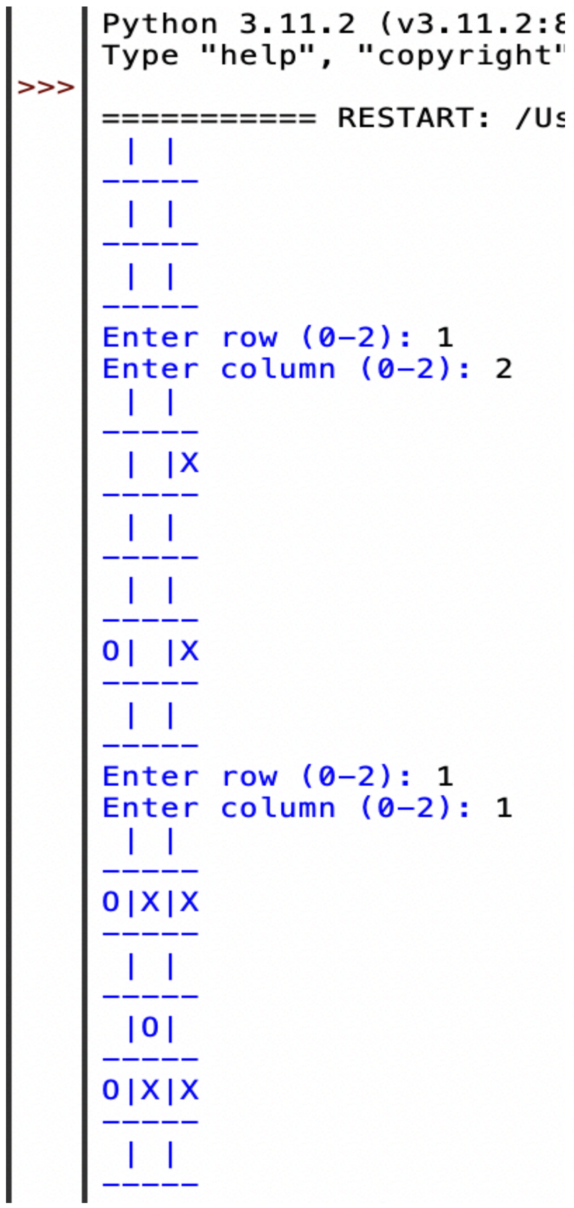
LAB-1 - Tic Tac Toe

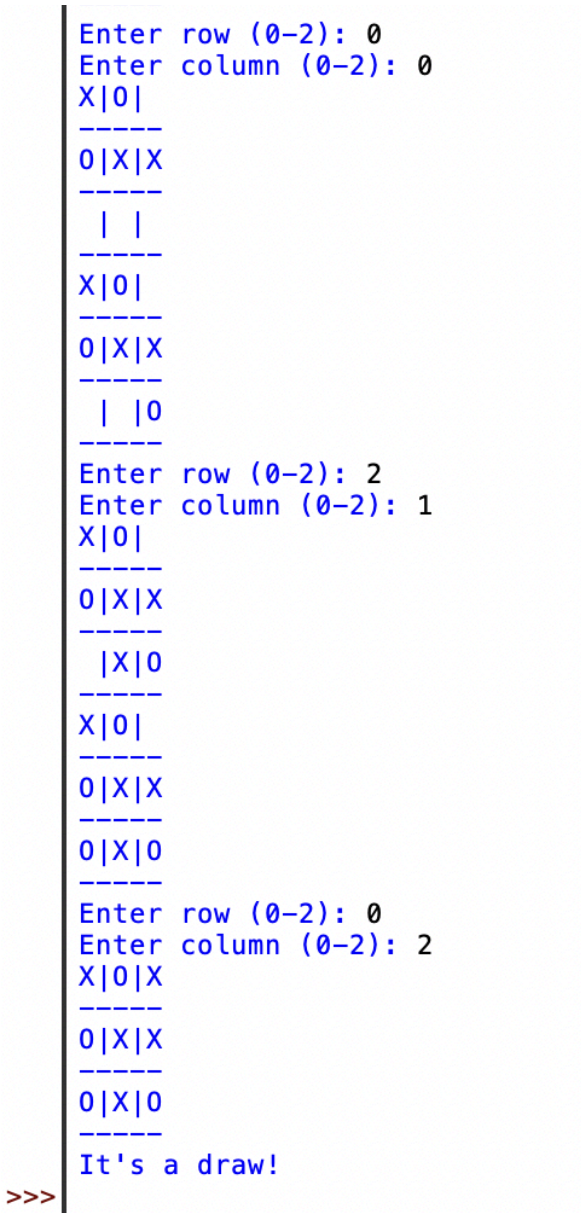
Code:

```
import random

def initialize_board():
    return [[' ' for _ in range(3)] for _ in range(3)]

def display_board(board):
    for row in board:
        print('|'.join(row))
        print('-' * 5)

def check_winner(board):
    for row in board:
        if row[0] == row[1] == row[2] != ' ':
            return row[0]

    for col in range(3):
        if board[0][col] == board[1][col] == board[2][col] != ' ':
            return board[0][col]

    if board[0][0] == board[1][1] == board[2][2] != ' ':
        return board[0][0]

    if board[0][2] == board[1][1] == board[2][0] != ' ':
        return board[0][2]

    return None

def available_moves(board):
    return [(i, j) for i in range(3) for j in range(3) if board[i][j] == ' ']

def check_two_in_a_row(board, player):
    for row in range(3):
        if board[row].count(player) == 2 and board[row].count(' ') == 1:
            return row, board[row].index(' ')

    for col in range(3):
        if [board[row][col] for row in range(3)].count(player) == 2:
            empty_index = [row for row in range(3) if board[row][col] == ' ']
            if empty_index:
                return empty_index[0], col

    if [board[i][i] for i in range(3)].count(player) == 2:
        empty_index = [i for i in range(3) if board[i][i] == ' ']
        if empty_index:
            return empty_index[0], empty_index[0]

    if [board[i][2 - i] for i in range(3)].count(player) == 2:
        empty_index = [i for i in range(3) if board[i][2 - i] == ' ']
        if empty_index:
            return empty_index[0], 2 - empty_index[0]

    return None

def make_move(board, player, move):
    board[move[0]][move[1]] = player

def computer_move(board):
    move = check_two_in_a_row(board, 'O')
    if move:
        make_move(board, 'O', move)
        return

    move = check_two_in_a_row(board, 'X')
    if move:
        make_move(board, 'O', move)
        return

    moves = available_moves(board)
    if moves:
        move = random.choice(moves)
        make_move(board, 'O', move)

def user_move(board):
    while True:
        try:
            row = int(input("Enter row (0-2): "))
            col = int(input("Enter column (0-2): "))
            if board[row][col] == ' ':
                make_move(board, 'X', (row, col))
                return
            else:
                print("That spot is already taken. Try again.")
        except (ValueError, IndexError):
            print("Invalid input. Please enter numbers between 0 and 2.")

def play_game():
    board = initialize_board()
    players = ['X', 'O']
    current_player = 0

    for _ in range(9):
        display_board(board)
        if current_player == 0:
            user_move(board)
        else:
            computer_move(board)

        winner = check_winner(board)
        if winner:
            display_board(board)
            print(f"Player {winner} wins!")
            return

        current_player = 1 - current_player

    display_board(board)
    print("It's a draw!")

play_game()
```

Output:



```
    Python 3.11.2 (v3.11.2:
    Type "help", "copyright
>>>
    =========== RESTART: /U
     | |
    -----
     | |
    -----
     | |
    -----
    Enter row (0-2): 1
    Enter column (0-2): 2
     | |
    -----
     | |X
    -----
     | |
    -----
     | |
    -----
    O| |X
    -----
     | |
    -----
    Enter row (0-2): 1
    Enter column (0-2): 1
     | |
    -----
    O|X|X
    -----
     | |
    -----
     |O|
    -----
    O|X|X
    -----
     | |
    -----
```



```
    Enter row (0-2): 0
    Enter column (0-2): 0
    X|O|
    -----
    O|X|X
    -----
     | |
    -----
    X|O|
    -----
    O|X|X
    -----
     | |O
    -----
    Enter row (0-2): 2
    Enter column (0-2): 1
    X|O|
    -----
    O|X|X
    -----
     |X|O
    -----
    X|O|
    -----
    O|X|X
    -----
    O|X|O
    -----
    Enter row (0-2): 0
    Enter column (0-2): 2
    X|O|X
    -----
    O|X|X
    -----
    O|X|O
    -----
    It's a draw!
>>>
```