Course-Design And Analysis Of Algorithms

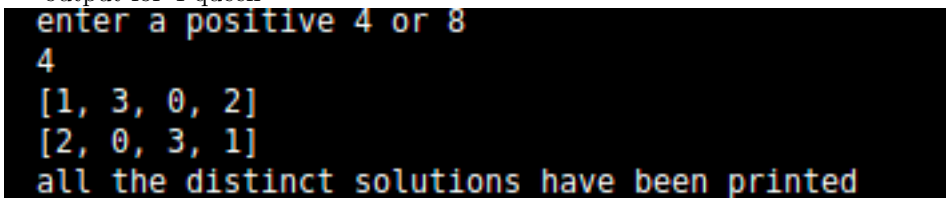
January 3, 2024

lab12 assignment NQUEEN Problem code in python

```python
#this attempts to place a queen in column k
def nqueens(x,k,n):
    flag=0
    global start
    for x[k] in range(start,n):
        if placeok(k,x):
            start=0
            flag=1
            if k==n-1:
                print(x)
            else:
                nqueens(x,k+1,n)
    if not flag:#not placed
       start=x[k-1]+1
       return


def placeok(k,x):
    for i in range(0,k):
        if(x[i]==x[k] or (abs(x[i]-x[k]) == abs(i-k))):
            return False
    return True

print("enter a positive 4 or 8")
n=int(input())
x=[0]*n

k=0
start=0

nqueens(x,k,n)
print("all the distinct solutions have been printed")
```

The n-queens problem is about finding how many different ways queens can be placed on a chessboard so that none attack each other.

output for 4 queen

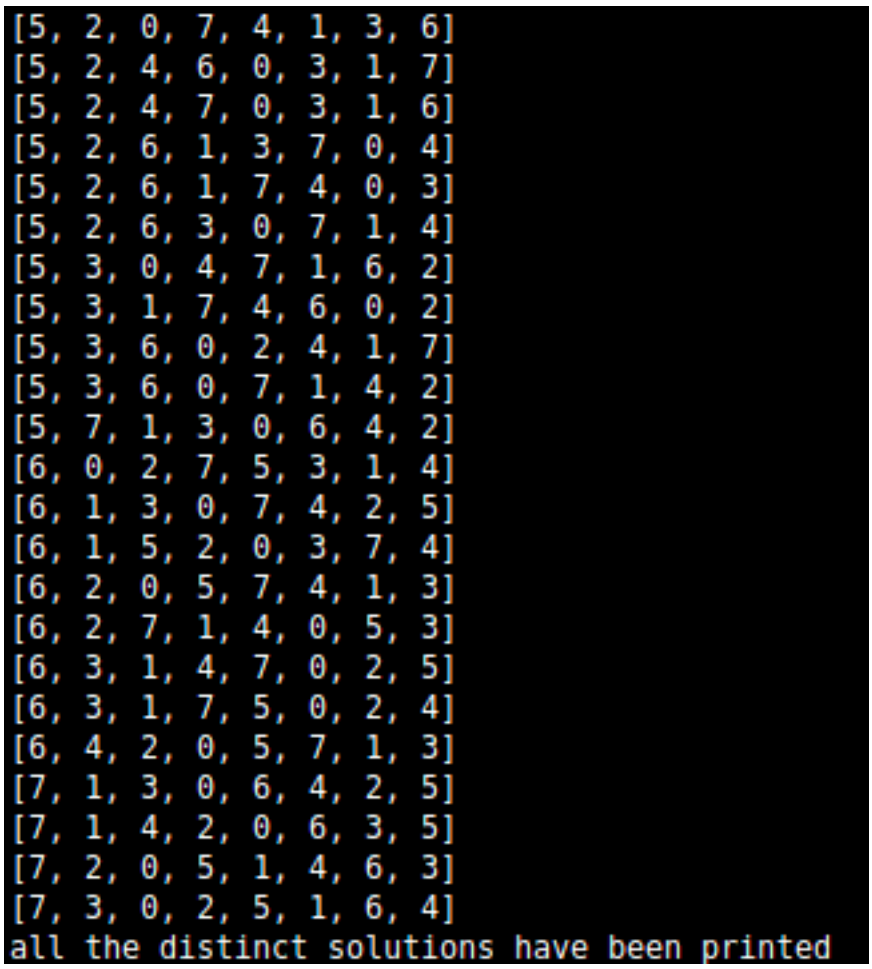


here;[1,3,0,2]
mean 1st row of the 0th column ,
3rd row of the 1st column,
and 0th row of the 2nd column
and 2nd row of the 3rd column ..since this is python indexing is from 0 and being a 4 queen problem means that the board is 4X4 with 4 queens needing to be placed on it safely.

for 8 queen
note that these are distinct not unique ,There are 12 unique solutions to this problem. Two solutions are not unique if you can "mirror" one solution to find the other, or if you can rotate the board to find the other solution, or a
combination of the two moves.–

```
enter a positive 4 or 8
8
[0, 4, 7, 5, 2, 6, 1, 3]
[0, 5, 7, 2, 6, 3, 1, 4]
[0, 6, 3, 5, 7, 1, 4, 2]
[0, 6, 4, 7, 1, 3, 5, 2]
[1, 3, 5, 7, 2, 0, 6, 4]
[1, 4, 6, 0, 2, 7, 5, 3]
[1, 4, 6, 3, 0, 7, 5, 2]
[1, 5, 0, 6, 3, 7, 2, 4]
[1, 5, 7, 2, 0, 3, 6, 4]
[1, 6, 2, 5, 7, 4, 0, 3]
[1, 6, 4, 7, 0, 3, 5, 2]
[1, 7, 5, 0, 2, 4, 6, 3]
[2, 0, 6, 4, 7, 1, 3, 5]
[2, 4, 1, 7, 0, 6, 3, 5]
[2, 4, 1, 7, 5, 3, 6, 0]
[2, 4, 6, 0, 3, 1, 7, 5]
[2, 4, 7, 3, 0, 6, 1, 5]
[2, 5, 1, 4, 7, 0, 6, 3]
[2, 5, 1, 6, 0, 3, 7, 4]
[2, 5, 1, 6, 4, 0, 7, 3]
[2, 5, 3, 0, 7, 4, 6, 1]
[2, 5, 3, 1, 7, 4, 6, 0]
[2, 5, 7, 0, 3, 6, 4, 1]
[2, 5, 7, 0, 4, 6, 1, 3]
[2, 5, 7, 1, 3, 0, 6, 4]
[2, 6, 1, 7, 4, 0, 3, 5]
[2, 6, 1, 7, 5, 3, 0, 4]
[2, 7, 3, 6, 0, 5, 1, 4]
[3, 0, 4, 7, 1, 6, 2, 5]
[3, 0, 4, 7, 5, 2, 6, 1]
[3, 1, 4, 7, 5, 0, 2, 6]
[3, 1, 6, 2, 5, 7, 0, 4]
[3, 1, 6, 2, 5, 7, 4, 0]
[3, 1, 6, 4, 0, 7, 5, 2]
[3, 1, 7, 4, 6, 0, 2, 5]
[3, 1, 7, 5, 0, 2, 4, 6]
```

```
[3, 5, 0, 4, 1, 7, 2, 6]
[3, 5, 7, 1, 6, 0, 2, 4]
[3, 5, 7, 2, 0, 6, 4, 1]
[3, 6, 0, 7, 4, 1, 5, 2]
[3, 6, 2, 7, 1, 4, 0, 5]
[3, 6, 4, 1, 5, 0, 2, 7]
[3, 6, 4, 2, 0, 5, 7, 1]
[3, 7, 0, 2, 5, 1, 6, 4]
[3, 7, 0, 4, 6, 1, 5, 2]
[3, 7, 4, 2, 0, 6, 1, 5]
[4, 0, 3, 5, 7, 1, 6, 2]
[4, 0, 7, 3, 1, 6, 2, 5]
[4, 0, 7, 5, 2, 6, 1, 3]
[4, 1, 3, 5, 7, 2, 0, 6]
[4, 1, 3, 6, 2, 7, 5, 0]
[4, 1, 5, 0, 6, 3, 7, 2]
[4, 1, 7, 0, 3, 6, 2, 5]
[4, 2, 0, 5, 7, 1, 3, 6]
[4, 2, 0, 6, 1, 7, 5, 3]
[4, 2, 7, 3, 6, 0, 5, 1]
[4, 6, 0, 2, 7, 5, 3, 1]
[4, 6, 0, 3, 1, 7, 5, 2]
[4, 6, 1, 3, 7, 0, 2, 5]
[4, 6, 1, 5, 2, 0, 3, 7]
[4, 6, 1, 5, 2, 0, 7, 3]
[4, 6, 3, 0, 2, 7, 5, 1]
[4, 7, 3, 0, 2, 5, 1, 6]
[4, 7, 3, 0, 6, 1, 5, 2]
[5, 0, 4, 1, 7, 2, 6, 3]
[5, 1, 6, 0, 2, 4, 7, 3]
[5, 1, 6, 0, 3, 7, 4, 2]
[5, 2, 0, 6, 4, 7, 1, 3]
[5, 2, 0, 7, 3, 1, 6, 4]
```



References

web:N -Queens Problem,Latin Squares,Author: Duncan Prince

Book:Design and Analysis of Algorithms V.V Muniswamy