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CLass:- TE Computer

ERP :-09

Subject :-LP2(AI) (N Queens)

Code:-

```
# Function to check if two queens threaten each other or not
def isSafe(mat, r, c):
    # return false if two queens share the same column
    for i in range(r):
        if mat[i][c] == 'Q':
            return False

    # return false if two queens share the same `` diagonal
    (i, j) = (r, c)
    while i >= 0 and j >= 0:
        if mat[i][j] == 'Q':
            return False
        i = i - 1
        j = j - 1

    # return false if two queens share the same `/` diagonal4
    (i, j) = (r, c)
    while i >= 0 and j < len(mat):
        if mat[i][j] == 'Q':
            return False
        i = i - 1
        j = j + 1

    return True


def printSolution(mat):
    for r in mat:
        print(str(r).replace(',', '').replace('\'', ''))
    print()


def nQueen(mat, r):
    # if `N` queens are placed successfully, print the solution
    if r == len(mat):
        printSolution(mat)
        return

    # place queen at every square in the current row `r`
    # and recur for each valid movement
```

```
    for i in range(len(mat)):

        # if no two queens threaten each other
        if isSafe(mat, r, i):
            # place queen on the current square
            mat[r][i] = 'Q'

            # recur for the next row
            nQueen(mat, r + 1)

            # backtrack and remove the queen from the current square
            mat[r][i] = '–'


if __name__ == '__main__':
    # `N × N` chessboard
    N = int(input("Enter Number of Queen on N*N Chess Board :"))

    # `mat[][]` keeps track of the position of queens in
    # the current configuration
    mat = [['–' for x in range(N)] for y in range(N)]

    nQueen(mat, 0)
```

Output:-

Enter Number of Queen on N*N Chess Board :5

[Q – – – –]

[– – Q – –]

[– – – – Q]

[– Q – – –]

[– – – Q –]

[Q – – – –]

[– – – Q –]

[– Q – – –]

[– – – – Q]

[– – Q – –]

[– – – – Q]

[– – Q – –]

[Q – – – –]

[– – – Q –]

[– Q – – –]

Process finished with exit code 0

```
C:\Users\asus\PycharmProjects\AStar\Scripts\python.exe "C:/Users/asus/PycharmProjects/AStar/N Queen Problem.py"
Enter Number of Queen on N*N Chess Board :5
[Q - - - -]
[- - Q - -]
[- - - - Q]
[- Q - - -]
[- - - Q -]

[Q - - - -]
[- - - Q -]
[- Q - - -]
[- - - - Q]
[- - Q - -]

[- Q - - -]
[- - - Q -]
[Q - - - -]
[- - Q - -]
[- - - - Q]

[- Q - - -]
[- - - - Q]
[- - Q - -]
[Q - - - -]
[- - - Q -]

[- - Q - -]
[Q - - - -]
[- - - Q -]
[- Q - - -]
[- - - - Q]
```