AI Assignment - 4
Local Search Algorithm

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Function Description:

Solving the n - queens problem which are placed in a chessboard so that no queen is under attack from any other queen.

Data Structure : Arrays

Code :

```
import random

N = int(input())


def genBoard():
    return [random.randint(0, N-1) for i in range(N)]


def showBoard(board):
    for i in range(N):
        for j in range(N):
            if board[j] == i:
                print(1, end=' ')
            else:
                print(0, end=' ')
        print()


def attacks(board):
    x = 0
    for q in range(N):
        for c in range(N):
            if (board[q] == board[c] and q != c) or (abs(q-c) ==
abs(board[q]-board[c]) and q != c):
```

```
                x += 1
    return x


def hillClimb(board):
    for t in range(10):
        minh = 1e9
        nrc = []
        for c in range(N):
            orow = board[c]
            for nr in range(N):
                board[c] = nr
                h = attacks(board)
                if h < minh:
                    minh = h
                    nrc = [nr, c]
            board[c] = orow
        board[nrc[1]] = nrc[0]


board = genBoard()
print(board)
showBoard(board)
print(attacks(board))
hillClimb(board)
showBoard(board)
print(attacks(board))
```

Output :

```
8
[7, 7, 3, 6, 3, 3, 7, 2]
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
0 0 1 0 1 1 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 1 0 0 0 0
1 1 0 0 0 0 1 0
20
0 0 0 1 0 0 0 0
0 1 0 0 0 0 0 0
0 0 0 0 0 0 0 1
0 0 0 0 1 1 0 0
0 0 1 0 0 0 0 0
1 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 1 0
2
```