Assignment No:2

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Div:A
Batch:A

```python
import random

def print_board(board):
    """Prints the current state of the Tic Tac Toe board."""
    for row in board:
        print(" | ".join(row))
        print("-" * 10)

def check_winner(board):
    """Checks if there is a winner in the current board state."""
    for i in range(3):
        if board[i][0] == board[i][1] == board[i][2] != " ":
            return board[i][0]
        if board[0][i] == board[1][i] == board[2][i] != " ":
            return board[0][i]

    if board[0][0] == board[1][1] == board[2][2] != " ":
        return board[0][0]
    if board[0][2] == board[1][1] == board[2][0] != " ":
        return board[0][2]

    return None

def is_full(board):
    """Checks if the board is full."""
    return all(cell != " " for row in board for cell in row)

def get_machine_move(board):
    """Generates a move for the machine player."""
    empty_cells = [(r, c) for r in range(3) for c in range(3) if board[r][c] == " "]
    return random.choice(empty_cells) if empty_cells else None

def tic_tac_toe():
    """Main function to play Tic Tac Toe."""
    board = [[" " for _ in range(3)] for _ in range(3)]
    players = ["X", "O"]
    turn = 0

    while True:
```

```python
        print_board(board)
        current_player = players[turn % 2]

        if current_player == "X":
            print(f"Player {current_player}'s turn")
            while True:
                try:
                    row, col = map(int, input("Enter row and column (0-2) separated by space: ").split())
                    if board[row][col] == " ":
                        board[row][col] = current_player
                        break
                    else:
                        print("Cell is already taken. Try again.")
                except (ValueError, IndexError):
                    print("Invalid input. Enter row and column as numbers between 0 and 2.")
        else:
            print(f"Machine ({current_player}) is making a move...")
            row, col = get_machine_move(board)
            board[row][col] = current_player

        winner = check_winner(board)
        if winner:
            print_board(board)
            print(f"Player {winner} wins!")
            break

        if is_full(board):
            print_board(board)
            print("It's a draw!")
            break

        turn += 1
tic_tac_toe()
```

Output:
```
student@student-OptiPlex-390:~$ python3 ai2.py
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 | | 
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Player X's turn
Enter row and column (0-2) separated by space: 0 0
X| | 
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 | | 
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 | | 
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Machine (O) is making a move...
X| | 
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 | |
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O | |
-------
Player X's turn
Enter row and column (0-2) separated by space: 1 1
X | |
-------
 | X |
-------
O | |
-------
Machine (O) is making a move...
X | |
-------
 | X |
-------
O | | O
-------
Player X's turn
Enter row and column (0-2) separated by space: 2 1
X | |
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 | X |
-------
O | X | O
-------
Machine (O) is making a move...
X | | O
-------
 | X |
-------
O | X | O
-------
Player X's turn
Enter row and column (0-2) separated by space: 0 1
X | X | O
-------
 | X |
-------
O | X | O
-------
Player X wins!
student@student-OptiPlex-390:~$ python3 ai2.py
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 | |
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 | |
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Player X's turn
```

Enter row and column (0-2) separated by space: 2 0
 | |
- - - - - - -
 | |
- - - - - - -
X | |
- - - - - - -
Machine (O) is making a move...
 | |
- - - - - - -
 | |
- - - - - - -
X | O |
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 1 1
 | |
- - - - - - -
 | X |
- - - - - - -
X | O |
- - - - - - -
Machine (O) is making a move...
 | |
- - - - - - -
 | X |
- - - - - - -
X | O | O
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 0 2
 | | X
- - - - - - -
 | X |
- - - - - - -
X | O | O
- - - - - - -
Player X wins!
student@student-OptiPlex-390:~$ python3 ai2.py
 | |
- - - - - - -
 | |
- - - - - - -
 | |
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 2 2
 | |
- - - - - - -
 | |
- - - - - - -
 | | X

Machine (O) is making a move...
 | |

 | |

 | O | X

Player X's turn
Enter row and column (0-2) separated by space: 1 1
 | |

 | X |

 | O | X

Machine (O) is making a move...
 | |

 | X | O

 | O | X

Player X's turn
Enter row and column (0-2) separated by space: 0 1
 | X |

 | X | O

 | O | X

Machine (O) is making a move...
 | X |

 | X | O

O | O | X

Player X's turn
Enter row and column (0-2) separated by space: 1 0
 | X |

X | X | O

O | O | X

Machine (O) is making a move...
O | X |

X | X | O

O | O | X

```
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 0 2
O | X | X
- - - - - - -
X | X | O
- - - - - - -
O | O | X
- - - - - - -
It's a draw!
student@student-OptiPlex-390:~$ python3 ai2.py
  |  |
- - - - - - -
  |  |
- - - - - - -
  |  |
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 0 0
X |  |
- - - - - - -
  |  |
- - - - - - -
  |  |
- - - - - - -
Machine (O) is making a move...
X |  |
- - - - - - -
  |  | O
- - - - - - -
  |  |
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 1 1
X |  |
- - - - - - -
  | X | O
- - - - - - -
  |  |
- - - - - - -
Machine (O) is making a move...
X | O |
- - - - - - - - - student@student-OptiPlex-390:~$ python3 ai2.py
  |  |
- - - - - - -
  |  |
- - - - - - -
  |  |
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 0 0
X |  |
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-------
Machine (O) is making a move...
X | |
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 | |
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O | |
-------
Player X's turn
Enter row and column (0-2) separated by space: 1 1
X | |
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 | X |
-------
O | |
-------
Machine (O) is making a move...
X | |
-------
 | X |
-------
O | | O
-------
Player X's turn
Enter row and column (0-2) separated by space: 2 1
X | |
-------
 | X |
-------
O | X | O
-------
Machine (O) is making a move...
X | | O
-------
 | X |
-------
O | X | O
-------
Player X's turn
Enter row and column (0-2) separated by space: 0 1
X | X | O
-------
 | X |
-------
O | X | O
-------
Player X wins!
student@student-OptiPlex-390:~$ python3 ai2.py
```

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 | |
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 | |
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 | |
-------
Player X's turn
Enter row and column (0-2) separated by space: 2 0
 | |
-------
 | |
-------
X| |
-------
Machine (O) is making a move...
 | |
-------
 | |
-------
X|O|
-------
Player X's turn
Enter row and column (0-2) separated by space: 1 1
 | |
-------
 |X|
-------
X|O|
-------
Machine (O) is making a move...
 | |
-------
 |X|
-------
X|O|O
-------
Player X's turn
Enter row and column (0-2) separated by space: 0 2
 | |X
-------
 |X|
-------
X|O|O
-------
Player X wins!
student@student-OptiPlex-390:~$ 2 2
2: command not found
student@student-OptiPlex-390:~$ python3 ai2.py
 | |
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 | |
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```

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 | |
-------
Player X's turn
Enter row and column (0-2) separated by space: 2 2
 | |
-------
 | |
-------
 | |X
-------
Machine (O) is making a move...
 | |
-------
 | |
-------
 |O|X
-------
Player X's turn
Enter row and column (0-2) separated by space: 1 1
 | |
-------
 |X|
-------
 |O|X
-------
Machine (O) is making a move...
 | |
-------
 |X|O
-------
 |O|X
-------
Player X's turn
Enter row and column (0-2) separated by space: 0 1
 |X|
-------
 |X|O
-------
 |O|X
-------
Machine (O) is making a move...
 |X|
-------
 |X|O
-------
O|O|X
-------
Player X's turn
Enter row and column (0-2) separated by space: 1 0
 |X|
-------
X|X|O
```

```
- - - - - - -
O | O | X
- - - - - - -
Machine (O) is making a move...
O | X |
- - - - - - -
X | X | O
- - - - - - -
O | O | X
- - - - - - -
Player X's turn
Enter row and column (0-2) separated by space: 0 2
O | X | X
- - - - - - -
X | X | O
- - - - - - -
O | O | X
- - - - - - -
It's a draw!
student@student-OptiPlex-390:~$
```