**Artificial Intelligence**

**Lab 8**

**Submitted by**

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**Hill-Climbing algorithm to solve the 8-queen problem.**

import random

def calculate\_attacks(board):

    return sum(board[i] == board[j] or abs(i - j) == abs(board[i] - board[j]) for i in range(len(board)) for j in range(i + 1, len(board)))

def print\_board(board):

    for row in range(len(board)):

        print(" ".join("Q" if board[row] == col else "-" for col in range(len(board))))

def random\_board(n):

    return random.sample(range(n), n)

def hill\_climbing(n):

    board = random\_board(n)

    current\_attacks = calculate\_attacks(board)

    while True:

        neighbor = board.copy()

        i, j = random.sample(range(n), 2)

        neighbor[i], neighbor[j] = neighbor[j], neighbor[i]

        neighbor\_attacks = calculate\_attacks(neighbor)

        if neighbor\_attacks < current\_attacks:

            board, current\_attacks = neighbor, neighbor\_attacks

        else:

            break

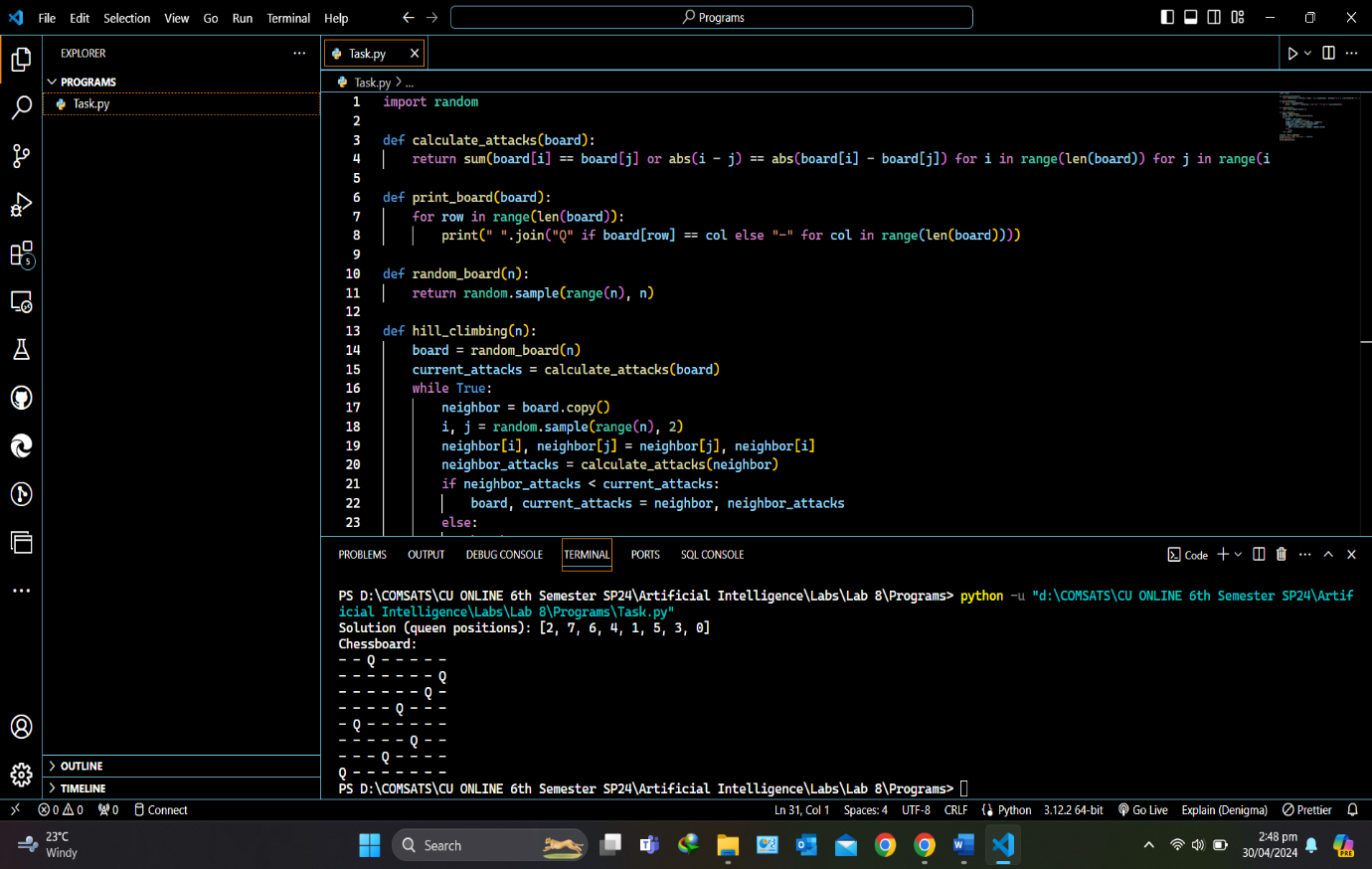
    return board

solution = hill\_climbing(8)

print("Solution (queen positions):", solution)

print("Chessboard:")

print\_board(solution)

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