

Lab1(18.08.2025)

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Implement tic-tac-toe problem

```
def print_board(board):
    print("\nCurrent Board:")
    for row in board:
        print(row)
    print()

def check_winner(board, player):
    for i in range(3):
        if all(cell == player for cell in board[i]):
            return True
        if all(board[j][i] == player for j in range(3)):
            return True

    if all(board[i][i] == player for i in range(3)):
        return True
    if all(board[i][2 - i] == player for i in range(3)):
        return True

    return False

def is_full(board):
    return all(cell != " " for row in board for cell in row)

def tic_tac_toe():
    board = [[" " for _ in range(3)] for _ in range(3)]
    current_player = "X"
    move_count = 0

    print("Tic-Tac-Toe Game (3x3 Matrix Format)\n")
    print_board(board)

    while True:
        try:
            row = int(input(f"Player {current_player}, enter row (0-2): "))
            col = int(input(f"Player {current_player}, enter col (0-2): "))
        except ValueError:
            print("Please enter integers between 0 and 2.")
            continue

        if not (0 <= row <= 2 and 0 <= col <= 2):
            print("Invalid position. Try again.")
```

```

        continue
    if board[row][col] != " ":
        print("Cell already filled. Choose another.")
        continue

    board[row][col] = current_player
    move_count += 1
    print_board(board)

    if check_winner(board, current_player):
        print(f"Player {current_player} wins!")
        break

    if is_full(board):
        print("Game is a draw.")
        break

    current_player = "O" if current_player == "X" else "X"

    print(f"Total moves (cost): {move_count}")

```

tic_tac_toe()

Output case1:

Tic-Tac-Toe Game (3x3 Matrix Format)

Current Board:

```

[' ', ' ', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ', ' ']

```

Player X, enter row (0-2): 1

Player X, enter col (0-2): 1

Current Board:

```

[' ', ' ', ' ', ' ', ' ', ' ']
[' ', ' ', 'X', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ', ' ']

```

Player O, enter row (0-2): 0

Player O, enter col (0-2): 2

Current Board:

```

[' ', ' ', ' ', ' ', 'O', ' ']
[' ', ' ', 'X', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ', ' ']

```

Player X, enter row (0-2): 1

Player X, enter col (0-2): 0

Current Board:

```

[' ', ' ', ' ', ' ', 'O', ' ']
['X', 'X', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ', ' ']

```

Player O, enter row (0-2): 2
Player O, enter col (0-2): 1

Current Board:
[' ', ' ', 'O']
['X', 'X', ' ']
[' ', 'O', ' ']

Player X, enter row (0-2): 2
Player X, enter col (0-2): 2

Current Board:
[' ', ' ', 'O']
['X', 'X', ' ']
[' ', 'O', 'X']

Player O, enter row (0-2): 2
Player O, enter col (0-2): 0

Current Board:
[' ', ' ', 'O']
['X', 'X', ' ']
['O', 'O', 'X']

Player X, enter row (0-2): 0
Player X, enter col (0-2): 1

Current Board:
[' ', 'X', 'O']
['X', 'X', ' ']
['O', 'O', 'X']

Player O, enter row (0-2): 1
Player O, enter col (0-2): 2

Current Board:
[' ', 'X', 'O']
['X', 'X', 'O']
['O', 'O', 'X']

Player X, enter row (0-2): 0
Player X, enter col (0-2): 0

Current Board:
['X', 'X', 'O']
['X', 'X', 'O']
['O', 'O', 'X']

Player X wins!
Total moves (cost): 9

Output case2:

Tic-Tac-Toe Game (3x3 Matrix Format)

Current Board:
[' ', ' ', ' ']
[' ', ' ', ' ']
[' ', ' ', ' ']

Player X, enter row (0-2): 0
Player X, enter col (0-2): 2

Current Board:

```
[' ', ' ', 'X']  
[' ', ' ', ' ']  
[' ', ' ', ' ']
```

Player O, enter row (0-2): 2
Player O, enter col (0-2): 1

Current Board:

```
[' ', ' ', 'X']  
[' ', ' ', ' ']  
[' ', 'O', ' ']
```

Player X, enter row (0-2): 0
Player X, enter col (0-2): 0

Current Board:

```
['X', ' ', 'X']  
[' ', ' ', ' ']  
[' ', 'O', ' ']
```

Player O, enter row (0-2): 0
Player O, enter col (0-2): 1

Current Board:

```
['X', 'O', 'X']  
[' ', ' ', ' ']  
[' ', 'O', ' ']
```

Player X, enter row (0-2): 2
Player X, enter col (0-2): 0

Current Board:

```
['X', 'O', 'X']  
[' ', ' ', ' ']  
['X', 'O', ' ']
```

Player O, enter row (0-2): 1
Player O, enter col (0-2): 1

Current Board:

```
['X', 'O', 'X']  
[' ', 'O', ' ']  
['X', 'O', ' ']
```

Player O wins!
Total moves (cost): 6

Output case3:

Tic-Tac-Toe Game (3x3 Matrix Format)

```
Current Board:
[' ', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ']
```

```
Player X, enter row (0-2): 1
Player X, enter col (0-2): 0
Current Board:
[' ', ' ', ' ', ' ', ' ']
['X', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ']
```

```
Player O, enter row (0-2): 0
Player O, enter col (0-2): 2
```

```
Current Board:
[' ', ' ', ' ', ' ', 'O']
['X', ' ', ' ', ' ', ' ']
[' ', ' ', ' ', ' ', ' ']
```

```
Player X, enter row (0-2): 2
Player X, enter col (0-2): 0
```

```
Current Board:
[' ', ' ', ' ', ' ', 'O']
['X', ' ', ' ', ' ', ' ']
['X', ' ', ' ', ' ', ' ']
```

```
Player O, enter row (0-2): 0
Player O, enter col (0-2): 0
```

```
Current Board:
['O', ' ', ' ', ' ', 'O']
['X', ' ', ' ', ' ', ' ']
['X', ' ', ' ', ' ', ' ']
```

```
Player X, enter row (0-2): 0
Player X, enter col (0-2): 1
```

```
Current Board:
['O', 'X', ' ', ' ', 'O']
['X', ' ', ' ', ' ', ' ']
['X', ' ', ' ', ' ', ' ']
```

```
Player O, enter row (0-2): 2
Player O, enter col (0-2): 1
```

```
Current Board:
['O', 'X', ' ', ' ', 'O']
['X', ' ', ' ', ' ', ' ']
['X', 'O', ' ', ' ', ' ']
```

```
Player X, enter row (0-2): 2
Player X, enter col (0-2): 2
```

```
Current Board:
['O', 'X', ' ', ' ', 'O']
```

```
['X', ' ', ' ']  
['X', 'O', 'X']
```

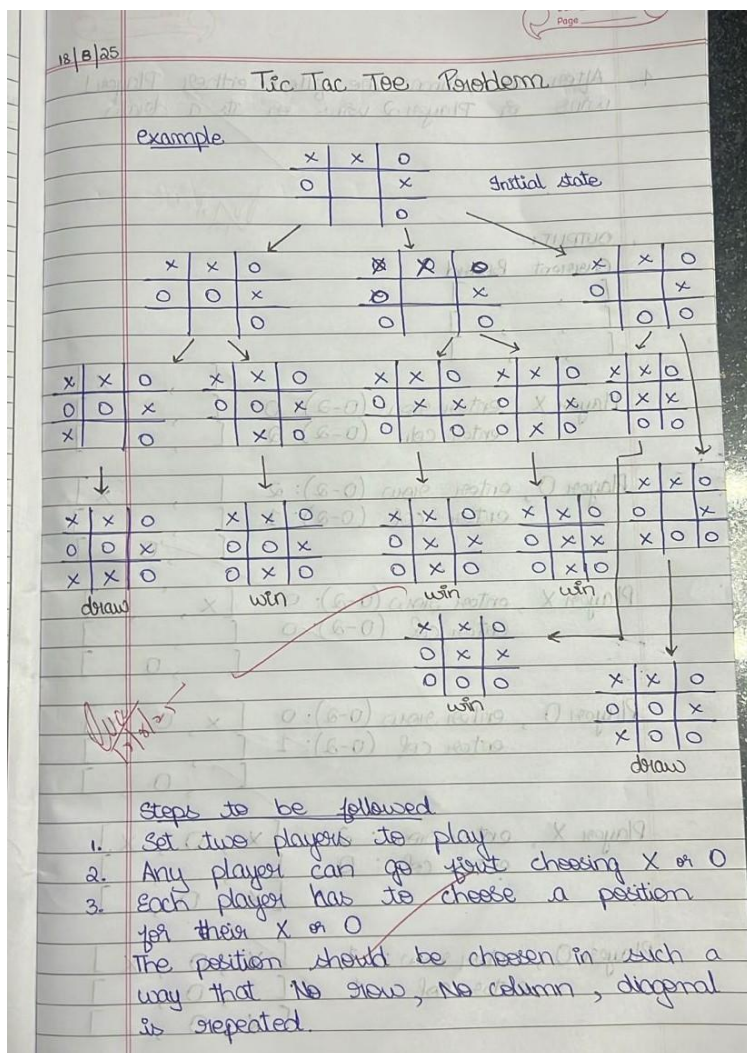
Player O, enter row (0-2): 1
Player O, enter col (0-2): 1

Current Board:
['O', 'X', 'O']
['X', 'O', ' ']
['X', 'O', 'X']

Player X, enter row (0-2): 1
Player X, enter col (0-2): 2

Current Board:
['O', 'X', 'O']
['X', 'O', 'X']
['X', 'O', 'X']

Game is a draw.
Total moves (cost): 9



4 After all columns are filled either Player 1 wins or Player 2 wins or its a draw

OUTPUT:

Current Board

[, ,]
[, ,]
[, ,]

Player X, enter row (0-2): 0
enter col (0-2): 2

[, , X]
[, ,]
[, ,]

Player O, enter row (0-2): 2
enter col (0-2): 1

[, , X]
[, ,]
[, O ,]

Player X, enter row (0-2): 0
enter col (0-2): 0

[X , , X]
[, ,]
[, O ,]

Player O, enter row (0-2): 0
enter col (0-2): 1

[X , O , X]
[, ,]
[, O ,]

Player X, enter row : 2
enter col : 0

[X , O , X]
[, ,]
[X , O ,]

Player O, enter row : 1
enter col : 1

[X , O , X]
[, O ,]
[X , O ,]

Player O wins!
Total moves (cnt): 6

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