ECS 170: Spring 2020
Homework Assignment 1

Due Date:

No later than Sunday, April 19, 11:59pm PDT. Note that your next homework
assignment may be posted before then. You are expected to do this assignment on your
own, not with another person.

*It is possible (maybe even likely) that we will have to make some adjustments to this
assignment as the days go by. Please try to be flexible.*

The assignment:

Consider the peg puzzle program we have discussed in class, which is written in Python
and has also been posted to Canvas as `pegpuzzle.py`. Your task is to adapt this
program so that it solves an arbitrary eight-tile puzzle. Call your new program
`tilepuzzle.py`.

Just like the peg puzzle program, your tile puzzle program will be invoked with any valid
start state (the first argument) and any valid goal state (the second argument). Again, just
like the peg puzzle program, your tile puzzle program should return a list of states
representing a path from the start state to the goal state.

For example, the state in the tile puzzle that looks like this in our lecture slides:

```
2 8 3
1 _ 4
7 6 5
```

will be represented by the following Python list of lists:

```
[[2,8,3],[1,0,4],[7,6,5]]
```

Note that the integer 0 represents the empty tile or space.

When your tile puzzle program finds a path from the start state to the goal state, it should
return a list of states representing that path, beginning with the start state and ending with
the goal state. For example, if your program is called like this:

```
>>> tilepuzzle([[2,8,3],[1,0,4],[7,6,5]],[[1,2,3],[8,0,4],[7,6,5]])
```

your program should return a list that looks like this:

```
[[[2,8,3],[1,0,4],[7,6,5]], [[2,0,3],[1,8,4],[7,6,5]],
 [[0,2,3],[1,8,4],[7,6,5]], [[1,2,3],[0,8,4],[7,6,5]],
 [[1,2,3],[8,0,4],[7,6,5]]]
```

This example is taken from the Power Point slides, but your program does not have to find this particular path. The path shown above is only one example of the many solutions your tile puzzle program could find. Your program need only return the first solution it finds, not the most optimal solution.

Motivation:

This is an easy homework assignment. So why do this? First, it gives students who are using Python for the first time an opportunity to practice those new skills. Second, it gives students who have some Python experience a chance dust off those old skills. Third, and most important, it gives everyone the opportunity to work on representing states, constructing operators, and applying operators to a state to generate new states. These are all skills that may be useful in the very near future.

Turning it in:

Submit your `tilepuzzle.py` program via Canvas.