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

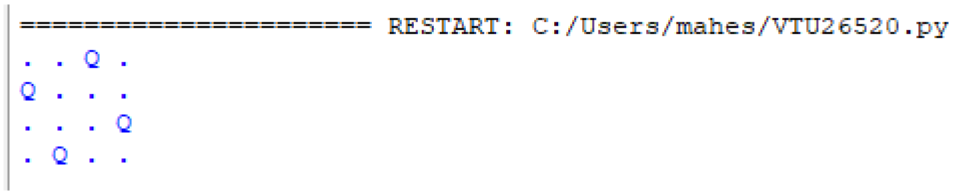
Step 6:for i<-1 to n do if Queen-place (k,i) then x[k] <- i if k=n then write

(x[i---n]) else N-Queen (k+1,n).

Program:

```
# Python3 program to solve N Queen Problem using backtracking
N = 4  # You can change N for different board sizes
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()
    print()  # Add extra line for readability
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
    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):
            board[i][col] = 1  # Place this queen
            if solveNQUtil(board, col + 1):
                return True
            board[i][col] = 0  # Backtrack if placing queen doesn't lead to a solution
    return False
def solveNQ():
    board = [[0 for _ in range(N)] for _ in range(N)]
    if not solveNQUtil(board, 0):
        print("Solution does not exist")
        return False
    printSolution(board)
    return True
# Driver Code
if __name__ == "__main__":
    solveNQ()
```

Output:



```
====================== RESTART: C:/Users/mahes/VTU26520.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.