expand the cells when searching from s to g? Ties are broken in lexicographic order. That is, A1 is preferred over A2 and B1, and A2 is preferred over B1.



4) Compare the advantages and disadvantages of breadth-first and depth-first search and discuss to which degree pruning of tree nodes is important for them.

5) Does depth-first search always terminate if there is a path of finite length from the start to the goal? Why?

6) In Manhattan, you want to reach a given destination from your current location with as few left turns as possible. Can this be formulated as finding a minimum cost path in a graph? If so, how? If not, why not?