Due: At the beginning of class on Thursday March 28, 2019.

You have just graduated from a prestigious medical school. The world needs your help to end a zombie pandemic! A stroke of genius lead you to discover a super drug that can target the specific damaged parts of a zombie brain and transform the zombies back into humans. The first zombie trials are underway.

The formula requires 4 mL of Pacifylenol. Unfortunately, you do not have access to a 4 mL measuring beaker, but you do have access to three unmarked beakers having the following volumes: 8 mL, 5 mL and 3 mL. You have exactly 8 mL of Pacifylenol; you poured it all into the 8 mL beaker. Can you get exactly 4 mL of Pacifylenol in either the 8 mL beaker or the 5 mL beaker without wasting a single drop?

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 Pacifylenol in a beaker that is not precisely known. For example, when the 8 mL beaker is full, emptying half of the beaker into the 5 mL beaker 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 the 8 mL, 5 mL and 3 mL beakers contain 3 mL, 3 mL and 2 mL of Pacifylenol, respectively?

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 triplet (a, b, c) where a, b and c are the volumes of Pacifylenol in the 8 mL, 5 mL and 3 mL beakers, respectively.