CS 540
HW 2

Q2. 1) In a (m,n,K)-puzzle, there will be

m*n - K tiles

2.) In an (m,n,K)-puzzle, the total number of spots for either a tile or a space is m*n. Assuming all tiles and spaces to be distinct, these will be

m*n choices of tile/space for first spot,

((m*n)-1) choices of tile/space for second spot

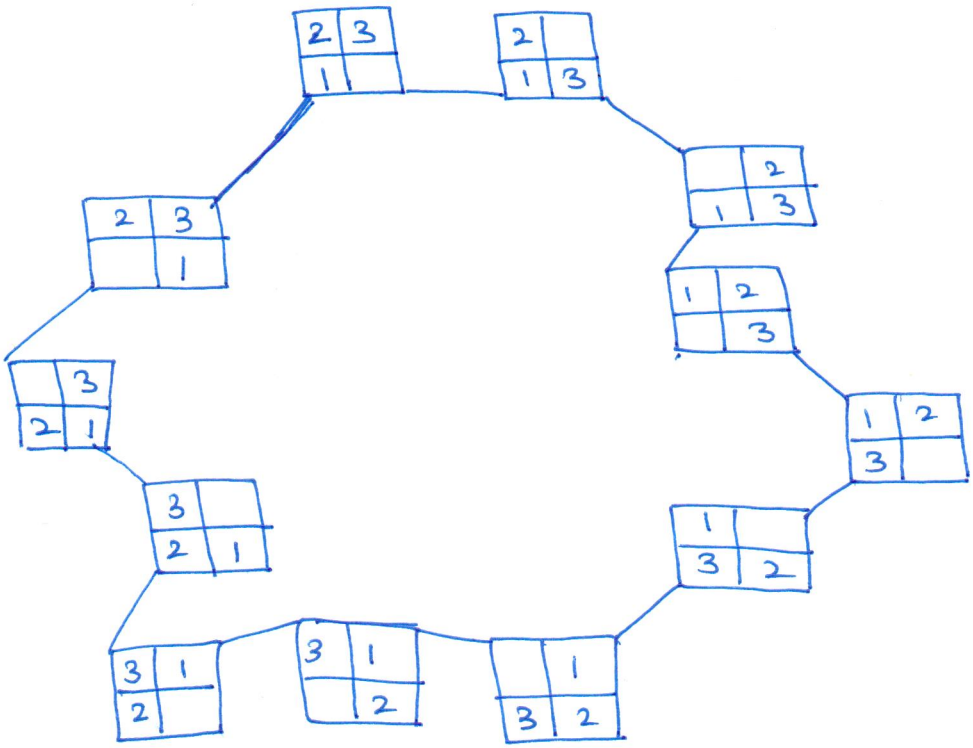
and so on.

Total ways to place m*n distinct tiles and spaces in m*n spots is equal to (m*n)! But these are K spaces which are the same and not distinct so permutations in which they are changed will not be distinct. Hence we divide by K!. For m*n - K tiles and K spaces, these will be

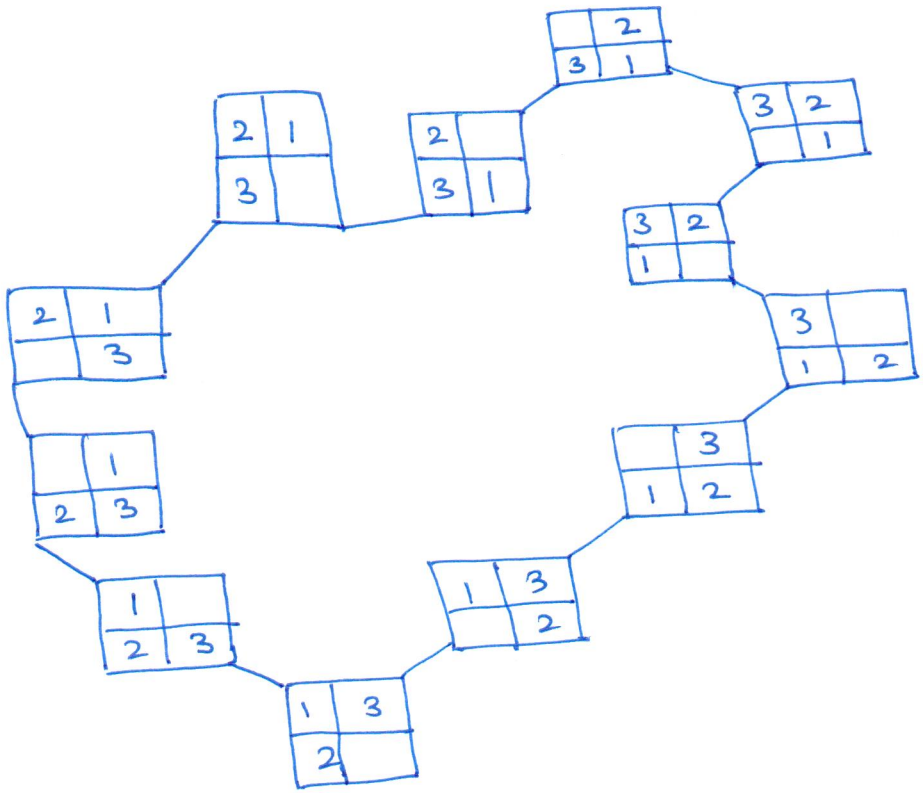
$$\frac{(mn)!}{K!}$$ distinct states.

State space of (2,2,1)-puzz

3.



(Goal State)



→ Each node is represented by a square with four distinct tiles represented by the numbers 1, 2, 3. The space in the square represents a space. The edges are connected to configurations that can be achieved in one move. There are two disjoint parts to the graph.