

21BCE7371

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## AI LAB ASSIGNMENT-2

Q Modifying the codes given in class in any way we like\\

MODIFIED CODE OF TIC TAC TOE

Making 3x3 to 4x4 with different solutions ..

```
def print_tic_tac_toe(values):
```

```
    print("\n")
```

```
    print("\t  |  |  |")
```

```
    print("\t {}| {}| {}|{}".format(values[0], values[1], values[2], values[3]))
```

```
    print("\t_ _|_ _|_ _|_ _')
```

```
    print("\t  |  |  |")
```

```
    print("\t {}| {}| {}|{}".format(values[4], values[5], values[6], values[7]))
```

```
    print("\t_ _|_ _|_ _|_ _')
```

```
    print("\t  |  |  |")
```

```
    print("\t {}| {}| {}|{}".format(values[8], values[9], values[10], values[11]))
```

```
    print("\t_ _|_ _|_ _|_ _')
```

```
    print("\t  |  |  |")
```

```
    print("\t {}| {}| {}|{}".format(values[12], values[13], values[14], values[15]))
```

```
    print("\t  |  |  |")
```

```
    print("\n")
```

```
# Function to print the score-board
```

```

def print_scoreboard(score_board):
    print("\t-----")
    print("\t\t\t\t\t SCOREBOARD\t\t")
    print("\t-----")

    players = list(score_board.keys())
    print("\t ", players[0], "\t ", score_board[players[0]])
    print("\t ", players[1], "\t ", score_board[players[1]])

    print("\t-----\n")

# Function to check if any player has won
def check_win(player_pos, cur_player):

    # All possible winning combinations
    soln = [[1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12], [13, 14, 15, 16], [1, 6, 11, 16], [4, 7, 10, 13],
    [1, 5, 9, 13], [2, 6, 10, 14], [3, 7, 11, 15], [4, 8, 12, 16]]

    # Loop to check if any winning combination is satisfied
    for x in soln:
        if all(y in player_pos[cur_player] for y in x):

            # Return True if any winning combination satisfies
            return True

    # Return False if no combination is satisfied
    return False

# Function to check if the game is drawn
def check_draw(player_pos):
    if len(player_pos['X']) + len(player_pos['O']) == 16:
        return True

```

```
return False
```

```
# Function for a single game of Tic Tac Toe
```

```
def single_game(cur_player):
```

```
    # Represents the Tic Tac Toe
```

```
    values = [' ' for x in range(16)]
```

```
    # Stores the positions occupied by X and O
```

```
    player_pos = {'X':[], 'O':[]}
```

```
    # Game Loop for a single game of Tic Tac Toe
```

```
    while True:
```

```
        print_tic_tac_toe(values)
```

```
        # Try exception block for MOVE input
```

```
        try:
```

```
            print("Player ", cur_player, " turn. Which box? : ", end="")
```

```
            move = int(input())
```

```
        except ValueError:
```

```
            print("Wrong Input!!! Try Again")
```

```
            continue
```

```
        # Sanity check for MOVE inout
```

```
        if move < 1 or move > 16:
```

```
            print("Wrong Input!!! Try Again")
```

```
            continue
```

```
        # Check if the box is not occupied already
```

```
        if values[move-1] != '':
```

```

    print("Place already filled. Try again!!")
    continue

# Update game information

# Updating grid status
values[move-1] = cur_player

# Updating player positions
player_pos[cur_player].append(move)

# Function call for checking win
if check_win(player_pos, cur_player):
    print_tic_tac_toe(values)
    print("Player ", cur_player, " has won the game!!")
    print("\n")
    return cur_player

# Function call for checking draw game
if check_draw(player_pos):
    print_tic_tac_toe(values)
    print("Game Drawn")
    print("\n")
    return 'D'

# Switch player moves
if cur_player == 'X':
    cur_player = 'O'
else:
    cur_player = 'X'

```

```
if __name__ == "__main__":

    print("Player 1")
    player1 = input("Enter the name : ")
    print("\n")

    print("Player 2")
    player2 = input("Enter the name : ")
    print("\n")

    # Stores the player who chooses X and O
    cur_player = player1

    # Stores the choice of players
    player_choice = {'X' : "", 'O' : ""}

    # Stores the options
    options = ['X', 'O']

    # Stores the scoreboard
    score_board = {player1: 0, player2: 0}
    print_scoreboard(score_board)

    # Game Loop for a series of Tic Tac Toe
    # The loop runs until the players quit
    while True:

        # Player choice Menu
        print("Turn to choose for", cur_player)
```

```
print("Enter 1 for X")
print("Enter 2 for O")
print("Enter 3 to Quit")

# Try exception for CHOICE input
try:
    choice = int(input())
except ValueError:
    print("Wrong Input!!! Try Again\n")
    continue

# Conditions for player choice
if choice == 1:
    player_choice['X'] = cur_player
    if cur_player == player1:
        player_choice['O'] = player2
    else:
        player_choice['O'] = player1

elif choice == 2:
    player_choice['O'] = cur_player
    if cur_player == player1:
        player_choice['X'] = player2
    else:
        player_choice['X'] = player1

elif choice == 3:
    print("Final Scores")
    print_scoreboard(score_board)
    break
```

```
print("Wrong Choice!!!! Try Again\n")
```

```
winner = single_game(options[choice-1])
```

```
if winner != 'D' :
```

```
score_board[player_won] = score_board[player_won] + 1
```

```
# Switch player who chooses X or O
```

```
cur_player = player2
```

```
cur_player = player1
```

```
main.py
1 def print_tac_toe(values):
2     print("\n")
3     print("\t\t\t\t\t| | |")
4     print("\t\t\t\t\t| | |")
5     print("\t\t\t\t\t| | |".format(values[0], values[1], values[2], values[3]))
6     print("\t\t\t\t\t|_|_|_|")
7
8     print("\t\t\t\t\t| | |")
9     print("\t\t\t\t\t| | |")
10    print("\t\t\t\t\t| | |".format(values[4], values[5], values[6], values[7]))
11    print("\t\t\t\t\t|_|_|_|")
12
13    print("\t\t\t\t\t| | |")
14    print("\t\t\t\t\t| | |")
15    print("\t\t\t\t\t| | |".format(values[8], values[9], values[10], values[11]))
16    print("\t\t\t\t\t|_|_|_|")
17
18    print("\t\t\t\t\t| | |")
19    print("\t\t\t\t\t| | |")
20    print("\t\t\t\t\t| | |".format(values[12], values[13], values[14], values[15]))
21    print("\t\t\t\t\t|_|_|_|")
22
23    # Function to print the score board
24    def print_scoreboard(score_board):
25        print("-----")
26        print("\t\t\t\t\tSCOREBOARD\t\t")
27        print("-----")
28
29        players = list(score_board.keys())
30        print("\t\t\t\t\t", players[0], "\t\t\t\t\t", score_board[players[0]])
31        print("\t\t\t\t\t", players[1], "\t\t\t\t\t", score_board[players[1]])
32
33        print("\t\t\t\t\t-----\n")
34
35    # Function to check if any player has won
36    def check_win(player_pos, cur_player):
37
38        # All possible winning combinations
39        soln = [[1, 2, 3, 4], [5, 6, 7, 8], [9, 10, 11, 12], [13, 14, 15, 16], [1, 6, 11, 16], [4, 7, 10, 13], [1, 5, 9, 13], [2, 6, 10, 14], [3, 7, 11, 15], [4, 8, 12, 16]]
40
41        # Loop to check if any winning combination is satisfied
42        for x in soln:
43            if all(y in player_pos[cur_player] for y in x):
44
45                # Return True if any winning combination satisfies
46                return True
47
48        # Return False if no combination is satisfied
49        return False
50
51    # Function to check if the game is drawn
52    def check_draw(player_pos):
```

main.py

```
44 # Return False if no combination is satisfied
45 return False
46
47 # Function to check if the game is drawn
48 def check_draw(player_pos):
49     if len(player_pos['X']) + len(player_pos['O']) == 16:
50         return True
51     return False
52
53 # Function for a single game of Tic Tac Toe
54 def single_game(cur_player):
55
56     # Represents the Tic Tac Toe
57     values = [' ' for x in range(16)]
58
59     # Stores the positions occupied by X and O
60     player_pos = {'X':[], 'O':[]}
61
62     # Game Loop for a single game of Tic Tac Toe
63     while True:
64         print_tic_tac_toe(values)
65
66         # Try exception block for MOVE input
67         try:
68             print("Player ", cur_player, " turn. Which box? : ", end="")
69             move = int(input())
70         except ValueError:
71             print("Wrong Input!!! Try Again")
72             continue
73
74         # Sanity check for MOVE input
75         if move < 1 or move > 16:
76             print("Wrong Input!!! Try Again")
77             continue
78
79         # Check if the box is not occupied already
80         if values[move-1] != ' ':
81             print("Place already filled. Try again!!")
82             continue
83
84         # Update game information
85
86         # Updating grid status
87         values[move-1] = cur_player
88
89         # Updating player positions
90         player_pos[cur_player].append(move)
91
```



main.py

```
88
89     # Updating player positions
90     player_pos[cur_player].append(move)
91
92     # Function call for checking win
93     if check_win(player_pos, cur_player):
94         print_tic_tac_toe(values)
95         print("Player ", cur_player, " has won the game!!")
96         print("\n")
97         return cur_player
98
99     # Function call for checking draw game
100    if check_draw(player_pos):
101        print_tic_tac_toe(values)
102        print("Game Drawn")
103        print("\n")
104        return 'D'
105
106    # Switch player moves
107    if cur_player == 'X':
108        cur_player = 'O'
109    else:
110        cur_player = 'X'
111
112    if __name__ == "__main__":
113
114        print("Player 1")
115        player1 = input("Enter the name : ")
116        print("\n")
117
118        print("Player 2")
119        player2 = input("Enter the name : ")
120        print("\n")
121
122        # Stores the player who chooses X and O
123        cur_player = player1
124
125        # Stores the choice of players
126        player_choice = {'X' : "", 'O' : ""}
127
128        # Stores the options
129        options = ['X', 'O']
130
131        # Stores the scoreboard
132        score_board = {player1: 0, player2: 0}
133        print_scoreboard(score_board)
```

```

159-
160-     elif choice == 2:
161-         player_choice['O'] = cur_player
162-         if cur_player == player1:
163-             player_choice['X'] = player2
164-         else:
165-             player_choice['X'] = player1
166-
167-     elif choice == 3:
168-         print("Final Scores")
169-         print_scoreboard(score_board)
170-         break
171-
172-     else:
173-         print("Wrong Choice!!!! Try Again\n")
174-
175-     # Stores the winner in a single game of Tic Tac Toe
176-     winner = single_game(options[choice-1])
177-
178-     # Edits the scoreboard according to the winner
179-     if winner != 'D' :
180-         player_won = player_choice[winner]
181-         score_board[player_won] = score_board[player_won] + 1
182-
183-     print_scoreboard(score_board)
184-     # Switch player who chooses X or O
185-     if cur_player == player1:
186-         cur_player = player2
187-     else:
188-         cur_player = player1

```

## OUTPUT

```

Player 1
Enter the name : rk

```

```

Player 2
Enter the name : tanmay

```

```

-----
                        SCOREBOARD
-----
rk           0
tanmay       0
-----

```

```

Turn to choose for rk
Enter 1 for X
Enter 2 for O
Enter 3 to Quit
1

```

```

| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

```

```

Player X turn. Which box? : 1

```

```

Player X turn. Which box? : 1

```

```

| | |
X| |
| | |
| | |
| | |
| | |
| | |
| | |

```

```

Player O turn. Which box? : 4

```

```

| | |
X| | O
| | |
| | |
| | |
| | |
| | |
| | |

```

```

Player X turn. Which box? : 13

```

Player X turn. Which box? : 13

X		O
--	--	--
--	--	--
--	--	--
X		

Player O turn. Which box? : 5

X		O
--	--	--
O		
--	--	--
--	--	--
X		

Player X turn. Which box? : 11

X		O
--	--	--
O	O	X
--	--	--
--	--	--
X		

Player O turn. Which box? : 10

X		O
--	--	--
O	O	X
--	--	--
	O	X
--	--	--
X		

Player X turn. Which box? : 15

Player X turn. Which box? : 11

X		O
--	--	--
O		
--	--	--
		X
--	--	--
X		

Player O turn. Which box? : 6

X		O
--	--	--
O	O	
--	--	--
		X
--	--	--
X		

Player X turn. Which box? : 7

X		O
--	--	--
O	O	X
--	--	--
	O	X
--	--	--
X		X

Player O turn. Which box? : 3

X		O O
--	--	--
O	O	X
--	--	--
	O	X
--	--	--
X		X

Player X turn. Which box? : 16

X		O O
--	--	--
O	O	X
--	--	--
	O	X
--	--	--
X		X X

Player O turn. Which box? : 14

X		O O
--	--	--
O	O	X
--	--	--
	O	X
--	--	--
X	O	X X

Player X turn. Which box? : 2

Player X turn. Which box? : 2

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

Player O turn. Which box? : 8

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

Player O turn. Which box? : 8

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

Player X turn. Which box? : 12

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

Player O turn. Which box? : 9

Player O turn. Which box? : 9

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

Game Drawn

```
-----
                SCOREBOARD
-----
    rk      0
tanmay      0
-----
```

Turn to choose for tanmay

Enter 1 for X

Enter 2 for O

Enter 3 to Quit

3

Final Scores

```
-----
                SCOREBOARD
-----
    rk      0
tanmay      0
-----
```

...Program finished with exit code 0  
Press ENTER to exit console.

Q2

INPUT

```
import random

#generate number directly
num = random.randrange(1,5)


#initialize global variables
player1 = "Human"
player2 = "Alien"
player3 = "god"
player1PlayCount = 0
player2PlayCount = 0
player3PlayCount = 0
maxPlayTimes = 1


#game logic
def Game():
    global player1, player2, player3, player1PlayCount, player2PlayCount, player3PlayCount, maxPlayTimes, num
    """enter and assign names to players"""
    player1Name = input('Player1 Enter Your Name: ')
    player2Name = input('Player2 Enter Your Name: ')
    player3Name = input('Player3 Enter Your Name: ')

    player1 = player1Name

    player2 = player2Name

    player3 = player3Name
```

```
player = player1
```

```
print(player1, 'turn')
```

```
while ((player1PlayCount and player2PlayCount and player3PlayCount) !=  
maxPlayTimes):
```

```
    guessNum = int(input("Guess Number: "))
```

```
    if guessNum == num:
```

```
        print(player, "won")
```

```
        exit()
```

```
    elif guessNum < num:
```

```
        print("Player guessed lower...\n")
```

```
    elif guessNum > num:
```

```
        print("Player guessed higher...\n")
```

```
    if player == player1:
```

```
        player1PlayCount +=1
```

```
        player = player2
```

```
        print(player2, 'turn')
```

```
    elif player == player2:
```

```
        player2PlayCount +=1
```

```
        player = player3
```

```
        print(player3, 'turn')
```

```
    elif player == player3:
```

```
        player3PlayCount +=1
```

```
        player = player1
```

```
    elif (player2Playcount < maxPlayTimes):
```

```
print(player1, 'turn')
```

```
else:
```

```
print(player1, ",", player2, "and", player3, "all 3 loose the game.")
```

```
exit()
```

```
Game()
```

```
main.py
1 import random
2 #generate number directly
3 num = random.randrange(1,5)
4
5 #initialize global variables
6 player1 = "Human"
7 player2 = "Alien"
8 player3 = "god"
9 player1PlayCount = 0
10 player2PlayCount = 0
11 player3PlayCount = 0
12 maxPlayTimes = 1
13
14 #game logic
15 def Game():
16     global player1, player2, player3, player1PlayCount, player2PlayCount, player3PlayCount, maxPlayTimes, num
17     """enter and assign names to players"""
18     player1Name = input('Player1 Enter Your Name: ')
19     player2Name = input('Player2 Enter Your Name: ')
20     player3Name = input('Player3 Enter Your Name: ')
21
22     player1 = player1Name
23
24     player2 = player2Name
25
26     player3 = player3Name
27
28
29     player = player1
30
31     print(player1, 'turn')
32
33     while ((player1PlayCount and player2PlayCount and player3PlayCount) != maxPlayTimes):
34         guessNum = int(input("Guess Number: "))
35
36         if guessNum == num:
37             print(player, "won")
38             exit()
39         elif guessNum < num:
40             print("Player guessed lower...\n")
41         elif guessNum > num:
42             print("Player guessed higher...\n")
43
44         if player == player1:
45             player1PlayCount += 1
46             player = player2
```

```

main.py
22 player1 = player1Name
23
24 player2 = player2Name
25
26 player3 = player3Name
27
28
29 player = player1
30
31 print(player1, 'turn')
32
33 while ((player1PlayCount and player2PlayCount and player3PlayCount) != maxPlayTimes):
34     guessNum = int(input("Guess Number: "))
35
36     if guessNum == num:
37         print(player, "won")
38         exit()
39     elif guessNum < num:
40         print("Player guessed lower...\n")
41     elif guessNum > num:
42         print("Player guessed higher...\n")
43
44     if player == player1:
45         player1PlayCount +=1
46         player = player2
47         print(player2, 'turn')
48
49     elif player == player2:
50         player2PlayCount +=1
51         player = player3
52         print(player3, 'turn')
53
54     elif player == player3:
55         player3PlayCount +=1
56         player = player1
57
58     elif (player2Playcount < maxPlayTimes):
59         print(player1, 'turn')
60
61 else:
62     print(player1,"",player2,"and", player3, "all 3 loose the game.")
63     exit()
64 Game()
65
66
67

```

## OUTPUT

```

Player1 Enter Your Name: rk
Player2 Enter Your Name: rohit
Player3 Enter Your Name: aryan
rk turn
Guess Number: 9
Player guessed higher...

rohit turn
Guess Number: 8
Player guessed higher...

aryan turn
Guess Number: 7
Player guessed higher...

rk , rohit and aryan all 3 loose the game.

...Program finished with exit code 0
Press ENTER to exit console.

```