1.Implement Tic –Tac –Toe Game

```python
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:
```

```python
                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()))
```

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

LAB - I

① Implement Tic - Tac - Toe game.

~~import~~

Algorithm :

Function Print-board (board)
FOR each row IN board
PRINT row joined by " 1 "
PRINT "-" * 9

FUNCTION check - winner (board)
// check rows
FOR each row IN board
IF row[0] == row[1] == row[2] AND row[0] != " "

RETURN row[0]

// check columns
FOR col From 0 TO 2
IF board[0][col] == board[1][col] == board[2][col]
AND board[0][col] != " "
RETURN board[0][col]

// check diagonals
IF board[0][0] == board[1][1] == board[2][2] AND
board[0][0] != " "
RETURN board[0][0]

IF board[0][2] == board[1][1] == board[2][0]
AND board[0][2] != " "
RETURN board[0][2]

RETURN None

```
FUNCTION  is_full (board)
  RETURN  True IF all cells in board are
  not " " ELSE False


FUNCTION tic_tac_toe()
  INITIALISE  board  al 3x3 grid filled with " "
    SET  current_player  to "x"


WHILE  True
    CALL Print_board (board)
  PRINT "Player" + current_player + ",
    Enter your move (row and column):"


    TRY
      INPUT row, col
      IF  board [row][col]! = " "
      PRINT "cell already taken. Try again"
        CONTINUE
    ENDIF
      board [row][col]  = current_player
      EXCEPT (value Error, IndexError)
    PRINT "Invalid input, please enter row and
    column (0,1, or 2) Seperated by space"
      CONTINUE


    SET  winner = CALL check_winner (board)
    IF winner  is NOT None
    CALL  Print_board (board)
    PRINT "Player" + winner + "wins !"
      Break


    IF CALL is_full (board)
```

CALL print_board (board)
PRINT " It's a draw!"
BREAK

SET current_player to "0" IF current_player
is "x" ELSE "x".

IF _name_ == "_main_"
CALL _tic_tac_toe()