Experiment 12: Tic-Tac-Toe Game

Aim:

Implement an Algorithm in Python for solving Tic-Tac-Toe Game.

Python Program:

```
class TicTacToe:
    def __init__(self):
        self.board = [[' ' for _ in range(3)] for _ in range(3)]
        self.current_player = 'X'

    def display(self):
        for row in self.board:
            print('|'.join(row))
            print('-----')
        print()

    def is_full(self):
        for row in self.board:
            if ' ' in row:
                return False
        return True

    def is_valid_move(self, row, col):
        if self.board[row][col] == ' ':
            return True
        return False

    def make_move(self, row, col):
        if not self.is_valid_move(row, col):
            return False
        self.board[row][col] = self.current_player
        if self.current_player == 'X':
            self.current_player = 'O'
        else:
            self.current_player = 'X'
        return True

    def check_winner(self):
        for row in self.board:
            if row[0] == row[1] == row[2] != ' ':
                return row[0]
        for col in range(3):
            if self.board[0][col] == self.board[1][col] == self.board[2][col] != ' ':
                return self.board[0][col]
        if self.board[0][0] == self.board[1][1] == self.board[2][2] != ' ':
            return self.board[0][0]
        if self.board[0][2] == self.board[1][1] == self.board[2][0] != ' ':
            return self.board[0][2]
        if self.is_full():
            return 'T'
        return 'N'
```

```
def main():
    game = TicTacToe()
    print("Tic Tac Toe")
    game.display()
    while True:
        row = int(input(f"Player {game.current_player}, enter the row (0-2): "))
        col = int(input(f"Player {game.current_player}, enter the column (0-2):
"))
        if 0 <= row < 3 and 0 <= col < 3:
            if game.make_move(row, col):
                game.display()
                result = game.check_winner()
                if result != 'N':
                    print(f"Player {'X' if game.current_player=='O' else 'O'} wins!")
                    break
                if game.is_full():
                    print("It's a tie!")
                    break
        else:
            print("Invalid input. Please enter a valid row and column.")

if __name__ == '__main__':
    main()
```

Output:

```
Player X, enter the column (0-2): 1
X|O|
-----
 |X|
-----
 | |
-----
Player O, enter the row (0-2): 0
Player O, enter the column (0-2): 2
X|O|O
-----
 |X|
-----
 | |
-----
Player X, enter the row (0-2): 2
Player X, enter the column (0-2): 2
X|O|O
-----
 |X|
-----
 | |X
-----
Player X wins!
```

Result:

Code has been Implemented successfully.