

EX.NO:1

DATE:11/9/2024

Reg.no:220701057

8- QUEENS PROBLEM

AIM : To implement an 8-Queens problem using Python.

You are given an 8x8 board; find a way to place 8 queens such that no queen can attack any other

queen on the chessboard. A queen can only be attacked if it lies on the same row, same column,

or the same diagonal as any other queen. Print all the possible configurations.

To solve this problem, we will make use of the Backtracking algorithm. The backtracking algorithm, in general checks all possible configurations and test whether the required result is

obtained or not. For the given problem, we will explore all possible positions the queens can be

relatively placed at. The solution will be correct when the number of placed queens = 8.



CODE:

```
N = int(input("Enter the number of queens:"))
board = [[0] * N for _ in range(N)]

def is_safe(board, row, col):
    for i in range(col):
        if board[row][i] == 1:
            return False

    for i, j in zip(range(row, -1, -1), range(col, -1, -1)):
        if board[i][j] == 1:
            return False

    for i, j in zip(range(row, N, 1), range(col, -1, -1)):
        if board[i][j] == 1:
            return False

    return True

def solve_nqueens(board, col):
    if col >= N:
        return True

    for i in range(N):
        if is_safe(board, i, col):
            board[i][col] = 1

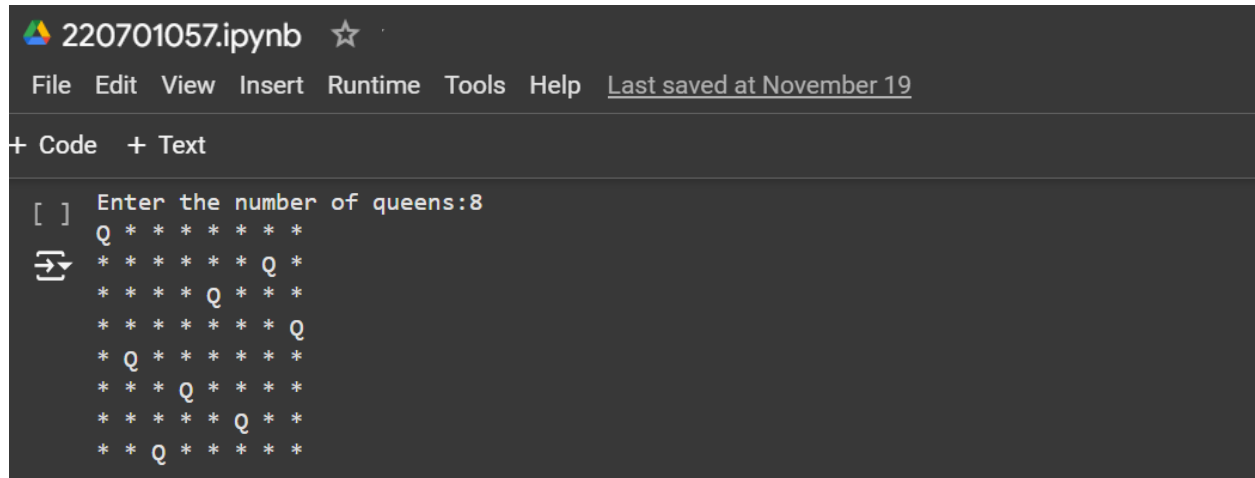
            if solve_nqueens(board, col + 1):
                return True

            board[i][col] = 0

    return False

if solve_nqueens(board, 0):
    for row in board:
        print(' '.join('Q' if x == 1 else '*' for x in row))
else:
    print("No solution exists")
```

RESULT:



The image shows a Jupyter Notebook interface with a dark theme. The top bar displays the file name '220701057.ipynb' and a star icon. Below the top bar is a menu bar with options: File, Edit, View, Insert, Runtime, Tools, Help, and a link 'Last saved at November 19'. The main area has tabs for '+ Code' and '+ Text'. The code cell contains the following text:

```
[ ] Enter the number of queens:8
Q * * * * *
* * * * * Q *
* * * * Q * *
* * * * * * Q
* Q * * * * *
* * * Q * * *
* * * * * Q *
* * Q * * * *
```

The output shows an 8x8 grid of asterisks with the letter 'Q' placed in each row at a unique column position, representing a solution to the 8-Queens problem. The positions of the queens are: Row 1, Column 1; Row 2, Column 8; Row 3, Column 6; Row 4, Column 8; Row 5, Column 2; Row 6, Column 4; Row 7, Column 7; Row 8, Column 3.