# N - Queens Proposal

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# INTRODUCTION

The **N-Queens** problem can be defined as follows: Place N queens on an $n$ by $n$ chessboard, one queen on each square, in which there exists at most one queen on the same row, column and diagonal.

# PROBLEM STATMENT

Given an $n \times n$ chessboard, the goal is to place $n$ queens on the board in such a way that no two queens threaten each other.

**Constraints:**

1. Each row must contain exactly one queen.
2. Each column must contain exactly one queen.
3. No two queens can share the same diagonal.

# PROBLEM FORMULATION

**- Initial Point:**

- No queens on the board.

**- Successor Function:**

- Add a queen to any empty square that is not attacked.

**- Goal Test:**

- 8 queens are on the board, none attached.

**- Path Cost :**

- Each step costs 1, so the path cost is the number of steps in the path.

## OBJECTIVE

Find a placement of queens on the board that satisfies all constraints.

## CONTRIBUTION

- **Algorithm Design:** develop efficient algorithms to solve the N-Queens problem. This includes both exact algorithms, such as backtracking and constraint propagation techniques.
- **Constraint Satisfaction:** explore the problem from the perspective of constraint satisfaction, formulating it as a Constraint Satisfaction Problem (CSP), we will devise methods to efficiently find solutions that satisfy all constraints.

## AI ALGORITHMS

- DFS

# PEAS

**- Performance Measure (P):**

- 8 queens are on the board, none attacked.

**- Environment (E):**

- The environment is the $n \times n$ chessboard where queens are placed on each chessboard square.

**- Actuators (A):**

- The actuators are placing queens on the board. The actions involve choosing a row for a queen in each column.

**- Sensors (S):**

- The sensors are queens & the board to detect the current placement of queens and the presence of any conflicts on the chessboard.

# ODESA

- **Observability (O):**

  - The N-Queens problem is **fully observable**.

- **Deterministic (D):**
  - The N-Queens problem is **deterministic**.

- **Episode (E):**

  - The N-Queens problem is explored **sequentially**

- **Static (S) :**

  - The N-Queens problem is **static**.

- **Agent (A):**

  - The N-Queens problem is a **single-agent**

- **Discrete (D):**

  - The N-Queens problem is a **Discrete**

## TYPE OF AGENT PROGRAM

- **Goal-based agent:**

Comparing percepts with previous actions (history of percepts)
What would it be if I did action A ? (placing a queen in a certain square)

## CONCLUSION

In summary, the **n-queens** problem offers a captivating puzzle within AI and computer science. In this proposal, we've pointed out its importance, problem, and constraints, objective discussing its PEAS, ODESA

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# Thank you.

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