

Name :- Akash Mete

Class:- TE Computer

ERP :-52

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 `^ diagonal

(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("\n", ""))

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 x 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 :7

```

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

```

```

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

```

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

```
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 : 7
[Q - - - - -]
[- - Q - - -]
[- - - Q - -]
[- - - - Q]
[- Q - - - -]
[- - - Q - -]
[- - - - Q -]

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

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