

TASK:8

Implementation of **N-queen problem using backtracking algorithm** using prolog In the 4 Queens problem the object is to place 4 queens on a chessboard in such a way that no queens can capture a piece.

Aim: To Implement N-Queen's problem by using backtracking algorithm using python

Algorithm:

Step 1: k=queen and I is column number in which queen k is placed

Step 2: where x[] is a global array whose first k-1 values have been set

Step 3: Queen-place (k, i) returns true if a queen can be placed in the kth row and ith column otherwise return false

Step 4:ABS (r) returns the absolute value of r.

Step 5: for j<-1 to k-1 do if x[j]=1 or ABS(x[j]-1)= ABS (j-k) then return false

Step 6:for i<-1 to n do if Queen-place (k,i) then x[k] <- i if k=n
then write (x[i---n]) else N-Queen (k+1,n).

Program:

```
# Python3 program to solve N Queen
```

```
# Problem using backtracking
```

```
global N
```

```
N = 4
```

```
def printSolution(board):
```

```
    for i in range(N):
```

```
        for j in range(N):
```

```
            if board[i][j] == 1:
```

```
                print("Q",end=" ")
```

```
            else:
```

```
                print(".",end=" ")
```

```
        print()
```

```
def isSafe(board, row, col):
```

```

# Check this row on left side

for i in range(col):

    if board[row][i] == 1:

        return False

# Check upper diagonal on left side

for i, j in zip(range(row, -1, -1),
                range(col, -1, -1)):

    if board[i][j] == 1:

        return False

# Check lower diagonal on left side

for i, j in zip(range(row, N, 1),
                range(col, -1, -1)):

    if board[i][j] == 1:

        return False

return True

def solveNQUtil(board, col):

    # Base case: If all queens are placed

    # then return true

    if col >= N:

        return True

    # Consider this column and try placing

    # this queen in all rows one by one

    for i in range(N):

        if isSafe(board, i, col):

```

```

        # Place this queen in board[i][col]

        board[i][col] = 1

        if solveNQUtil(board, col + 1) == True:

            return True

        board[i][col] = 0

    return False

def solveNQ():

    board = [[0, 0, 0, 0],

              [0, 0, 0, 0],

              [0, 0, 0, 0],

              [0, 0, 0, 0]]

    if solveNQUtil(board, 0) == False:

        print("Solution does not exist")

        return False

    printSolution(board)

    return True

# Driver Code

if __name__ == '__main__':

    solveNQ()

```

Output:

```

0 0 1 0
1 0 0 0
0 0 0 1
0 1 0 0

```

Result:

Thus the Implementation of N-queen problem using backtracking algorithm using Python was successfully executed and output was verified.