

**CS1571**  
**Fall 2019**  
**8/28 In-Class Worksheet**

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Where were you sitting in class today: Center

**A. Formulate a task as a search problem**

The following is the initial state and goal-state for an 8-puzzle problem.

7	2	4
5		6
8	3	1

Start State

	1	2
3	4	5
6	7	8

Goal State

Formulate the problem as a search problem by defining the following features. For the purposes of this exercise, feel free to use abstract terms (e.g., you don't need to define the goal test algorithm, just explain how you would do it).

1. Possible actions:

Actions would be sliding the blocks left, right, up, and down into an empty adjacent space, without moving it off the board. You also don't want to slide the tile back into the space that it just moved from.

2. Transition model:

The transition model would consist of moving a block into an empty space and continuing to do so until the goal state is reached.

3. Goal test:

Checking each state on the board to see whether every block in the current state matches the state of the goal state. (returns true or false)

4. Path cost:

Number of moves you have to make to reach the goal state (where the cost to move is 1)

**B. Tree Search**

5. Explain in words how you can use a tree-search algorithm to solve the n-puzzle problem.

You would start with the initial state and the children of the root would be the 4 different possible states that could happen from moving the empty space one of the 4 directions and checking and continuing the tree until you reach your goal state and the number of levels of children is the number of moves you had to make.