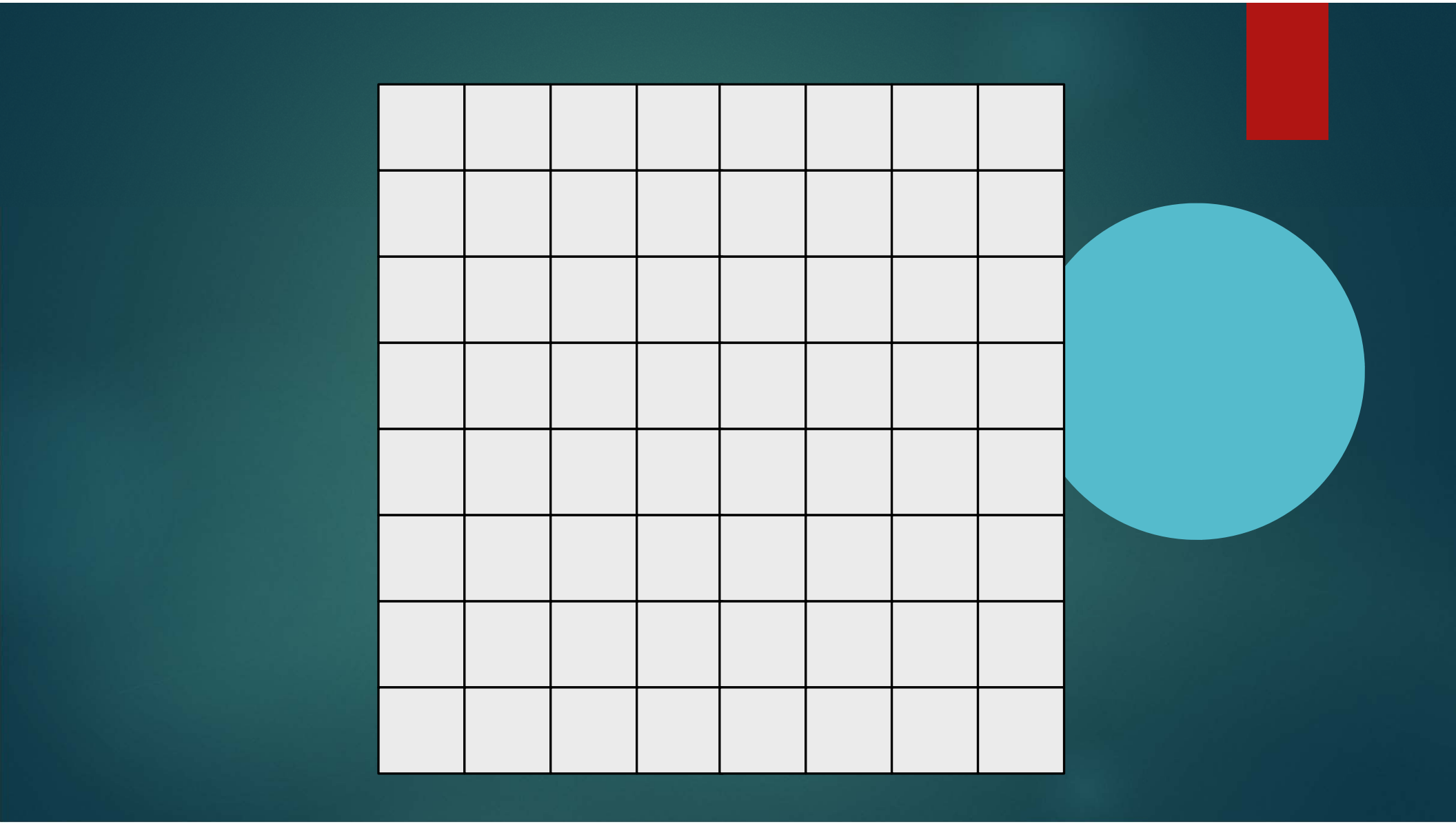
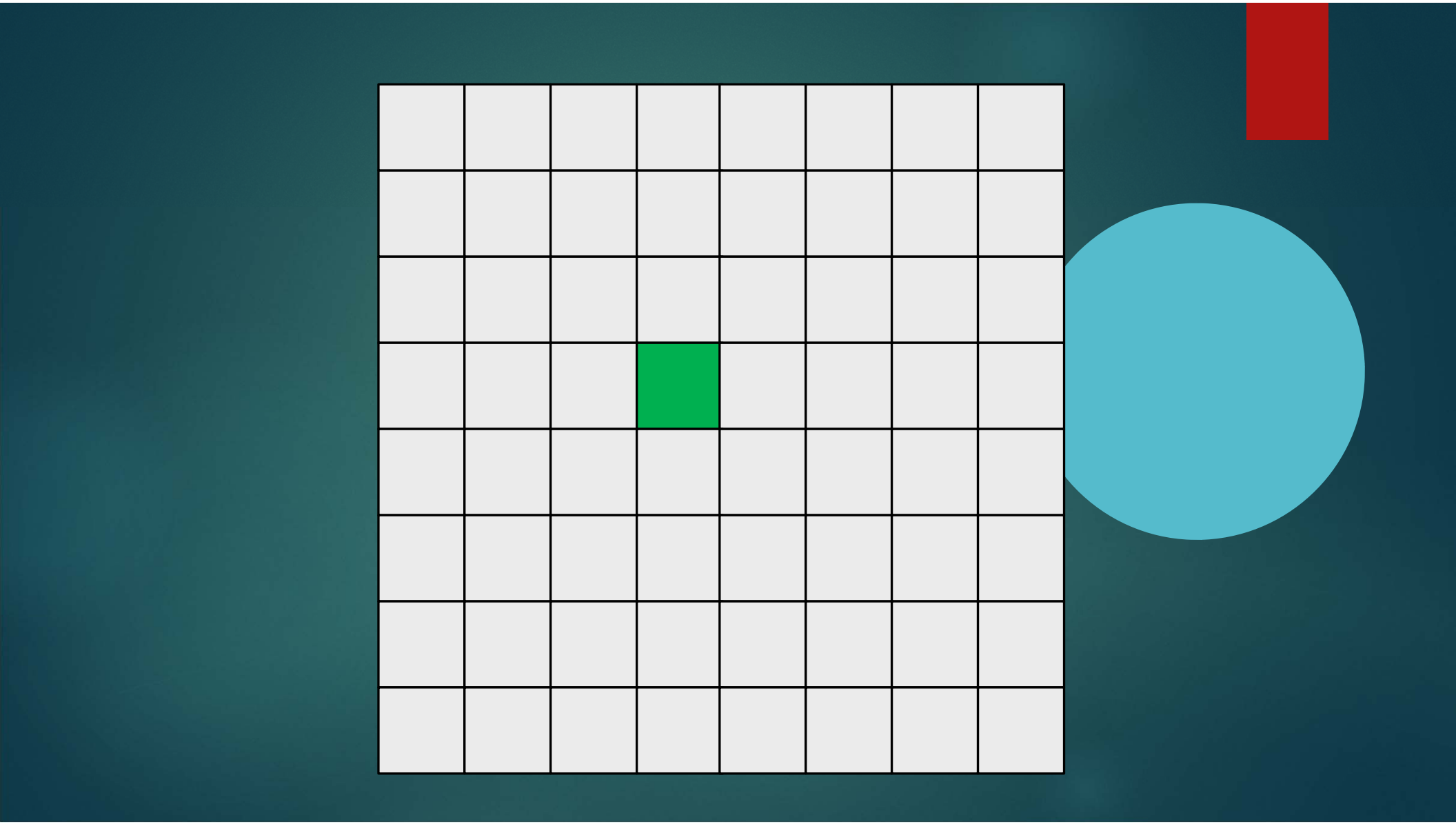
KNIGHT'S TOUR PROBLEM

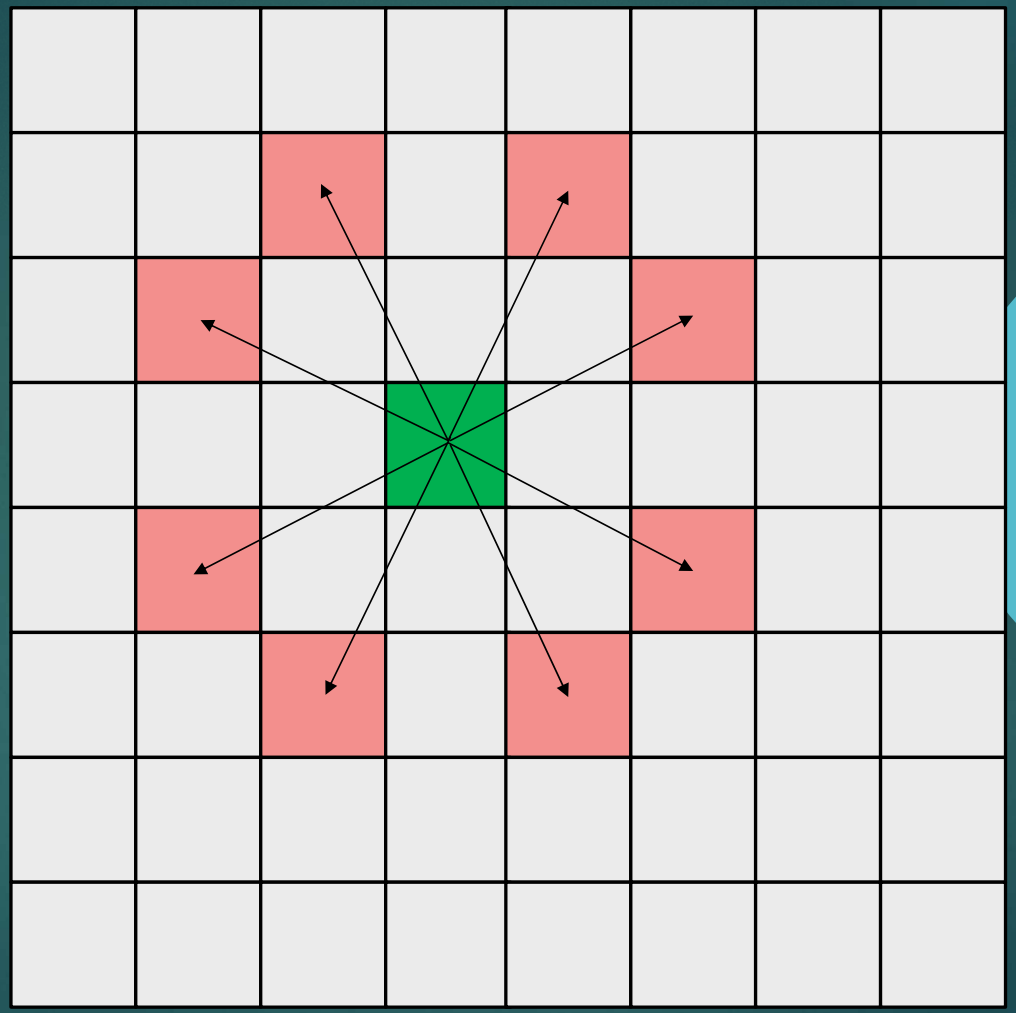
BACKTRACKING

Knight’s tour problem

- A sequence of moves of a knight on a chessboard such that the knight visits every square **EXACTLY** once
- Closed tour: when the knight end point is the same as the starting point
- The knight's tour problem is an instance of the more general Hamiltonian-path problem
- Closed knight tour ~ hamiltonian-cycle problem !!!
- Solutions: brute-force approach + backtracking





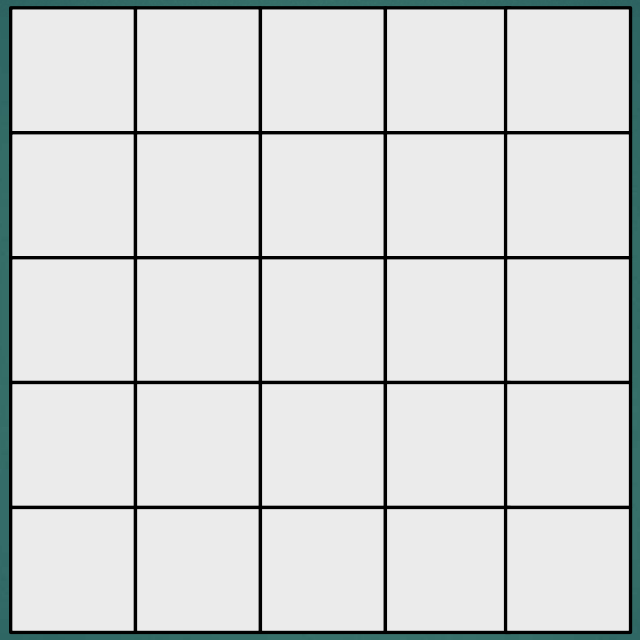


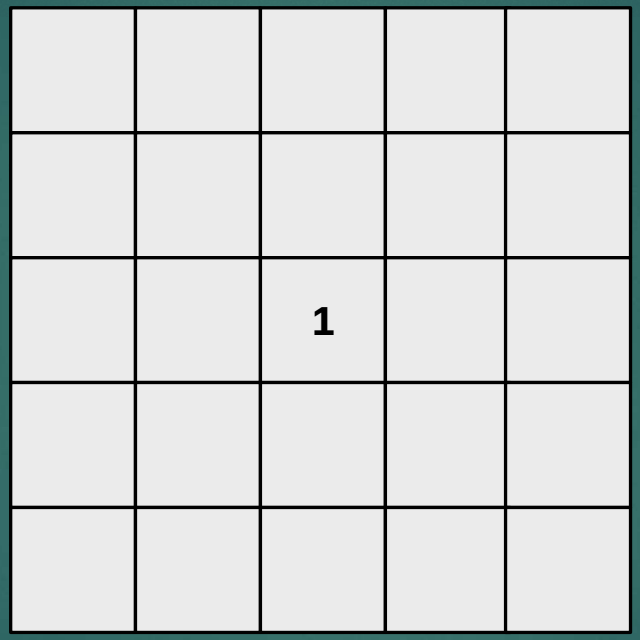
Schwenk theorem

- For an **m** x **n** chessboard the closed knight tour problem is always feasible, unless:
  - **m** and **n** are both odds
  - **m** = 1,2 or 4
  - **m** = 3 and **n** = 4,6 or 8

Backtracking

- Start with an empty solution matrix / **2D** array
- When adding a new item → we check whether adding the current item violates the problem constraints or not
- **Yes**: we backtrack
- **No**: we add the item to the solution set and go to the next item
- If we have considerd all the items we are ready !!!

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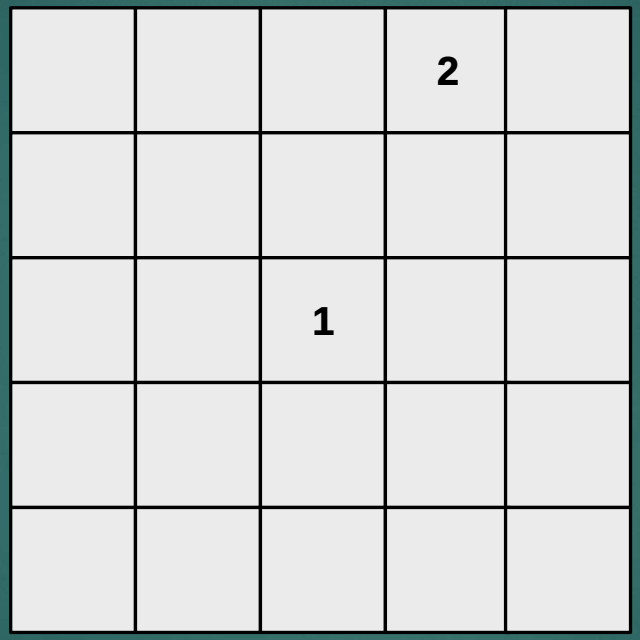
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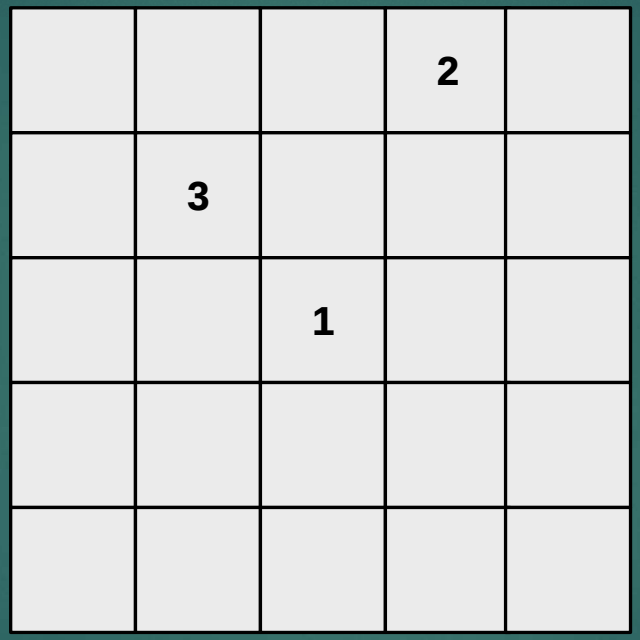
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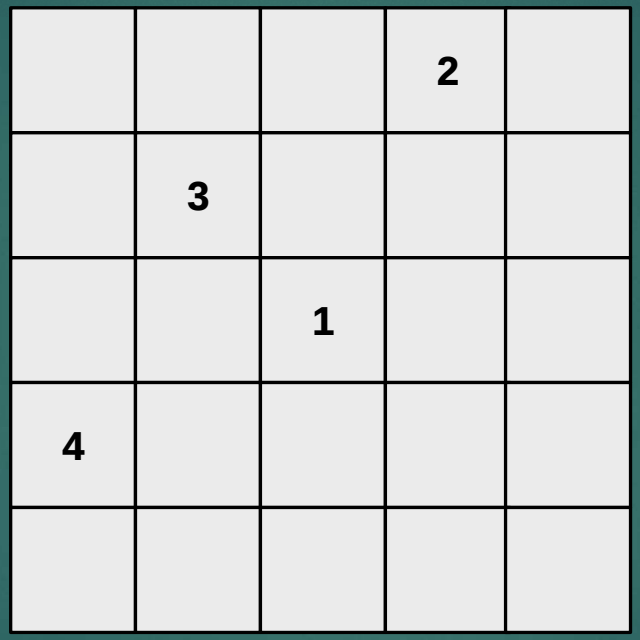
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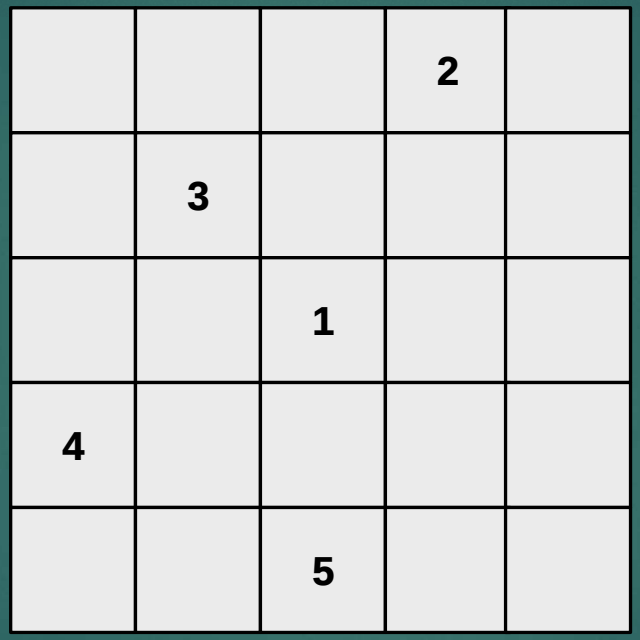
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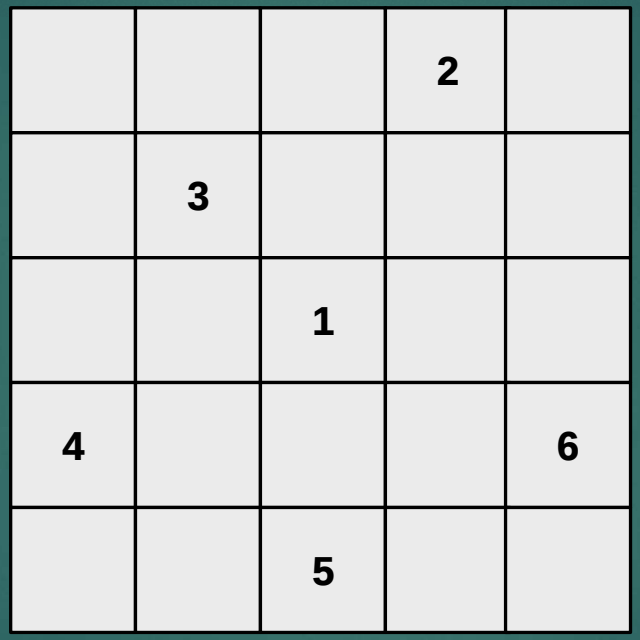
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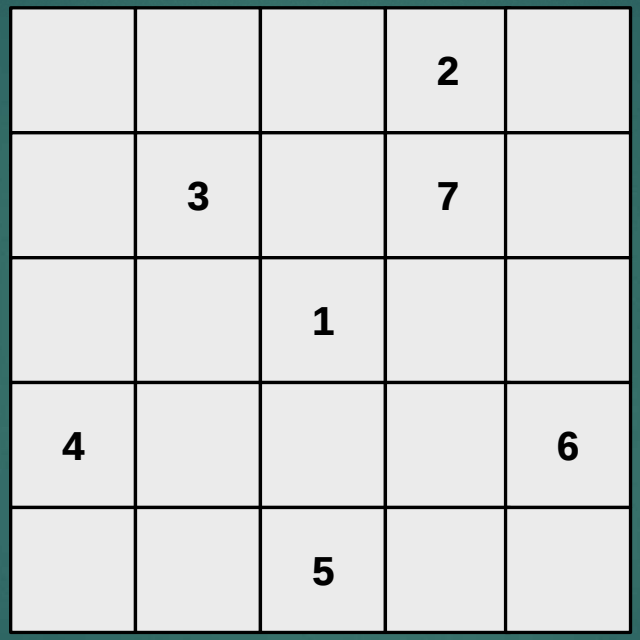
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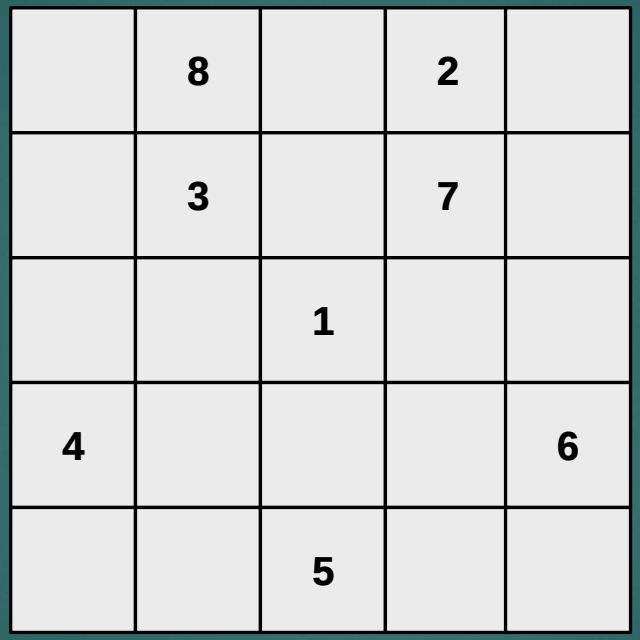
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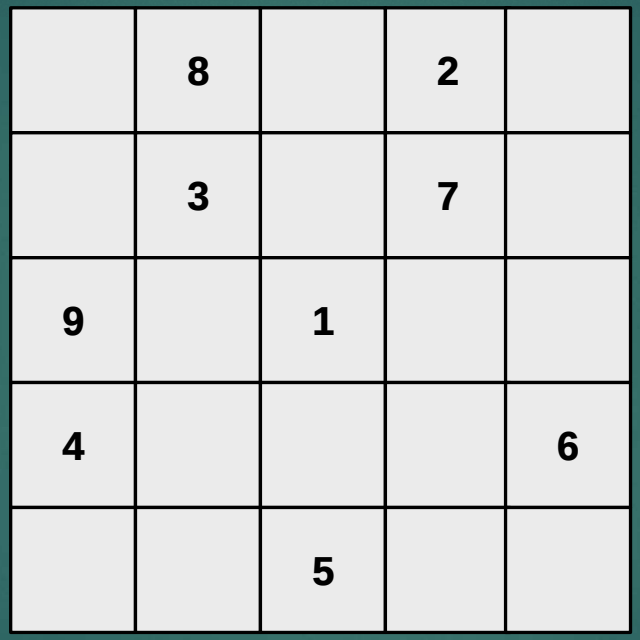
8
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9		1		
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	10	5		

	8		2	
	3		7	
9		1		
4			11	6
	10	5		

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	3		7	12
9		1		
4			11	6
	10	5		

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	3		7	12
9		1		
4			11	6
	10	5		

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