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Assignment No 04

Title : N-Queens Problem

Code :

def nQueens(board, n,row, col):

for i in range(0, n):

# if utility function return true then queen can be placed else not

place = utilityFunc(board, row, col)

if place:

board[row][col] = 1

col += 1

if col == 4:

col = 0

row += 1

if row==4 :

return

else:

col += 1

if col == 4:

col = 0

row += 1

if row==4 :

return

nQueens(board, n, row, col)

def utilityFunc(board, row1, col1):

# if utility function return true then queen can be placed else not

# queen can be placed if there is no queen in same row, column and diagonal

can\_be\_placed = True

if 0 < row1 < (n - 1) and 0 < col1 < (n - 1):

if board[row1 - 1][col1 - 1] == 1:

# left-top diagonal

can\_be\_placed = False

elif board[row1 + 1][col1 + 1] == 1:

# right-top diagonal

can\_be\_placed = False

# check row

curr\_row = board[row1]

for i in curr\_row:

if i == 1:

can\_be\_placed = False

# check col

curr\_col = []

for k in range(0, n):

curr\_col.append(board[k][col1])

for j in curr\_col:

if j == 1:

can\_be\_placed = False

# check diagonal

# can\_be\_placed = check\_diagonal(board, row1, col1, can\_be\_placed)

return can\_be\_placed

def check\_diagonal(board, row2, col2, can\_be\_placed1):

if 0 < row2 < (n - 1) and 0 < col2 < (n - 1):

if board[row2 - 1][col2 - 1] == 1:

# left-top diagonal

can\_be\_placed1 = False

elif board[row2 + 1][col2 + 1] == 1:

# right-top diagonal

can\_be\_placed1 = False

return can\_be\_placed1

n = int(input("Enter number of queens - "))

if n == 1:

print("Trivial solution")

elif n == 2 or n == 3:

print("No solution")

else:

board = []

for i in range(0, n):

l = []

for j in range(0, n):

l.append(0)

board.append(l)

print(board)

nQueens(board, n,0, 0)

print(board)

Output :

C:\Users\Lenovo\AppData\Local\Programs\Python\Python39\python.exe D:/Aditya/PICT/TE/LP2/assign4/assignment4.py

Enter number of queens - 4

[[0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0]]

[[1, 0, 0, 0], [0, 0, 1, 0], [0, 1, 0, 0], [0, 0, 0, 1]]

Process finished with exit code 0

Implementation Screenshots :

