

Lab report: TC1- AI/ML

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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
```

Lab report: TC1- AI/ML

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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

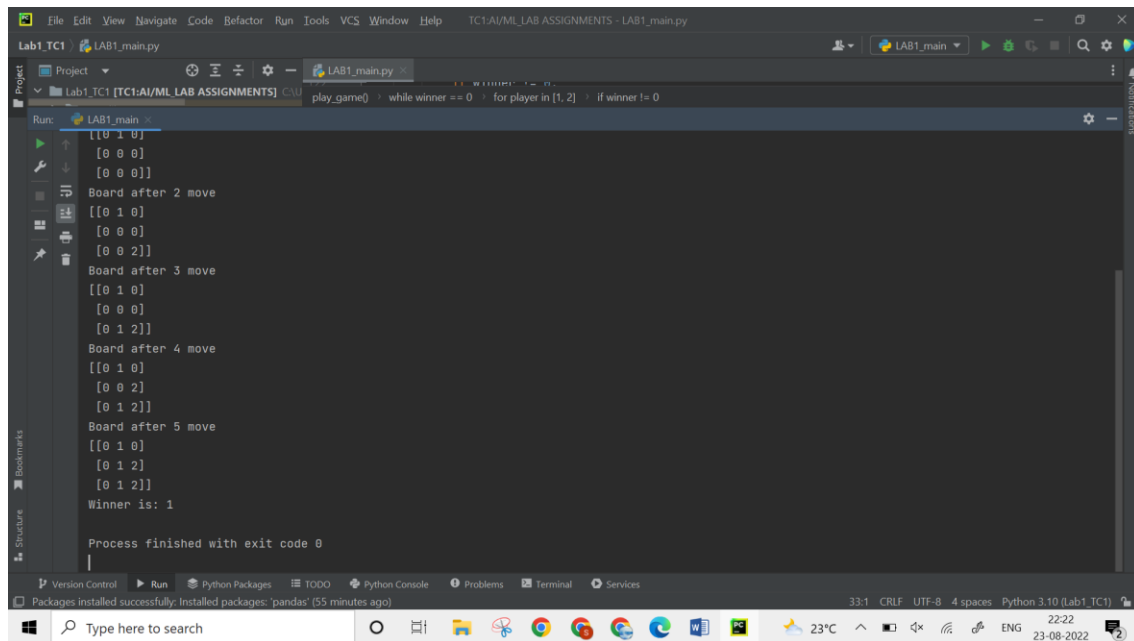
# Main function to start the game
def play_game():
    board, winner, counter = create_board(), 0, 1
    print(board)
    sleep(2)

    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()))
```

Lab report: TC1- AI/ML

- **Output Screenshots:**
 - **Case 1:** Either 1 or 2 will be a winner

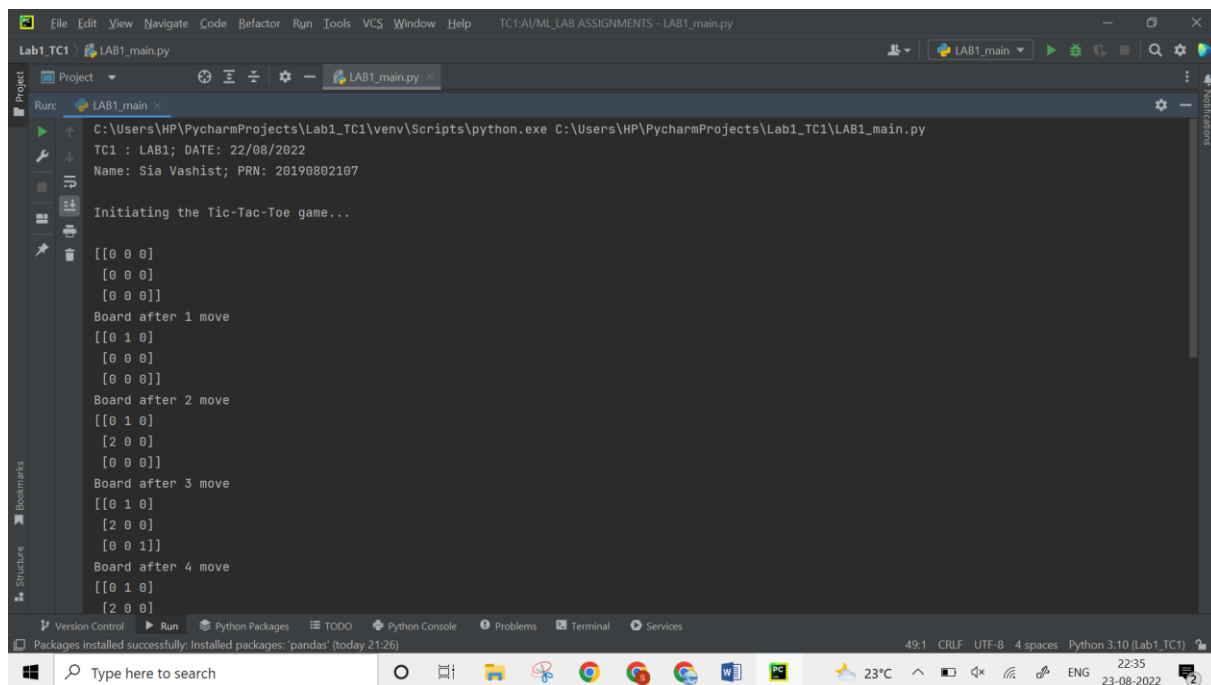


```
Lab1_TC1 [TC1:AI/ML LAB ASSIGNMENTS] C:\...
LAB1_main.py
play_game() while winner == 0 for player in [1, 2] if winner != 0

Run: LAB1_main
[[0 1 0]
 [0 0 0]
 [0 0 0]]
Board after 2 move
[[0 1 0]
 [0 0 0]
 [0 0 2]]
Board after 3 move
[[0 1 0]
 [0 0 0]
 [0 1 2]]
Board after 4 move
[[0 1 0]
 [0 0 2]
 [0 1 2]]
Board after 5 move
[[0 1 0]
 [0 1 2]
 [0 1 2]]
Winner is: 1

Process finished with exit code 0
```

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

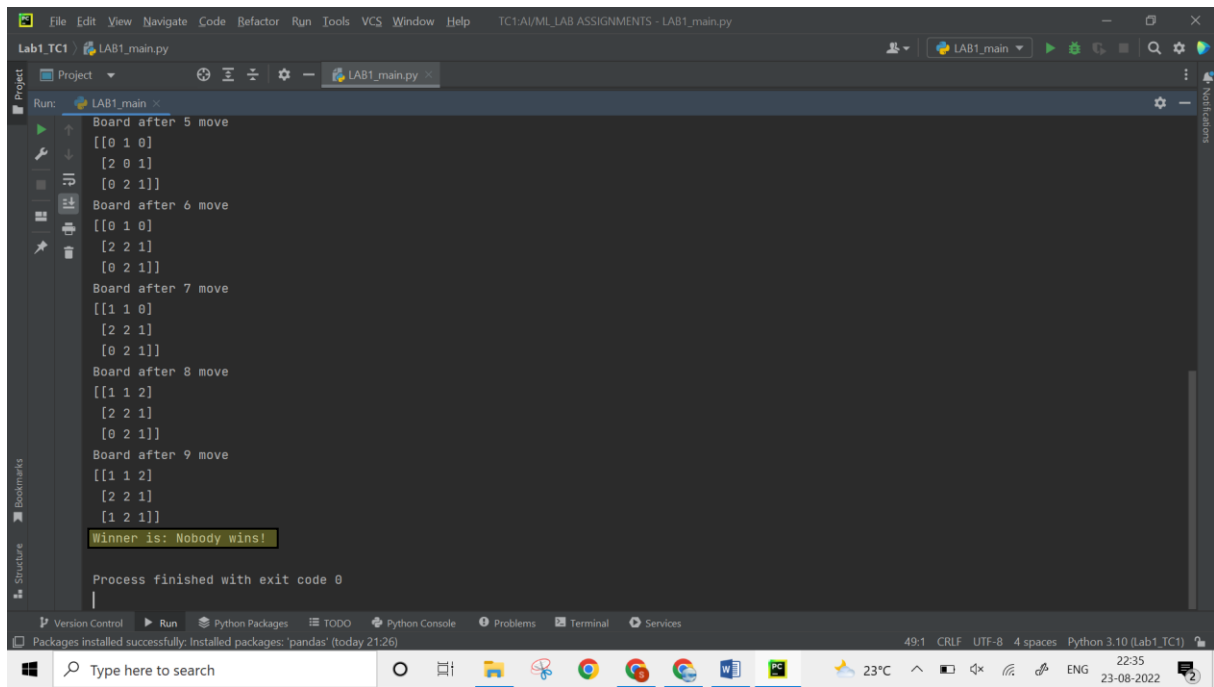


```
Lab1_TC1 [TC1:AI/ML LAB ASSIGNMENTS] LAB1_main.py
LAB1_main.py
C:\Users\HP\PycharmProjects\Lab1_TC1\venv\Scripts\python.exe C:\Users\HP\PycharmProjects\Lab1_TC1\LAB1_main.py
TC1 : LAB1; DATE: 22/08/2022
Name: Sia Vashist; PRN: 20190802107

Initiating the Tic-Tac-Toe game...

[[0 0 0]
 [0 0 0]
 [0 0 0]]
Board after 1 move
[[0 1 0]
 [0 0 0]
 [0 0 0]]
Board after 2 move
[[0 1 0]
 [2 0 0]
 [0 0 0]]
Board after 3 move
[[0 1 0]
 [2 0 0]
 [0 0 1]]
Board after 4 move
[[0 1 0]
 [2 0 0]
 [2 0 0]]
```

Lab report: TC1- AI/ML



```
TC1-AI/ML_LAB ASSIGNMENTS - LAB1_main.py
Lab1.TC1 LAB1_main.py
Run: LAB1_main.py
Board after 5 move
[[0 1 0]
 [2 0 1]
 [0 2 1]]
Board after 6 move
[[0 1 0]
 [2 2 1]
 [0 2 1]]
Board after 7 move
[[1 1 0]
 [2 2 1]
 [0 2 1]]
Board after 8 move
[[1 1 2]
 [2 2 1]
 [0 2 1]]
Board after 9 move
[[1 1 2]
 [2 2 1]
 [1 2 1]]
winner is: Nobody wins!
Process finished with exit code 0
```

Version Control Run Python Packages TODO Python Console Problems Terminal Services

Packages installed successfully: Installed packages: 'pandas' (today 21:26)

49:1 CRLF UTF-8 4 spaces Python 3.10 (Lab1.TC1)

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