

Python Code :-

```
# Python3 program to find the next optimal move for a player
player, opponent = 'x', 'o'

# This function returns true if there are moves
# remaining on the board. It returns false if
# there are no moves left to play.
def isMovesLeft(board) :

    for i in range(3) :
        for j in range(3) :
            if (board[i][j] == '_') :
                return True
    return False

# This is the evaluation function as discussed
# in the previous article ( http://goo.gl/sJgv68 )
def evaluate(b) :

    # Checking for Rows for X or O victory.
    for row in range(3) :
        if (b[row][0] == b[row][1] and b[row][1] == b[row][2]) :
            if (b[row][0] == player) :
                return 10
            else if (b[row][0] == opponent) :
                return -10

    # Checking for Columns for X or O victory.
    for col in range(3) :

        if (b[0][col] == b[1][col] and b[1][col] == b[2][col]) :

            if (b[0][col] == player) :
                return 10
            else if (b[0][col] == opponent) :
                return -10

    # Checking for Diagonals for X or O victory.
    if (b[0][0] == b[1][1] and b[1][1] == b[2][2]) :

        if (b[0][0] == player) :
            return 10
        else if (b[0][0] == opponent) :
            return -10
```

```

if (b[0][2] == b[1][1] and b[1][1] == b[2][0]) :

    if (b[0][2] == player) :
        return 10
    else if (b[0][2] == opponent) :
        return -10

# Else if none of them have won then return 0
return 0

# This is the minimax function. It considers all
# the possible ways the game can go and returns
# the value of the board
def minimax(board, depth, isMax) :
    score = evaluate(board)

    # If Maximizer has won the game return his/her
    # evaluated score
    if (score == 10) :
        return score

    # If Minimizer has won the game return his/her
    # evaluated score
    if (score == -10) :
        return score

    # If there are no more moves and no winner then
    # it is a tie
    if (isMovesLeft(board) == False) :
        return 0

    # If this maximizer's move
    if (isMax) :
        best = -1000

        # Traverse all cells
        for i in range(3) :
            for j in range(3) :

                # Check if cell is empty
                if (board[i][j] == '_') :

                    # Make the move
                    board[i][j] = player

```

```

        # Call minimax recursively and choose
        # the maximum value
        best = max( best, minimax(board,
                                   depth + 1,
                                   not isMax) )

        # Undo the move
        board[i][j] = '_'

    return best

# If this minimizer's move
else :
    best = 1000

    # Traverse all cells
    for i in range(3) :
        for j in range(3) :

            # Check if cell is empty
            if (board[i][j] == '_') :

                # Make the move
                board[i][j] = opponent

                # Call minimax recursively and choose
                # the minimum value
                best = min(best, minimax(board, depth + 1, not isMax))

                # Undo the move
                board[i][j] = '_'

    return best

# This will return the best possible move for the player
def findBestMove(board) :
    bestVal = -1000
    bestMove = (-1, -1)

    # Traverse all cells, evaluate minimax function for
    # all empty cells. And return the cell with optimal
    # value.
    for i in range(3) :
        for j in range(3) :

            # Check if cell is empty
            if (board[i][j] == '_') :
```

```

        # Make the move
        board[i][j] = player

        # compute evaluation function for this
        # move.
        moveVal = minimax(board, 0, False)

        # Undo the move
        board[i][j] = '_'

        # If the value of the current move is
        # more than the best value, then update
        # best/
        if (moveVal > bestVal) :
            bestMove = (i, j)
            bestVal = moveVal

    print("The value of the best Move is :", bestVal)
    print()
    return bestMove

# Driver code
board = [
    [ 'x', 'o', 'x' ],
    [ 'o', 'o', 'x' ],
    [ '_', '_', '_' ]
]

bestMove = findBestMove(board)

print("The Optimal Move is :")
print("ROW:", bestMove[0], " COL:", bestMove[1])

```

Output:-

The value of the best Move is : 10

The Optimal Move is :

ROW: 2 COL: 2