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# TC1_LAB1
# SIA VASHIST_ 20190802107
# Tic-Tac-Toe Program using
# random number in Python

# importing all necessary libraries
import numpy as np
import random
from time import sleep


# Creates an empty board
def create_board():
    return (np.array([[0, 0, 0],
                      [0, 0, 0],
                      [0, 0, 0]]))


# Check for empty places on board
def possibilities(board):
    l = []

    for i in range(len(board)):
        for j in range(len(board)):

            if board[i][j] == 0:
                l.append((i, j))
    return l


# Select a random place for the player
def random_place(board, player):
    selection = possibilities(board)
    current_loc = random.choice(selection)
    board[current_loc] = player
    return board


# Checks whether the player has three
# of their marks in a horizontal row
def row_win(board, player):
    global win
    for x in range(len(board)):
        win = True

        for y in range(len(board)):
            if board[x, y] != player:
                win = False
                continue

        if win:
            return win
    return win


# Checks whether the player has three
# of their marks in a vertical row
def col_win(board, player):
    for x in range(len(board)):
        win = True

        for y in range(len(board)):
            if board[y][x] != player:
                win = False
                continue

        if win:
            return win
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    return win


# Checks whether the player has three
# of their marks in a diagonal row
def diag_win(board, player):
    win = True
    y = 0
    for x in range(len(board)):
        if board[x, x] != player:
            win = False
    if win:
        return win
    win = True
    if win:
        for x in range(len(board)):
            y = len(board) - 1 - x
            if board[x, y] != player:
                win = False
    return win


# Evaluates whether there is
# a winner or a tie
def evaluate(board):
    winner = 0

    for player in [1, 2]:
        if (row_win(board, player) or
                col_win(board, player) or
                diag_win(board, player)):
            winner = player

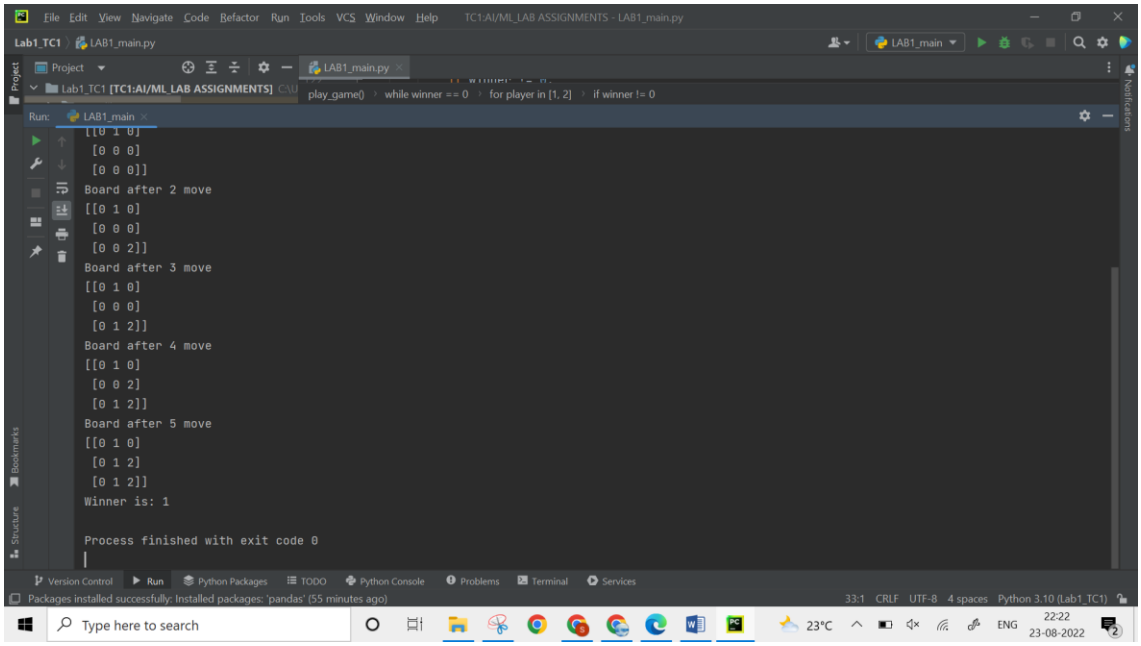
    if np.all(board != 0) and winner == 0:
        # winner = -1
        winner = "Nobody wins!"
    return winner


# Main function to start the game
def play_game():
    board, winner, counter = create_board(), 0, 1
    print(board)
    sleep(2)

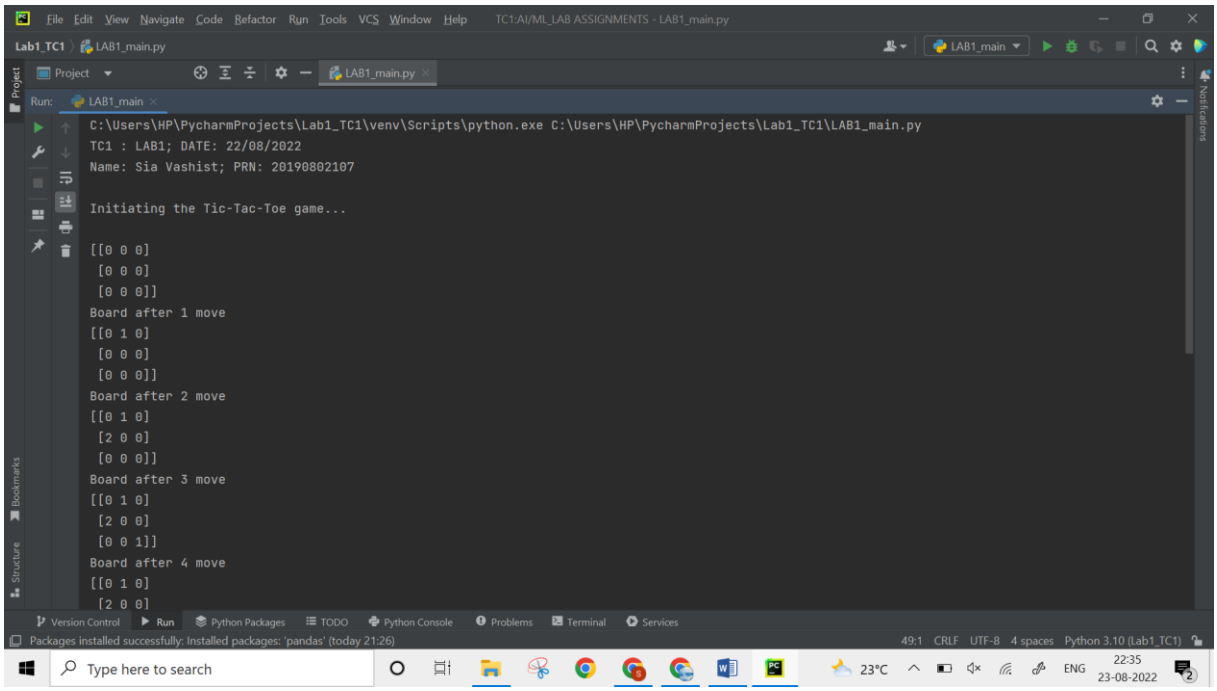
    while winner == 0:
        for player in [1, 2]:
            board = random_place(board, player)
            print("Board after " + str(counter) + " move")
            print(board)
            sleep(2)
            counter += 1
            winner = evaluate(board)
            if winner != 0:
                break
    return winner


# Driver Code
print("TC1 : LAB1; DATE: 22/08/2022")
print("Name: Sia Vashist; PRN: 20190802107 \n")
print("Initiating the Tic-Tac-Toe game... \n")
print("Winner is: " + str(play_game()))
```

- **Output Screenshots:**
  - **<u>Case 1</u>:** Either 1 or 2 will be a winner



  - **<u>Case 2:</u>** If after 9 moves, there are no winner. Nobody would win, it'll be a tie.



Lab report: TC1- AI/ML