TASK:8

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)

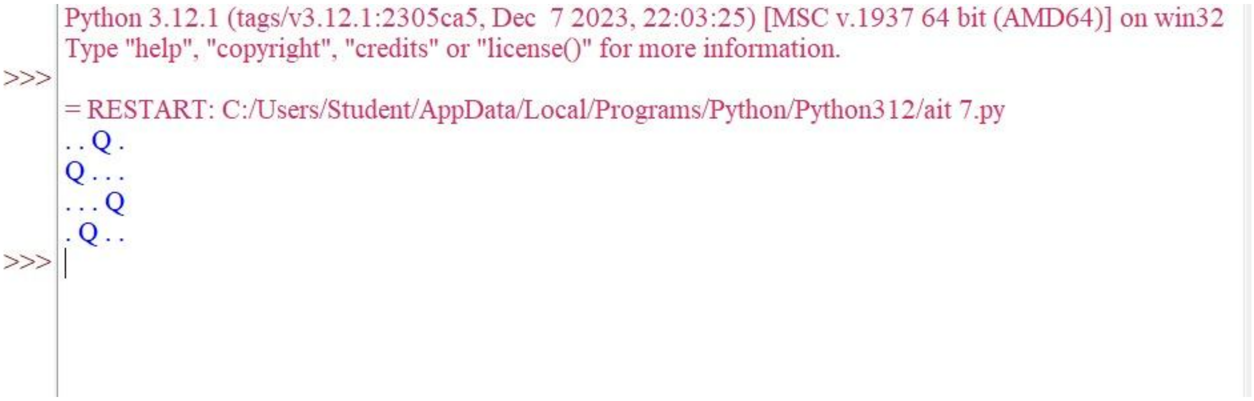
Program:

```
# 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:



```
    Python 3.12.1 (tags/v3.12.1:2305ca5, Dec  7 2023, 22:03:25) [MSC v.1937 64 bit (AMD64)] on win32
    Type "help", "copyright", "credits" or "license()" for more information.
>>>
    = RESTART: C:/Users/Student/AppData/Local/Programs/Python/Python312/ait 7.py
    . . Q .
    Q . . .
    . . . Q
    . Q . .
>>>
```

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