**A Brief Solution to the 4-Queen’s Problem**

The 4-queen’s problem is a variation to an already existing N-Queens problem and is a classic puzzle in the fields of Computer Science and Mathematics.

Here, the goal is to place N-queens in a chessboard such a way that no two queens attack each other.

For our 4-queen’s problem, here, N=4, so we have a 4x4 chessboard and have to position 4 queens such that:

* No two queens are in the same **row**.
* No two queens are in the same **column**.
* No two queens are on the same **diagonal**.

SOLUTION

We use **Backtracking** (different approach) which is a recursive algorithm that helps in exploring all possible arrangements of queens and backtracks whenever a conflict is found.

Steps of the Algorithm

1. Place the queen in the first row and the first column.
2. Move to the next row and attempt to place another queen in a column where it does not conflict with the previous queens.
3. If placing a queen result in an error (same row, column, diagonal), try the next column.
4. If none of the columns in a row are safe then backtrack to the previous row and move the queen to a column.
5. Repeat all the above process until all the 4 queens are placed successfully.

Here are the possible arrangements-

|  |  |  |  |
| --- | --- | --- | --- |
|  | Q |  |  |
|  |  |  | Q |
| Q |  |  |  |
|  |  | Q |  |

1.

2.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Q |  |
| Q |  |  |  |
|  |  |  | Q |
|  | Q |  |  |

Some of the applications of the 4-Queen’s Problem or the N-Queen’s Problem are-

1. Robotics
2. Constraint Satisfying Problems
3. Parallel computing