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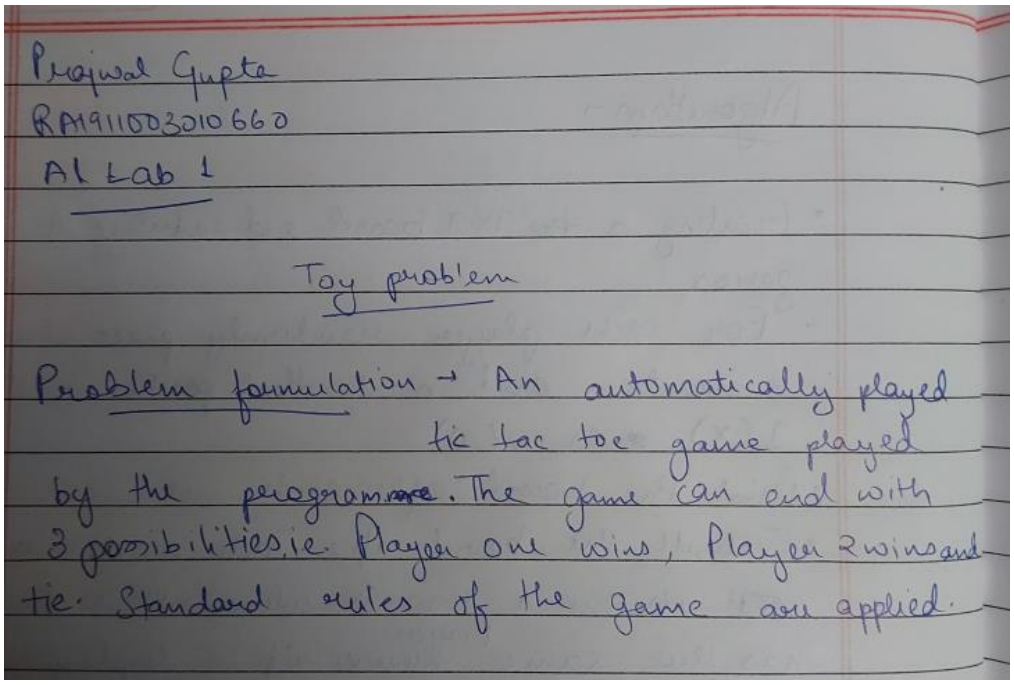
AI LAB1

Toy problem



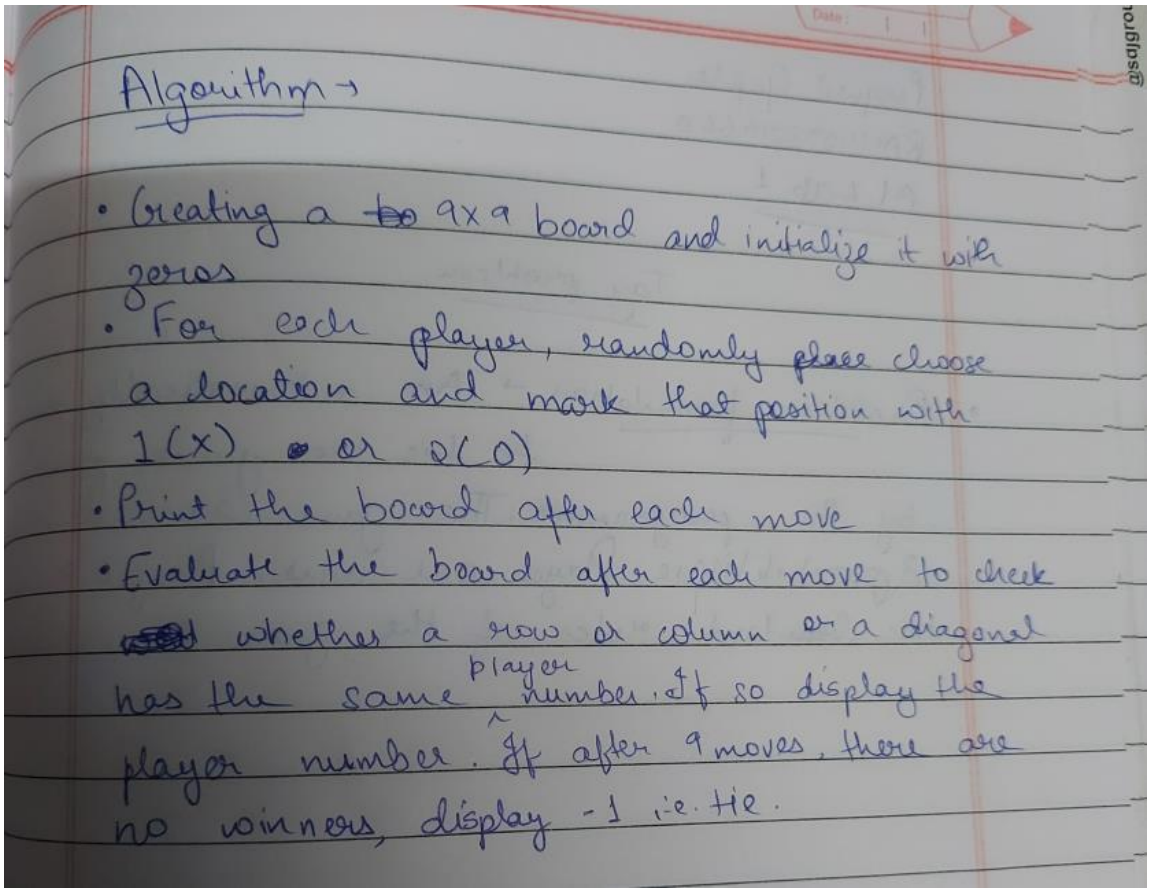
Problem Solving-

```
import numpy as np
import random
from time import sleep

def create_board():
   return(np.array([[0, 0, 0],
                    [0, 0, 0],
                    [0, 0, 0]]))

def possibilities(board):
   l = []

   for i in range(len(board)):
      for j in range(len(board)):

         if board[i][j] == 0:
            l.append((i, j))
   return(l)

def random_place(board, player):
```

```
    selection = possibilities(board)
    current_loc = random.choice(selection)
    board[current_loc] = player
    return(board)


def row_win(board, player):
    for x in range(len(board)):
        win = True

        for y in range(len(board)):
            if board[x, y] != player:
                win = False
                continue

        if win == True:
            return(win)
    return(win)


def col_win(board, player):
    for x in range(len(board)):
        win = True

        for y in range(len(board)):
            if board[y][x] != player:
                win = False
                continue

        if win == True:
            return(win)
    return(win)

def diag_win(board, player):
    win = True
    y = 0
    for x in range(len(board)):
        if board[x, x] != player:
            win = False
    if win:
        return win
    win = True
    if win:
        for x in range(len(board)):
            y = len(board) - 1 - x
            if board[x, y] != player:
                win = False
    return win

def evaluate(board):
    winner = 0

    for player in [1, 2]:
        if (row_win(board, player) or
            col_win(board,player) or
            diag_win(board,player)):
```

```
            winner = player

    if np.all(board != 0) and winner == 0:
        winner = -1
    return winner

def play_game():
    board, winner, counter = create_board(), 0, 1
    print(board)
    sleep(2)

    while winner == 0:
        for player in [1, 2]:
            board = random_place(board, player)
            print("Board after " + str(counter) + " move")
            print(board)
            sleep(2)
            counter += 1
            winner = evaluate(board)
            if winner != 0:
                break
    return(winner)


print("Winner is: " + str(play_game()))
```

Algorithm-



Output-

main.py

```
    winner = 0

    for player in [1, 2]:
        if (row_win(board, player) or
            col_win(board,player) or
            diag_win(board,player)):

            winner = player

    if np.all(board != 0) and winner == 0:
        winner = -1
```

input

```
Board after 1 move
[[0 0 0]
 [0 0 0]
 [0 0 1]]
Board after 2 move
[[0 0 0]
 [2 0 0]
 [0 0 1]]
Board after 3 move
[[0 0 0]
 [2 0 0]
 [0 1 1]]
Board after 4 move
[[0 0 2]
 [2 0 0]
 [0 1 1]]
Board after 5 move
[[0 0 2]
 [2 0 0]
 [1 1 1]]
Winner is: 1
```