Q Peas & Search Space Representation for 4-Queen

→ 4 Queen problem:
In 4 Queen Problem, the queens need to be placed on 4*4 chess board, so that no queens attack each other horizontally, vertically or diagonally.

PEAS for 4 Queen Problem:

| AGENT | DESCRIPTION |
|---|---|
| Performance Measure | • Arrangement of 4 queen in an 4*4 puzzle space of an 4*4 game chess board.<br>• No two or more queen should intersect their path vertically, horizontally or diagonally.<br>• The puzzles main performance measure is the fewest number of moves required to solve it. |
| Environment | • Puzzle space determined by 4X4 game board.<br>• Initial state is empty board.<br>• Final state is the board with 4 queens none attacking each other. |
| Actuators | • Each queen is placed, one after the other on a square board in such a way that they do not attack each other. |
| Sensors | • Fully software, so the agent will have full view of puzzle space. |

Q. Write PEAS & Search space for water Jug.

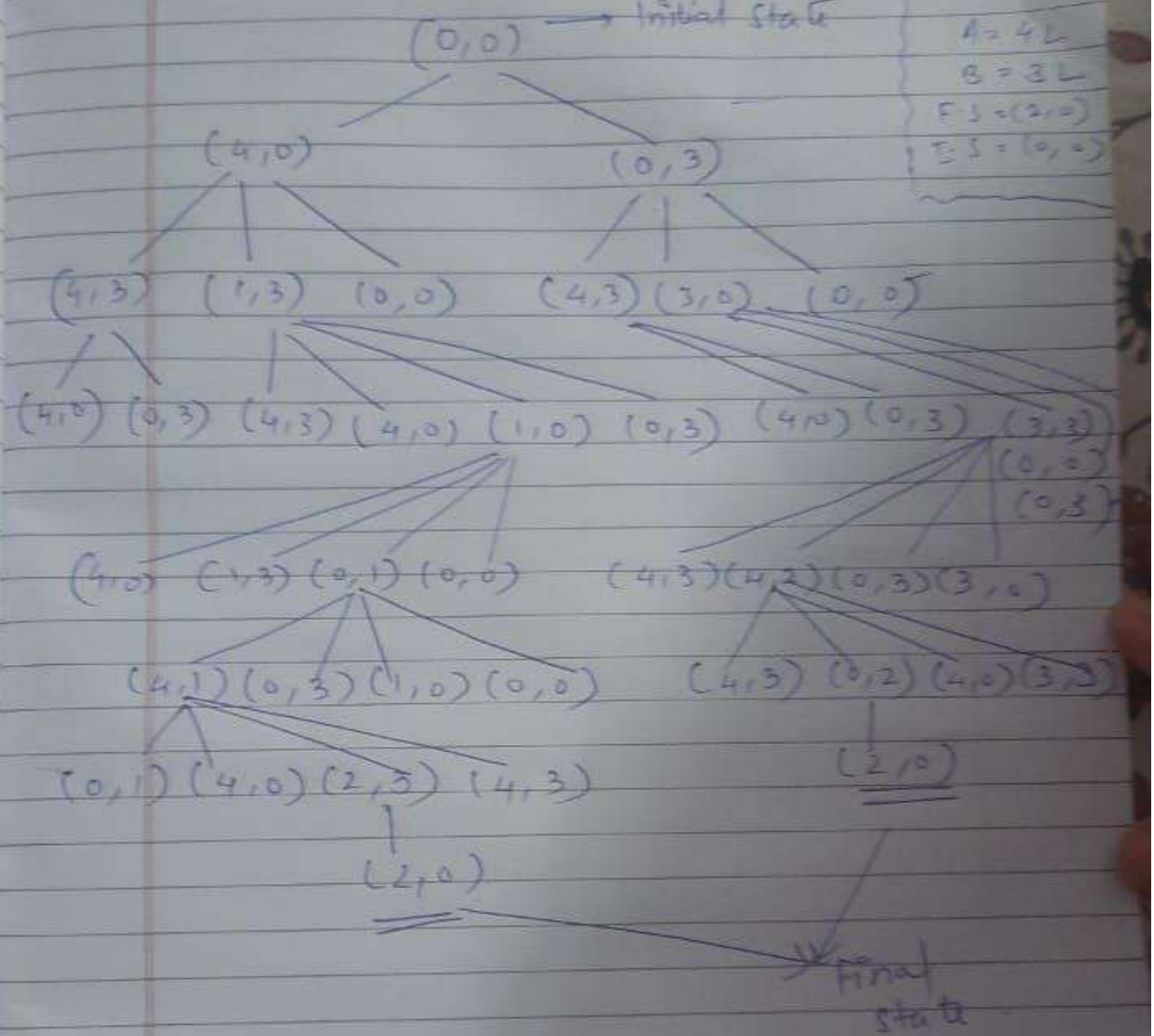
→ Water Jug problem:-

In this problem, we have two jugs. One jug with capacity of 4-gallon (L) & other with 3-gallon (L). We have to get 2-gallons of water in the jug.

PEAS for Water Jug Problem:-

| AGENT | DESCRIPTION |
|---|---|
| Performance Measure | • Successfully reach the goal of putting 2 gallons of water.<br>• No. of minimum steps to solve the problem |
| Environment | • One jug with capacity of 4 gallon.<br>• Other jug with capacity of 3 gallon. |
| Actuator | • The robotic arm to pour water. |
| Sensor | • Sensor to detect water level. |

## Search space Representation :-




All Empty Pots
A = 4L
B = 3L
F.S = (2,0)
I.S = (0,0)

Q Write PEAS & Search space search for Tic-Tac-Toe

## Tic-Tac-Toe problem:-

It's a Two player game where one makes a 'X' mark & other makes a 'O' mark played on a 3×3 grid. Player with same marks (3) in a complete row/column/diagonal wins the game.

## PEAS for Tic-Tac-Toe:-

| AGENT | DESCRIPTION |
|---|---|
| Performance measure | • Successfully reach the final goal of marking X/O in a complete row/column/diagonal<br>• No. of minimum steps to win.<br>• |
| Environment | • 3×3 board.<br>• One opponent marking X.<br>• Other opponent marking 7. |
| Actuator | • Robotic arm to put X/O mark of both the players. |
| Sensor | • Sensor to detect who has win the game. |

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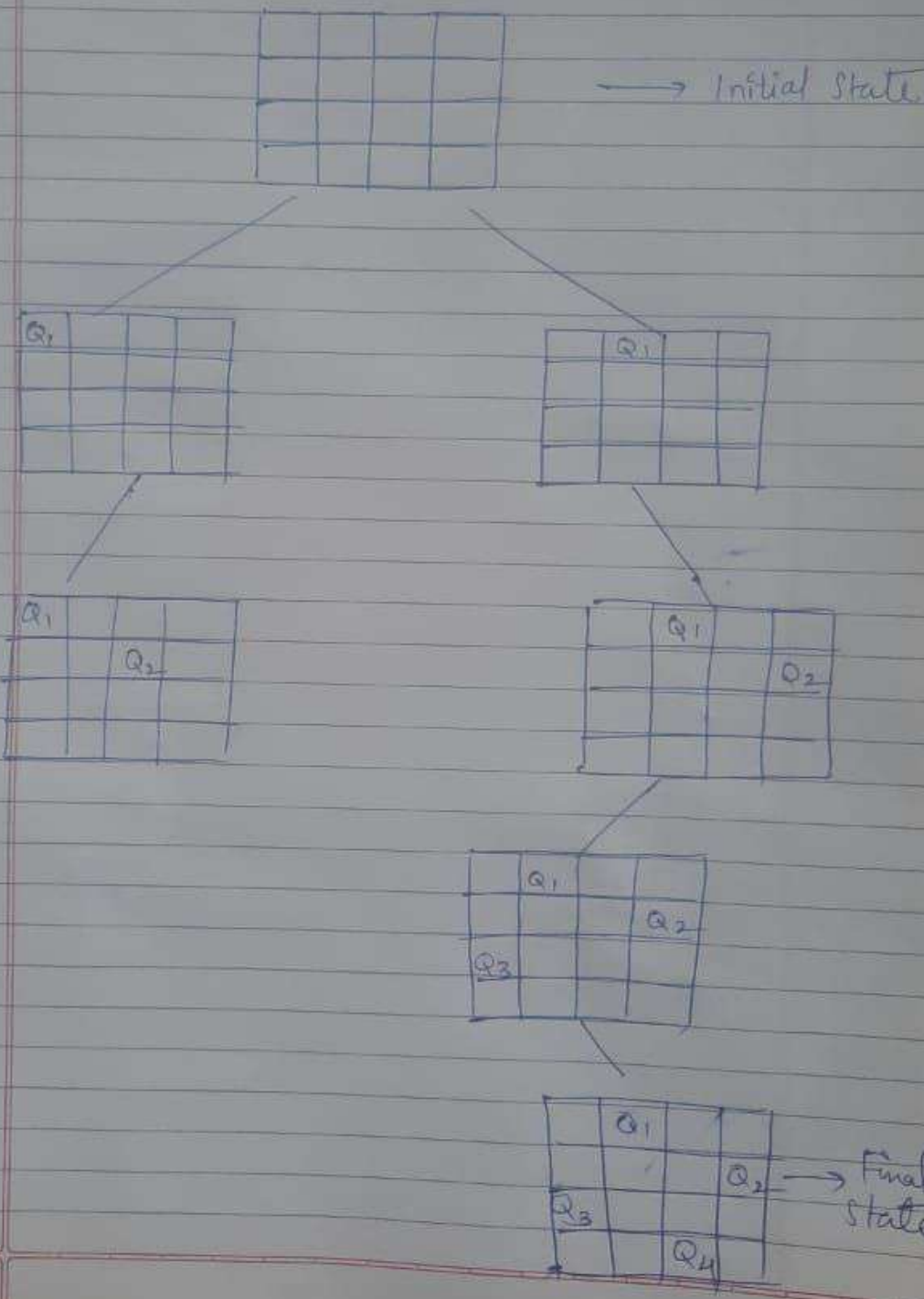
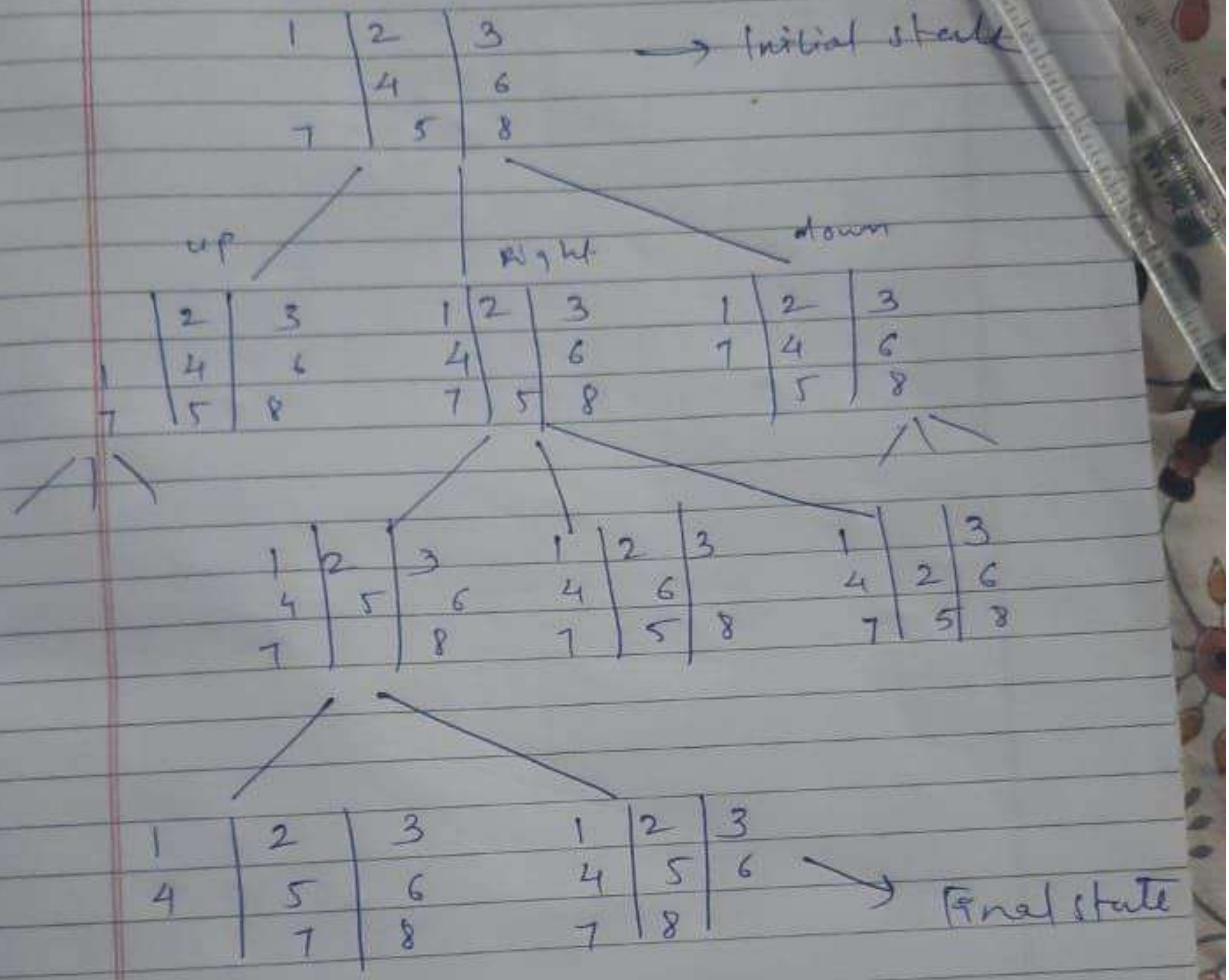
## Search Space Representation :-



Search space



Q Write Peas & search space for 8-Puzzle.

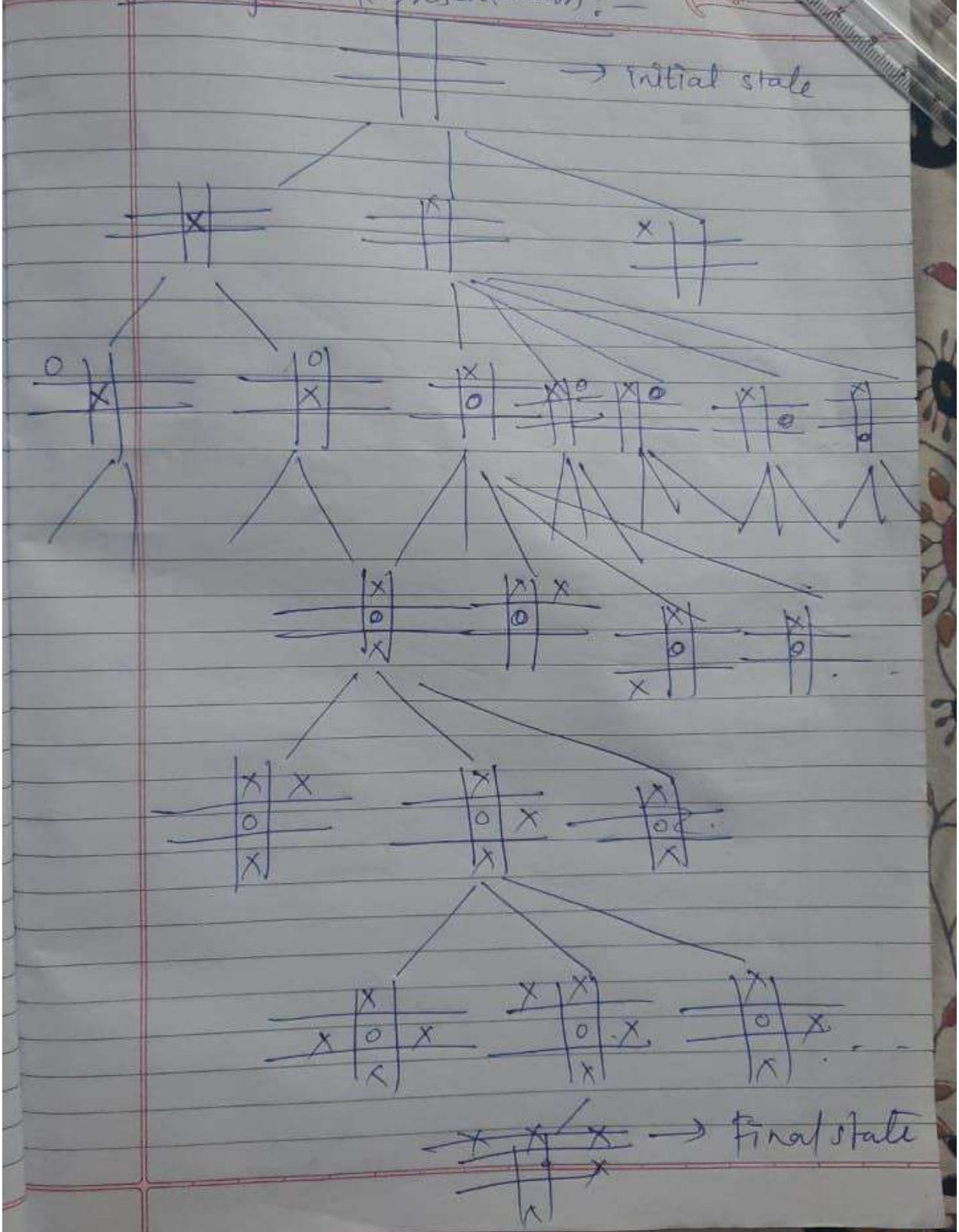
## 8 puzzle problem :-

The game is played on 3×3 grid where we have to reach the goal state by rearranging the tiles in order by moving the blank tiles up, down, left & right in minimum number of moves.

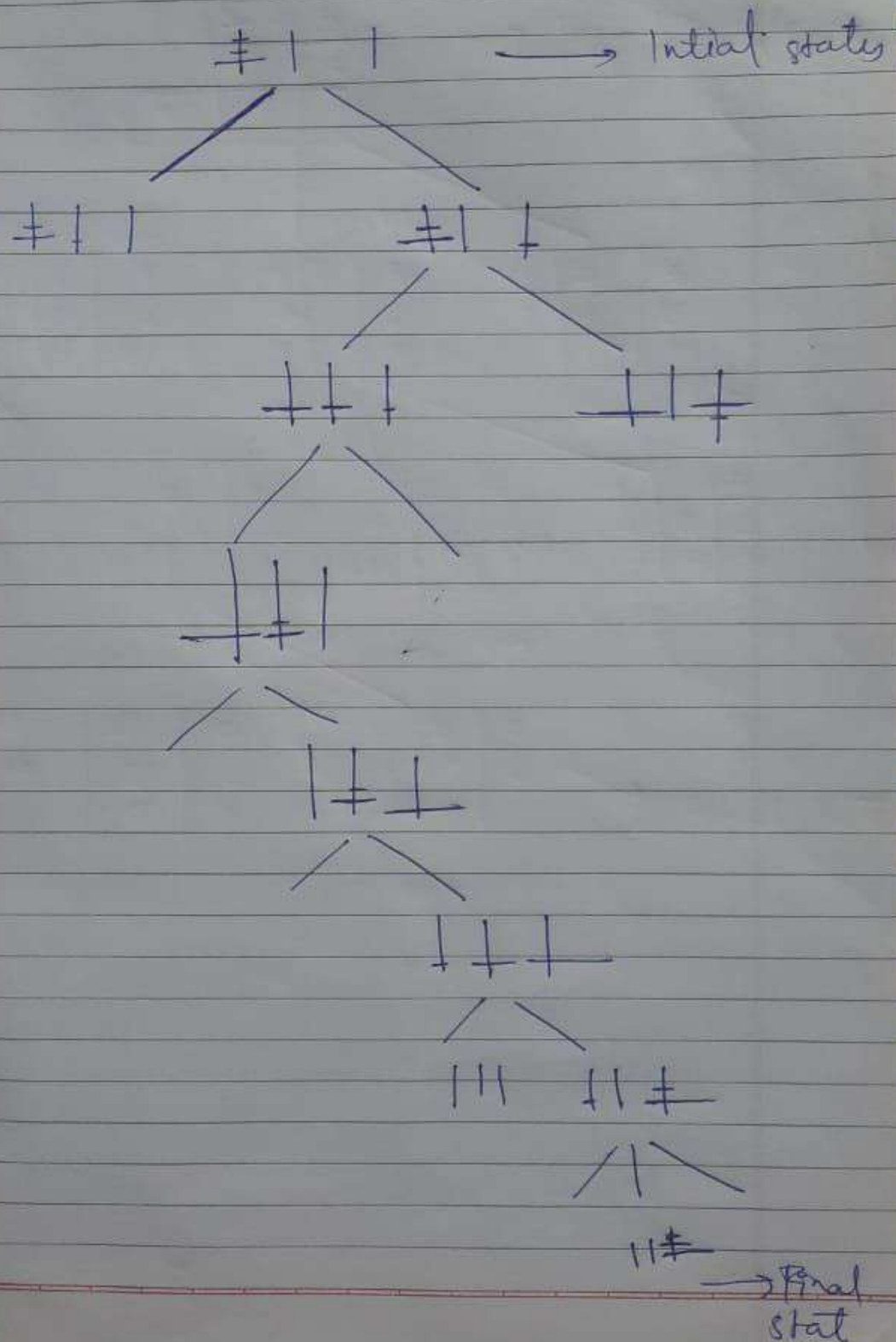
## Peas for 8-Puzzle problem :-

| AGENT | DESCRIPTION |
|---|---|
| Performance Measure | • Successfully reach the final goal of arranging tiles in order.<br>• Minimum moves to reach the goal state. |
| Environment | • 3×3 grid<br>• Numbered tiles from 1 to 8 & a blank tile. |
| Acutator | • Robotic arm to move the blank tile up, down, left, right. |
| Sensor | • Sensor to detect the order of tiles. |

Search space Representations :-



## Search space Representation :-



Q Write Peas & search space for Tower of Hanoi for 3 disk.

## Tower of Hanoi:-

In tower of Hanoi we have 3 rods and 3 disks. The disks are of different sizes. A disk can be only moved if there is no other disk on it. In this problem we have to move all the disk from 1st rod to the 3rd rod with minimum number of moves.

## Peas for Tower of Hanoi:-

| AGENT | DESCRIPTION |
|---|---|
| Performance Measure | • To successfully reach the final goal by arranging the disk from 1st rod to the 3rd rod.<br>• Minimum no. of moves to reach the goal state |
| Environment | • Disk can be moved only if no disk is on top of it.<br>• 3-rods<br>• 3 disk of different sizes |
| Acutator | • A robotic arm to move the disk from one rod to another. |
| Sensor | • Sensor to detect the arrangement of disk on rods. |