

LAB 1

TIC TAC TOE (user v/s computer)

Algorithm.

Step 1 → create a 3×3 matrix which will give 9 empty boxes.

Step 2 → Assign X to or O to the user depending on the symbol he chooses. And then assign the other to the computer. Assign - to represent empty spaces.

Step 3 → If the user starts the next turn will be given to the computer. This will happen till one of them win or till all the null spaces are filled which results in a tie.

Step 4 → If Now if the user starts, the computer should place O in such a way that it should not let the user make a row or a column or a diagonal with X's. (basically should not let the user win).

Step 5 → If the user or the computer creates a row or a column or a

diagonal with those respective symbols, will be the winner of that particular round in the tic-tak-toe game.

ॐ

If all the moves are done and there are no empty space left and none of them have made a row or a column or a diagonal then it will be considered as a tie.

$\{ \begin{aligned} & \text{if } a[i][0] == a[i][1] == a[i][2] == \text{player}_0 \\ & \text{if } a[0][i] == a[1][i] == a[2][i] == \text{player}_2 \end{aligned}$

winning
condition

$i = 0, j = 0, k = 0$
 $i = 1, j = 1, k = 1$
 $i = 2, j = 2, k = 2$
 $i = 3, j = 3, k = 3$
 $i = 4, j = 4, k = 4$
 $i = 5, j = 5, k = 5$
 $i = 6, j = 6, k = 6$
 $i = 7, j = 7, k = 7$
 $i = 8, j = 8, k = 8$
 $i = 9, j = 9, k = 9$
 $i = 10, j = 10, k = 10$
 $i = 11, j = 11, k = 11$
 $i = 12, j = 12, k = 12$
 $i = 13, j = 13, k = 13$
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 $i = 155, j = 155, k = 155$
 $i = 156, j = 156, k = 156$
 $i = 157, j = 157, k = 157$

~~was along the side the 11th~~
~~at a distance of 100m~~

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289. 2280
290. 2281
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301. 2292
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308. 2299
309. 2300
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311. 2302
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349. 2340
350. 2341
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357. 2348
358. 2349
359. 2350
360. 2351
361. 2352
362. 2353
363. 2354
364. 2355
365. 2356
366. 2357
367. 2358
368. 2359
369. 2360
370. 2361
371. 2362
372. 2363
373. 2364
374. 2365
375. 2366
376. 2367
377. 2368
378. 2369
379. 2370
380. 2371
381. 2372
382. 2

Diagramas with no roots with $f \leftarrow 1$ and $g \leftarrow 1$

code :-

import random

def print_board(board):

: "X" = for row in board:

print(" ".join(row))

print("\n")

def check_winner(board):

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_board_full(board):

return all(cell != " " for row in board for cell in

row)

def ai_move(board):

for i in range(3):

for j in range(3):

if board[i][j] == " ":

board[i][j] = "O"

if check_winner(board) == "O":

return "O won"

board[i][j] = "X"


```
for i in range(3):
```

```
    for j in range(3):
```

```
        if board[i][j] == "":
```

```
            board[i][j] = "X"
```

```
            if check_winner(board) == "X":
```

```
                board[i][j] = "O"
```

```
                return "X"
```

```
            board[i][j] = " "
```

```
    if board[i][j] == "X":
```

```
        board[i][j] = "O"
```

```
    return board
```

```
    board = board
```

```
corners = [(0,0), (0,2), (2,0), (2,2)]
```

```
random.shuffle(corners)
```

```
for corner in corners:
```

```
    if board[corner[0]][corner[1]] == "":
```

```
        board[corner[0]][corner[1]] = "O"
```

```
    return
```

```
sides = [(0,1), (1,0), (1,2), (2,1)]
```

```
random.shuffle(sides)
```

```
for side in sides:
```

```
    if board[side[0]][side[1]] == "":
```

```
        board[side[0]][side[1]] = "O"
```

```
    return
```

```
def play_game():
```

```
    board = [" " for _ in range(3)]
```

```
    print("Welcome to tic tac toe!")
```

```
    print_board(board)
```


while True :

while True :

try

row = int (input ("Enter row (1-3):")) - 1

col = int (input ("Enter column (1-3):")) - 1

if board [row] [col] == " " :

board [row] [col] = "x"

break

else :

print ("cell already taken, choose
another.")

except (ValueError, IndexError):

print ("Invalid input. Please enter numbers
between 1 and 3.")

print_board (board)

if check_winner (board) == "x" :

print ("You win!")

break

if is_board_full (board):

print ("It's a draw!")

break

print ("AI's turn ...")

ai_move (board)

print_board (board)

if check_winner (board) == "o" :

print ("AI wins!")

break

if is_board_full (board):

print ("It's a draw!")

break

if name == "main"

play game()

Output

Enter row (1-3): 2

Enter column (1-3): 2

	X	

last matrix

0	X	0
0	X	
0	X	X

AI wins!

24/9/24

Welcome to Tic Tac Toe!

--	--

--	--

--	--

Enter row (1-3): 2

Enter column (1-3): 1

--	--

x		
---	--	--

--	--

AI's turn...

--	--

x		o	
---	--	---	--

--	--

Enter row (1-3): 1

Enter column (1-3): 1

x		
---	--	--

x		o	
---	--	---	--

--	--

AI's turn...

x		
---	--	--

x		o	
---	--	---	--

o		
---	--	--

```
Enter row (1-3): 1
Enter column (1-3): 3
X |   | X
-----
X | O | 
-----
O |   | 
-----
AI's turn...
X | O | X
-----
X | O | 
-----
O |   | 
-----
Enter row (1-3): 3
Enter column (1-3): 2
X | O | X
-----
X | O | 
-----
O | X | 
-----
AI's turn...
X | O | X
-----
X | O | 
-----
O | X | O
-----
Enter row (1-3): 2
Enter column (1-3): 3
X | O | X
-----
X | O | X
-----
O | X | O
-----
It's a draw!
```



```
-----
Enter row (1-3): 1
Enter column (1-3): 2
X | X |
-----
  | 0 |
-----
  |  |
-----
AI's turn...
X | X | 0
-----
  | 0 |
-----
  |  |
-----
Enter row (1-3): 1
Enter column (1-3): 2
Cell already taken, choose another.
Enter row (1-3): 3
Enter column (1-3): 1
X | X | 0
-----
  | 0 |
-----
X |  |
-----
AI's turn...
X | X | 0
-----
0 | 0 |
-----
X |  |
-----
Enter row (1-3): 3
Enter column (1-3): 2
X | X | 0
-----
0 | 0 |
-----
X | X |
-----
AI's turn...
X | X | 0
-----
0 | 0 | 0
-----
X | X |
-----
AI wins!
```