Artificial Intelligence Lab

Assignment 6
Admission no:- l21ma010

NQueens problem

Q1) 1. Write a Program to Implement N-Queens Problem using Python.
Statement: The N-Queens problem is a classic problem in computer science and combinatorial optimization. The problem is defined as follows N X N chessboard, place
N queens on the board such that no two queens threated each other. In other words, no two queens should share the same row,column, or diagonal.

```
        return True

    for col in range(n):
        if issafe(arr, x, col, n):
            arr[x][col] = 1

            if nqueen(arr, x + 1, n):
                return True

            arr[x][col] = 0  # Backtrack if placing queen at (x, col)
                doesn't lead to a solution

    return False

if __name__ == "__main__":
    n = int(input())
    arr = [[0 for _ in range(n)] for _ in range(n)]

    if nqueen(arr, 0, n):
        for i in range(n):
            for j in range(n):
                print(arr[i][j], end=" ")
            print()
```

main.py

Save Run

```python
def issafe(arr, x, y, n):
    # Check if there is a queen in the same column
    for row in range(x):
        if arr[row][y] == 1:
            return False

    # Check upper left diagonal
    row, col = x, y
    while row >= 0 and col >= 0:
        if arr[row][col] == 1:
            return False
        row -= 1
        col -= 1

    # Check upper right diagonal
    row, col = x, y
    while row >= 0 and col < n:
        if arr[row][col] == 1:
            return False
        row -= 1
        col += 1

    return True

def nqueen(arr, x, n):
    if x >= n:
        return True
```

Output:

Output

Clear

```
4
0 1 0 0
0 0 0 1
1 0 0 0
0 0 1 0
>
```