Task 04

Explanation of Code:

This program solves the N-Queens Problem using backtracking.

Printing the Chessboard:

This function displays the chessboard, where indicates 1 for queen and 0 for an empty space.

Checking If a Queen Placement is Valid:

- Before placing a queen at a specific position `(rows, cols)`, we verify:
- **Column Check:** No queen is present in the same column above.
- **Upper Right Diagonal Check:** No queen is present in the upper right diagonal.
- **Upper Left Diagonal Check:** No queen is present in the upper left diagonal.
- If none of these conditions are satisfied, the position is considered **valid**.

Recursive Backtracking Function:

- This function attempts to place queen one row at a time through recursion.
- If all queens are successfully placed (`rows >= N`), it returns `True`, indicating a solution has been found.
- For each row, it tests every column (`i` from `0` to `N-1`):
  - If placing a queen at `(rows, i)` is **valid**, place it (`chess[rows][i] = 1`).
  - Recursively try to place queens in the next row.
  - If a solution is found, return True .
  - If no solution is found, **backtrack** by removing the queen (`chess[rows][i] = 0`).

Main Function to Solve the N-Queens Problem:

- Initializes an **N×N chessboard** filled with `0`s.
- Calls the recursive function to find a solution.
- If a solution is found, it prints the chessboard.
- If no solution exists, it prints "Solution not found!

Output:

```
N Queen Problem :
Enter the number of queens : 12
1 0 0 0 0 0 0 0 0 0 0 0
0 0 1 0 0 0 0 0 0 0 0 0
0 0 0 0 1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1 0 0 0 0
0 0 0 0 0 0 0 0 0 1 0 0
0 0 0 0 0 0 0 0 0 0 0 1
0 0 0 0 0 1 0 0 0 0 0 0
0 1 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 1 0 0 0 0 0
0 0 0 0 0 0 0 0 1 0 0 0
0 0 0 1 0 0 0 0 0 0 0 0
PS C:\Users\Muhammad Haseeb> & "C:/Users/Muhammad Haseeb/AppData/Local/Programs/Python/Python312/python.exe" "d:/University/Semester 4/Programming of AI lab/task 4/n_queen_problem.py"

N Queen Problem :
Enter the number of queens : 4
0 1 0 0
0 0 0 1
1 0 0 0
0 0 1 0
PS C:\Users\Muhammad Haseeb>
```