Planning under Uncertainty Lab

This lab asks you to develop your own algorithm for planning when the environment is partially observable and dynamic.
The Four Glasses Puzzle

The Four Glasses puzzle is a well-known logic puzzle, described on Wikipedia:

http://en.wikipedia.org/wiki/Four_glasses_puzzle

A person sits at a table with a top that can rotate.

The person is blindfolded.

Four glasses are placed on the tabletop, in a diamond pattern. Each glass is either up or down (person doesn’t know which).
The Four Glasses Puzzle

On each turn, the person may choose any 2 of the four glasses, feel whether they are up or down, and then set them to be in any position (both up, both down, one up one down, or the other up and the other down).
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After the person finishes taking an action for the turn, the table is turned either 0, 90, 180, or 270 degrees (each with equal probability), and the person doesn’t know how much the table is turned.
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The goal of the Four Glasses Puzzle is to come up with the shortest sequence of actions that sets all glasses to be up, or all glasses to be down.
Your Problem:
Planning Algorithm for Uncertainty

Your task is NOT to solve the Four Glasses Puzzle. (You can if you want, but that’s not the goal of this assignment.)

Your task is to come up with a planning algorithm that extends STRIPS-style planning to worlds where the agent doesn’t know the full state of the world, and some actions include perception (feeling whether a cup is up or down, e.g.), and the state of the world may change (table may rotate).

Your algorithm will involve some loop with a priority queue; your job is basically to figure out what the states are, and how to get new states from existing states (that is, how to describe the actions). Note that you will need to do something more complicated than STRIPS actions.

Your algorithm should be able to automatically find a plan for the Four Glasses Puzzle.
Lab Details

• You should work with a partner or two.

• This assignment is due by the end of lab.

• The first algorithm or two that you come up with will probably have some problems with it that you don’t see at first. Check with the TA each time you think you’ve solved it, and he should let you know if you’ve got a full solution or not.