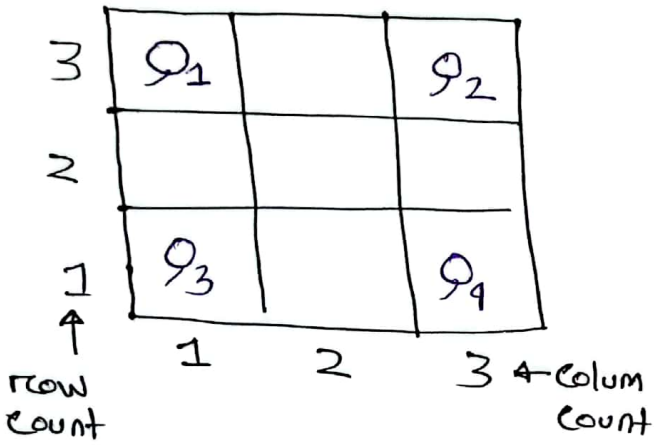
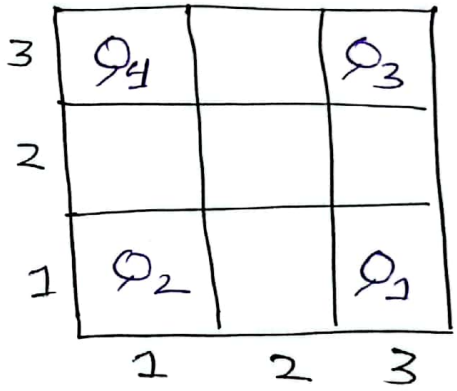
Detail explanation of the solution :-

- As defined the Problem four Knight placed at 3x3 chess board.

Initial places:



Goal places:



Constraint of the Problem is: (i) Each Knight is move as per Knight move (L shape). (ii) Knight can only move any place which is empty.

Strategy:

A Knight can move two column and one row or move two row and one column.

So Predicates 'diff_by_two' and 'diff_by_one' is used to measure difference between two position column or row and one position column or row position.

Also two action is used to move a knight as per knight moves.

Domain.pddl :

#Predicates:

- at → represent a knight position as col and row
- diff_by_one → indicates two row or column difference is 1 or not.
- diff_by_two → indicates two row or column difference is 2 or not.
- empty ⟶ at a position, that is empty or not.

action :

- move_knight_2col_1row ⟶ the action is applicable when knight at from_col and from_row position, to_col and to_row position is empty also from from_col to to_col difference is two and from_row to to_row difference is one.

  Then move the knight to to_position, and makes from_position empty.

- move_knight_2row_1col → the action is applicable when knight at from_col and from_row position, to_cal and to_row position is empty also from. from_row to to_row difference is two and from from_col to to_col difference is one.

  Then move the knight to to_position, and makes from_position empty.

Problem.pddl:

#object: As 3x3 so nine position three column and three row is defined as pos1, pos2, pos3
- Also four knight is defined.

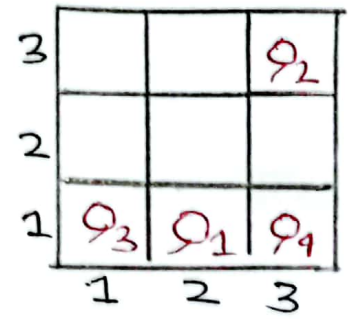
#init: First set up knight initial position.
- Positions which is not contains knight making them empty.
- diff_by_one indicates which has difference one
- diff_by_two indicates which has difference two.

#goal: The places of knights which is desired is defined here

Plan:

After Moving

1



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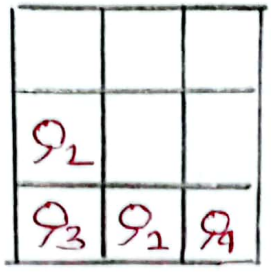

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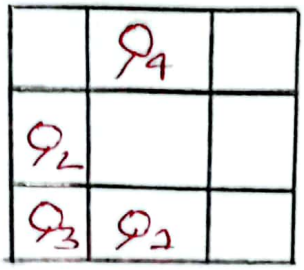

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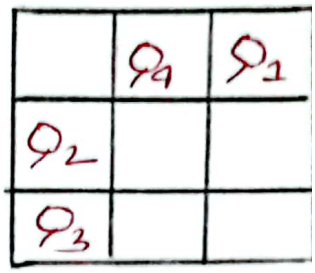

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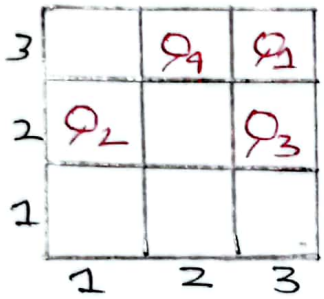

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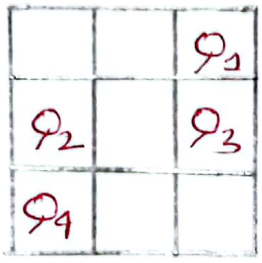

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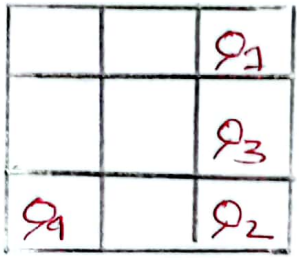

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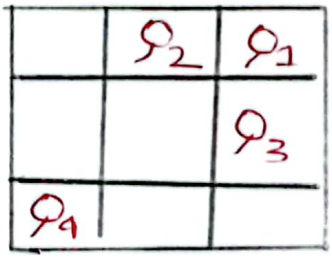

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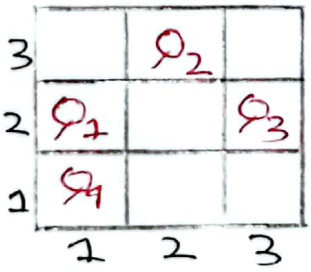

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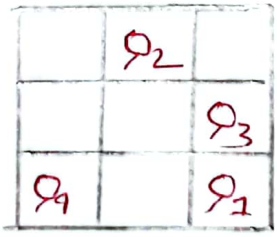

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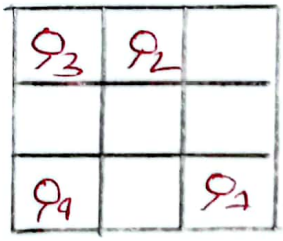

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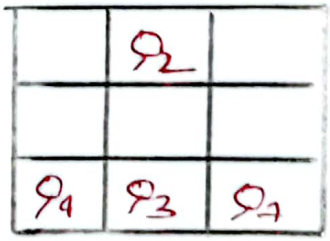

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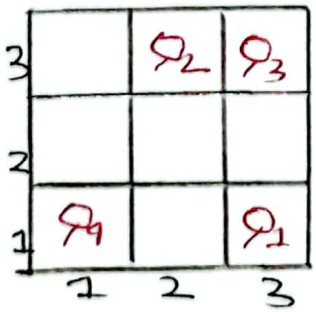

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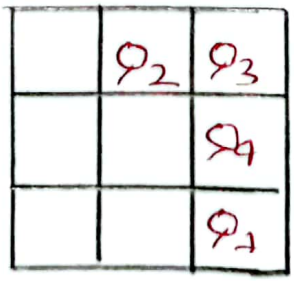

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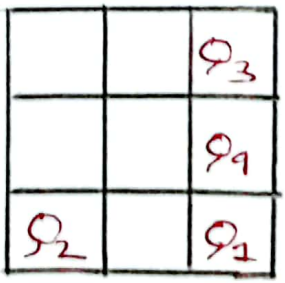

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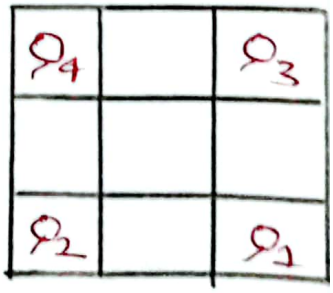

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Goal Position