Name - Yash Lakhtariya
Enrollment number - 21162101012
Branch - CBA Batch - 51
AAD Practical 14

Institute of Computer Technology
B. Tech Computer Science and Engineering

Sub: Algorithm Analysis and Design

Practical 14

Problem : Chessboard Challenge...!!! You're organizing a friendly chess competition among friends, and you've set up a NxN chessboard. The challenge is for each participant to place ‘N’ queens on the board in such a way that no queen can threaten another. As the organizer, you need to provide a program that can verify whether each participant's arrangement is valid, ensuring a fair and enjoyable competition for all.

Note: Display chessboard with n queens

Code :

```
import numpy as np

import YSL_io


def possible(r2, c2):

global q

for r1 in range(1, r2):

c1 = q[r1]

if (c1 == c2) or (abs(r1 - r2) == abs(c1 - c2)):

return False

return True
```

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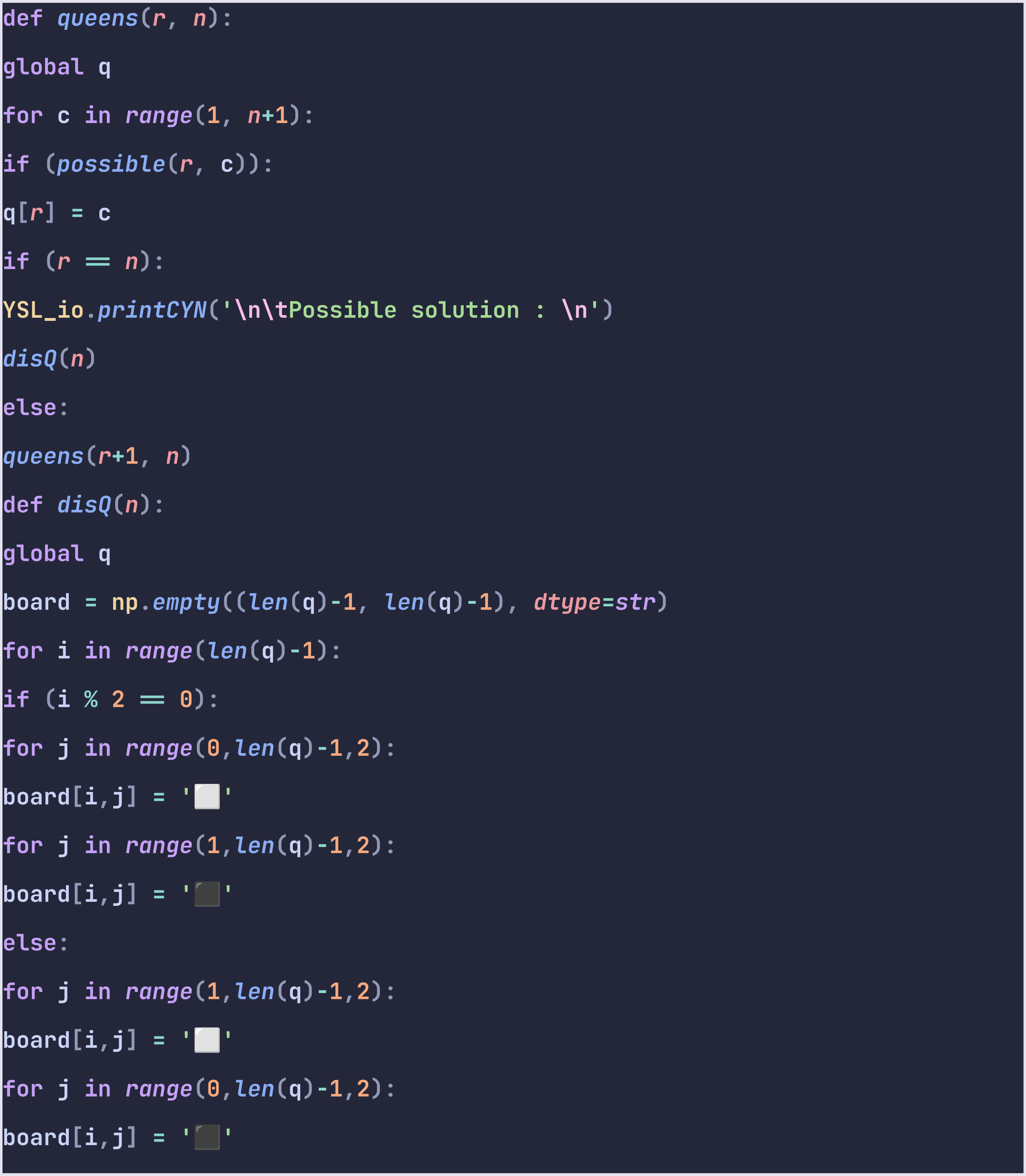

```
def queens(r, n):
global q
for c in range(1, n+1):
if (possible(r, c)):
q[r] = c
if (r == n):
YSL_io.printCYN('\n\tPossible solution : \n')
disQ(n)
else:
queens(r+1, n)
def disQ(n):
global q
board = np.empty((len(q)-1, len(q)-1), dtype=str)
for i in range(len(q)-1):
if (i % 2 == 0):
for j in range(0,len(q)-1,2):
board[i,j] = '⬜'
for j in range(1,len(q)-1,2):
board[i,j] = '⬛'
else:
for j in range(1,len(q)-1,2):
board[i,j] = '⬜'
for j in range(0,len(q)-1,2):
board[i,j] = '⬛'
```

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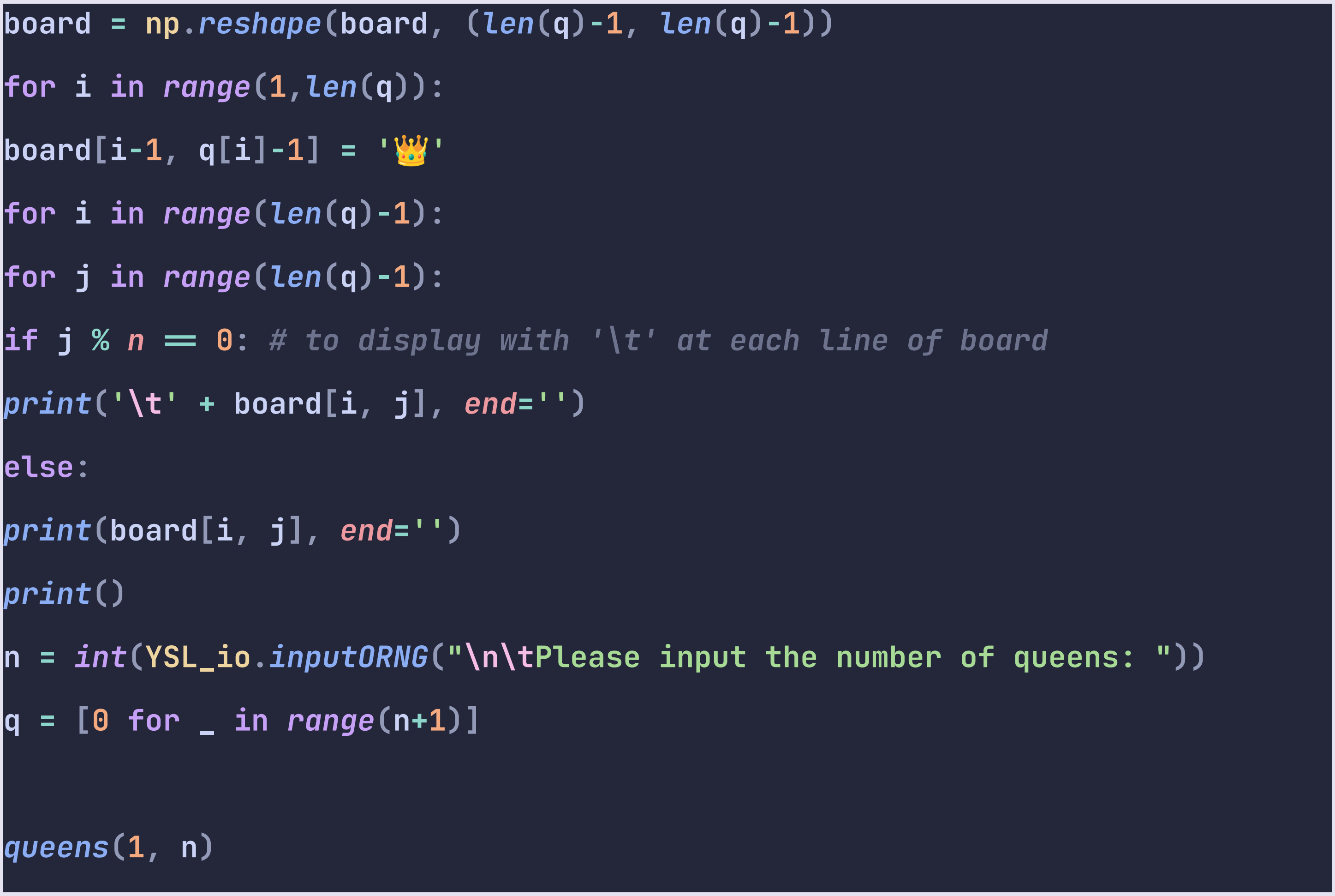

```
board = np.reshape(board, (len(q)-1, len(q)-1))
for i in range(1,len(q)):
board[i-1, q[i]-1] = '👑'
for i in range(len(q)-1):
for j in range(len(q)-1):
if j % n == 0: # to display with '\t' at each line of board
print('\t' + board[i, j], end='')
else:
print(board[i, j], end='')
print()
n = int(YSL_io.inputORNG("\n\tPlease input the number of queens: "))
q = [0 for _ in range(n+1)]

queens(1, n)
```

Screenshots :

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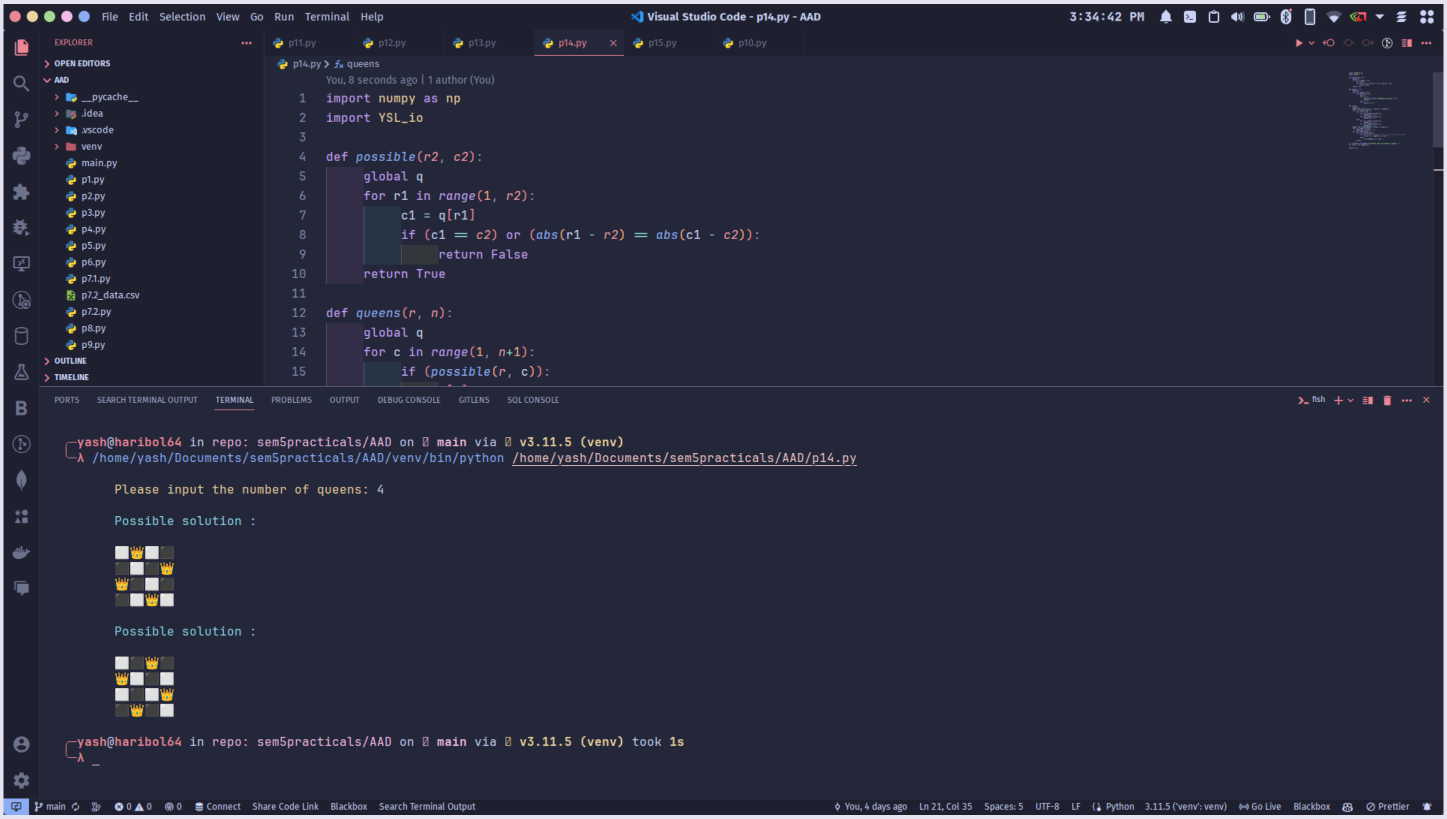
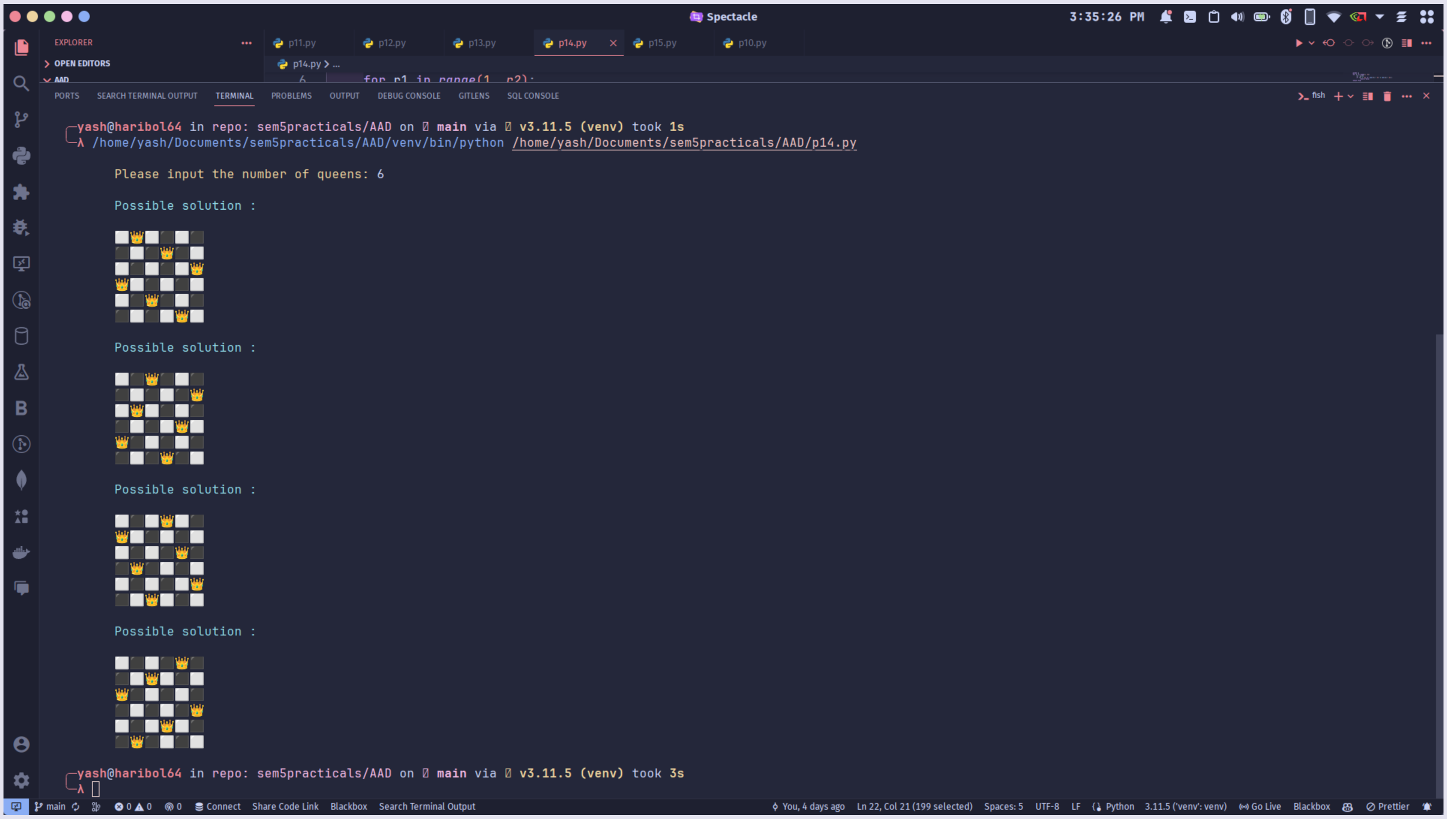

File Edit Selection View Go Run Terminal Help
Visual Studio Code - p14.py - AAD
3:34:42 PM
EXPLORER
OPEN EDITORS
AAD
__pycache__
.idea
.vscode
venv
main.py
p1.py
p2.py
p3.py
p4.py
p5.py
p6.py
p7.1.py
p7.2_data.csv
p7.2.py
p8.py
p9.py
OUTLINE
TIMELINE
p11.py p12.py p13.py p14.py p15.py p10.py
p14.py > queens
You, 8 seconds ago | 1 author (You)
PORTS SEARCH TERMINAL OUTPUT TERMINAL PROBLEMS OUTPUT DEBUG CONSOLE GITLENS SQL CONSOLE
fish
main 0 0 0 Connect Share Code Link Blackbox Search Terminal Output
You, 4 days ago Ln 21, Col 35 Spaces: 5 UTF-8 LF Python 3.11.5 ('venv': venv) Go Live Blackbox Prettier

```python
import numpy as np
import YSL_io

def possible(r2, c2):
    global q
    for r1 in range(1, r2):
        c1 = q[r1]
        if (c1 == c2) or (abs(r1 - r2) == abs(c1 - c2)):
            return False
    return True

def queens(r, n):
    global q
    for c in range(1, n+1):
        if (possible(r, c)):
```

```
┌yash@haribol64 in repo: sem5practicals/AAD on □ main via □ v3.11.5 (venv)
└λ /home/yash/Documents/sem5practicals/AAD/venv/bin/python /home/yash/Documents/sem5practicals/AAD/p14.py

        Please input the number of queens: 4

        Possible solution :

        ⬜👑⬜⬛
        ⬛⬜⬛👑
        👑⬛⬜⬛
        ⬛⬜👑⬜

        Possible solution :

        ⬜⬛👑⬛
        👑⬜⬛⬜
        ⬜⬛⬜👑
        ⬛👑⬛⬜

┌yash@haribol64 in repo: sem5practicals/AAD on □ main via □ v3.11.5 (venv) took 1s
└λ _
```


Spectacle
3:35:26 PM
EXPLORER
OPEN EDITORS
AAD
p11.py p12.py p13.py p14.py p15.py p10.py
p14.py > ...
for r1 in range(1, r2):
PORTS SEARCH TERMINAL OUTPUT TERMINAL PROBLEMS OUTPUT DEBUG CONSOLE GITLENS SQL CONSOLE
fish
main 0 0 0 Connect Share Code Link Blackbox Search Terminal Output
You, 4 days ago Ln 22, Col 21 (199 selected) Spaces: 5 UTF-8 LF Python 3.11.5 ('venv': venv) Go Live Blackbox Prettier

```
┌yash@haribol64 in repo: sem5practicals/AAD on □ main via □ v3.11.5 (venv) took 1s
└λ /home/yash/Documents/sem5practicals/AAD/venv/bin/python /home/yash/Documents/sem5practicals/AAD/p14.py

        Please input the number of queens: 6

        Possible solution :

        ⬜👑⬜⬛⬜⬛
        ⬛⬜⬛👑⬛⬜
        ⬜⬛⬜⬛⬜👑
        👑⬜⬛⬜⬛⬜
        ⬜⬛👑⬛⬜⬛
        ⬛⬜⬛⬜👑⬜

        Possible solution :

        ⬜⬛👑⬛⬜⬛
        ⬛⬜⬛⬜⬛👑
        ⬜👑⬜⬛⬜⬛
        ⬛⬜⬛⬜👑⬜
        👑⬛⬜⬛⬜⬛
        ⬛⬜⬛👑⬛⬜

        Possible solution :

        ⬜⬛⬜👑⬜⬛
        👑⬜⬛⬜⬛⬜
        ⬜⬛⬜⬛👑⬛
        ⬛👑⬛⬜⬛⬜
        ⬜⬛⬜⬛⬜👑
        ⬛⬜👑⬜⬛⬜

        Possible solution :

        ⬜⬛⬜⬛👑⬛
        ⬛⬜👑⬜⬛⬜
        👑⬛⬜⬛⬜⬛
        ⬛⬜⬛⬜⬛👑
        ⬜⬛⬜👑⬜⬛
        ⬛👑⬛⬜⬛⬜

┌yash@haribol64 in repo: sem5practicals/AAD on □ main via □ v3.11.5 (venv) took 3s
└λ ▯
```