Mangal
Date 04/10/24
Page 01

Implement Tic Tac Toe Game.

```
board = {
    1: ' ', 2: ' ', 3: ' ',
    4: ' ', 5: ' ', 6: ' ',
    7: ' ', 8: ' ', 9: ' '
}

def printBoard(board):
    print(board[1] + '|' + board[2] + '|' + board[3])
    print('-+-+-')
    print(board[4] + '|' + board[5] + '|' + board[6])
    print('-+-+-')
    print(board[7] + '|' + board[8] + '|' + board[9])
    print('\n')

def spaceFree(pos):
    return board[pos] == ' '

def checkWin():
    winning_conditions = [
        (1,2,3), (4,5,6), (7,8,9),
        (1,4,7), (2,5,8), (3,6,9),
        (1,5,9), (3,5,7)
    ]
    for a, b, c in winning_conditions:
        if board[a] == board[b] == board[c] and board[a]
!= ' ';
            return True
    return False
```

```
def checkDraw():
    return all( board[key] != ' ' for key in board.keys())

def insertLetter(letter, position):
    if spaceFree(position):
        board[position] = letter
        printBoard(board)

        if checkDraw():
            print('Draw!')
        elif checkWin():
            if letter == 'X':
                print('Bot Wins!')
            else:
                print('You Win!')
            return
        print('Position taken, please pick different
position')
        position = int(input('Enter new position: '))
        insertLetter(letter, position)

player = 'O'
bot = 'X'

def playerMove():
    position = int(input('Enter position for O: '))
    insertLetter(player, position)

def compMove()
    bestScore = -1000
    bestMove = 0
    for key in board.keys():
```

```
        if board[key] == '':
            board[key] = bot
            score = minimax(board, False)
            board[key] = ''
            if score > bestScore:
                bestScore = score
                bestMove = key
    insertLetter(bot, bestMove)

def minimax(board, isMaximizing):
    if checkMoveForWin(bot):
        return 1
    elif checkMoveForWin(player):
        return -1
    elif checkDraw():
        return 0
    if isMaximizing:
        bestScore = -1000
        for key in board.keys():
            if board[key] == '':
                board[key] = bot
                score = minimax(board, False)
                board[key] = ''
                bestScore = max(score, bestScore)
        return bestScore
    else:
        bestScore = 1000
        for key in board.keys():
            if board[key] == '':
                board[key] = player
                score = minimax(board, True)
                board[key] = ''
```

```
        bestScore = min(score, bestScore)
    return bestScore

while not checkWin():
    computerMove()
    playerMove()
```

**Output:**

Enter position: 5

| | | |
|---|---|---|
| X | | |
| | | |
| | | |

| | | |
|---|---|---|
| X | | |
| | O | |
| | | |

Enter position: 3

| | | |
|---|---|---|
| X | X | |
| | O | |
| | | |

| | | |
|---|---|---|
| X | X | O |
| | O | |
| | | |

Enter position: 4

| | | |
|---|---|---|
| X | X | O |
| O | O | |
| X | | |

| | | |
|---|---|---|
| X | X | O |
| O | O | X |
| X | | |

Enter position: 9.

| | | |
|---|---|---|
| X | X | O |
| O | O | X |
| X | X | O |

Draw!!

ok. 10/10