CS 288 2018S Section 006
Homework 06

Due: At the beginning of class on Monday April 16th, 2018.

You are at the beach with two empty, unmarked plastic buckets. One bucket is red and the other is green. The red bucket holds a maximum of four pounds of sand, and the green a maximum of three pounds. How can we get exactly 2 pounds of sand in the red bucket?

1. Define the problem as state space search (initial state, goal states, and operators). The operators must be rigorously defined. You should never end up with an amount of sand in a bucket that is not precisely known. For example, if a bucket is full with sand, emptying half of the bucket is not a legal action because it relies on an estimation of where the half-mark is.
2. Draw the complete state space (it's a graph, and not a tree; graphs have cycles). You must explicitly declare the size of the state space (total number of states and total number of arcs).
3. Find all solutions having the shortest sequence of operators.
4. What is the shortest sequence of operators required to reach the goal state where both buckets have 2 pounds of sand each?

Deliverables: A PDF, MS-Word, or MS-PowerPoint document containing the solutions to all questions given above.

Hint: A state can be represented with the pair (a, b) where a is the amount of sand in the red bucket and b is the amount of sand in the green bucket.