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             SCOREBOARD       ")
    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
```

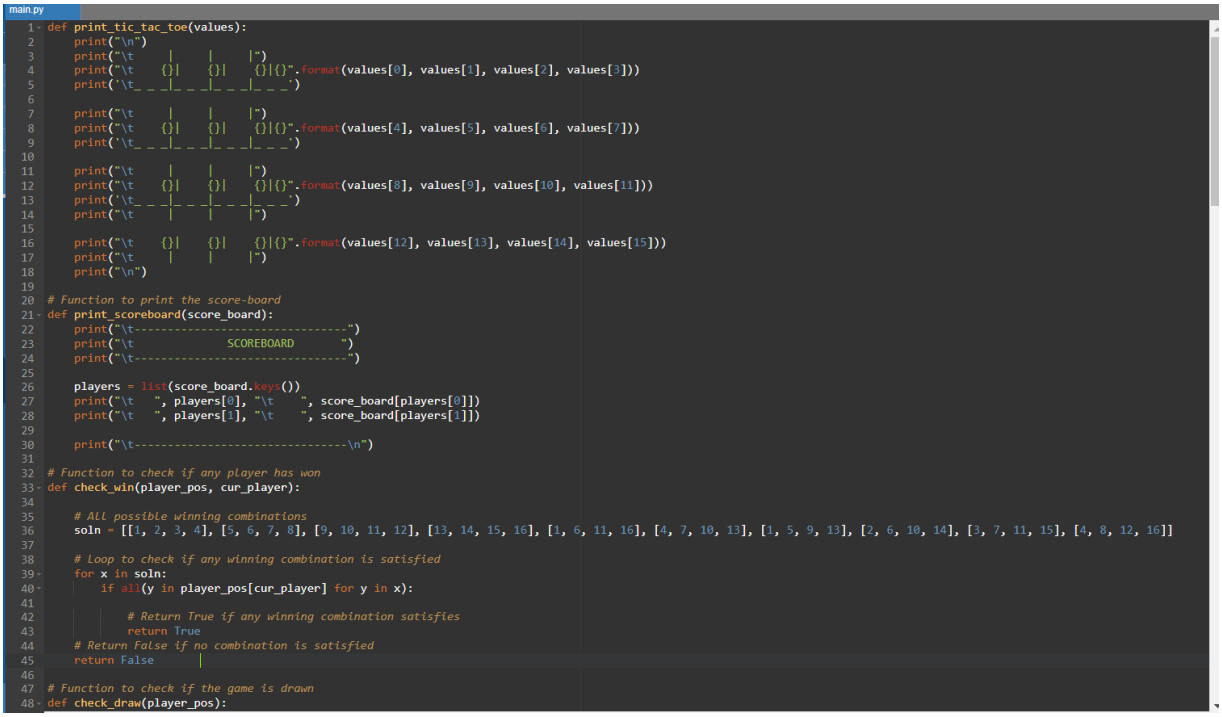
```
    return False

# 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
```

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

# Stores the winner in a single game of Tic Tac Toe
winner = single_game(options[choice-1])

# Edits the scoreboard according to the winner
if winner != 'D' :
    player_won = player_choice[winner]
    score_board[player_won] = score_board[player_won] + 1

print_scoreboard(score_board)
# Switch player who chooses X or O
if cur_player == player1:
    cur_player = player2
else:
    cur_player = player1
```



main.py

```
    # 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)

```

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)
```

```
    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

    else:
        print("Wrong Choice!!!! Try Again\n")

    # Stores the winner in a single game of Tic Tac Toe
    winner = single_game(options[choice-1])

    # Edits the scoreboard according to the winner
    if winner != 'D' :
        player_won = player_choice[winner]
        score_board[player_won] = score_board[player_won] + 1

    print_scoreboard(score_board)
    # Switch player who chooses X or O
    if cur_player == player1:
        cur_player = player2
    else:
        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
```

```
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  |
_ _ _|_ _ _|_ _ _|_ _ _
     |     |     |
     |     |  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? : 15

     |     |     |
  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
```

```
Player  X  turn. Which box? : 16

     |     |     |
  X  |     |  O  |  O
_ _ _|_ _ _|_ _ _|_ _ _
     |     |     |
  O  |  O  |  X  |
_ _ _|_ _ _|_ _ _|_ _ _
     |     |     |
     |  O  |  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

```python
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
```

main.py

```
    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()
```

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.
```