8-Puzzle Game, Part II: Successor function

Input: a state
Output: number of all possible actions and the corresponding successor states
Note that the actions are always output in the order of {up, down, left, right}.

範例 Examples:	
Input	Meaning
7 312457680 724506831 438126507 104782563 320685741 426031785 041235678	Number of test data State of test data #1 State of test data #2 . . .
Output	Meaning
2 move 0 to up 312450687 move 0 to left 312457608 4 move 0 to up 704526831 move 0 to down 724536801 move 0 to left 724056831 move 0 to right 724560831 3 move 0 to up 438106527 move 0 to left 438126057 move 0 to right 438126570 3 move 0 to down 184702563 move 0 to left 014782563 move 0 to right 140782563 2 move 0 to down 325680741 move 0 to left 302685741 3 move 0 to up 026431785 move 0 to down	Number of successors of test data #1 The 1st action of test data #1 Next state after the 1st action The 2nd action of test data #1 Next state after the 2nd action Number of successors of test data #2 The 1st action of test data #2 Next state after the 1st action . . .

426731085 move 0 to right 426301785 2 move 0 to down 241035678 move 0 to right 401235678	

[Hint]
Possible method:

1. Convert a state into a $n \times n$ matrix
2. Find the coordination of digit 0 as (x_0, y_0)
3. Swap 0 with the digits in (x_0, y_0-1), (x_0, y_0+1), (x_0-1, y_0), (x_0+1, y_0) if they are legal positions