Name : Akash Kulkarni

Class : TE-10

Batch : K-10

Roll No : 33241

Assn : 2

Problem Statement :

Implement n-Queens problem using Hill-climbing / simulated annealing / A* algorithm

In [19]:
```
import random
from array import array
```

In [20]:
```
board = [[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,
neighbour = [[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,0,0,0,0],[0,0,0,0,
queens = [0,0,0,0,0,0,0,0]
```

In [21]:
```
def collision_count(column,row):
    coll = 0

    for j in range(8):
        if j == row:
            continue
        if board[column][j] == 1 :
            coll += 1

    while(column < 7 and row < 7):
        row += 1
        column +=1
        if board[column][row] == 1:
            coll += 1

    while(column > 0 and row > 0):
        row -= 1
        column -=1
        if board[column][row] == 1:
            coll += 1

    while(column > 0 and row < 7):
        row += 1
        column -=1
        if board[column][row] == 1:
            coll += 1

    while(column < 7 and row > 0):
        row -= 1
        column +=1
        if board[column][row] == 1:
            coll += 1

    return coll
```

In [22]:
```
def totalcoll():
    totcoll = 0
    for i in range(8):
        totcoll += collision_count(i,queens[i])
    return totcoll
```

In [23]:
```
for i in range(8):
    queens[i] = random.randrange(0,8)
    board[i][queens[i]] = 1

totalcollision = totalcoll()
```

In [24]:
```
for i in range(8):
    oldqueen = queens[i]
    for j in range(8):
        queens[i] = j
        neighbour[i][j] = totalcoll()
    queens[i] = oldqueen
```

In [30]:
```
min = neighbour[0][0]
minqueencol = 0
minqueenrow = 0
for i in range(8):
    for j in range(8):
        if(neighbour[i][j]<min):
            min = neighbour[i][j]
            minqueenrow = j
            minqueencol = i

    if min<totalcollision:
        totalcollision = min
        queens[minqueencol] = minqueenrow
    else:
        break

    if totalcollision == 0:
                break

print("Final N Queens Configuration : ")
for i in range(8):
    for j in range(8):
        print(str(board[i][j]) + " " , end ="")
    print()
```

```
Final N Queens Configuration :
1 0 0 0 0 0 0 0
0 1 0 0 0 0 0 0
0 0 1 0 0 0 0 0
0 0 1 0 0 0 0 0
0 0 0 0 1 0 0 0
0 0 0 1 0 0 0 0
0 0 1 0 0 0 0 0
0 0 0 0 1 0 0 0
```

In [ ]: