Fr. Conceicao Rodrigues College of Engineering Fr. Agnel Ashram, Bandstand, Bandra (W), Mumbai - 400050

**Department of Computer Engineering**
**Academic Term II: 23-24**

**Class: B.E (Computer), Sem – VI Subject Name: Artificial Intelligence**

**Student Name: Royce Dmello Roll No: 9533**

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|---|---|
| **Practical No:** | **2** |
| **Title:** | Tic Tac Toe game implementation by Magic Square Method |
| **Date of Performance:** | 2/2/24 |
| **Date of Submission:** | 8/2/24 |

## Rubrics for Evaluation:

| Sr. No | Performance Indicator | Excellent | Good | Below Average | Marks |
|---|---|---|---|---|---|
| 1 | On time Completion & Submission (01) | 01 (On Time) | NA | 00 (Not on Time) | |
| 2 | Logic/Algorithm Complexity analysis (03) | 03(Correct ) | 02(Partial) | 01 (Tried) | |
| 3 | Coding Standards (03): Comments/indention/Naming conventions Test Cases /Output | 03(All used) | 02 (Partial) | 01 (rarely followed) | |
| 4 | Post Lab Assignment (03) | 03(done well) | 2 (Partially Correct) | 1(submitted) | |
| **Total** | | | | | |

**Signature of the Teacher:**



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# Experiment No: 2

**Title**: Tic Tac Toe game implementation by Magic Square Method

**Objective:** To write a computer program in such a way that computer wins most of the time using Magic Square Method

## Theory:

A player who places his coins first across the same row or same column or same diagonal wins the game. Let us take a magic square of order 3 x 3 (for 3 coins game). The sum of the numbers across rows, columns and diagonals are the same - it is 15. That is, a player who places his coins such that he gets the perfect score of 15 takes the prize.

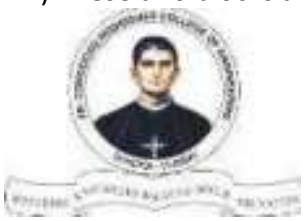
1) Board is considered to be a magic square of size 3 X 3 with 9 blocks numbered by numbers indicated by the magic square.
2) This representation makes the process of checking for a possible win simpler.
   Board Layout as magic square. Each row, column and diagonals add to 15.

| | | | |
|---|---|---|---|
| 8 | 3 | 4 | **15** |
| 1 | 5 | 9 | **15** |
| 6 | 7 | 2 | **15** |

3) Maintain the list of each player's blocks in which he has played.
   Consider each pair of blocks that the player owns.
   Compute difference D between 15 and the sum of the two blocks.

If D < 0 or D > 9 then

i) These two blocks are not collinear and so can be ignored.



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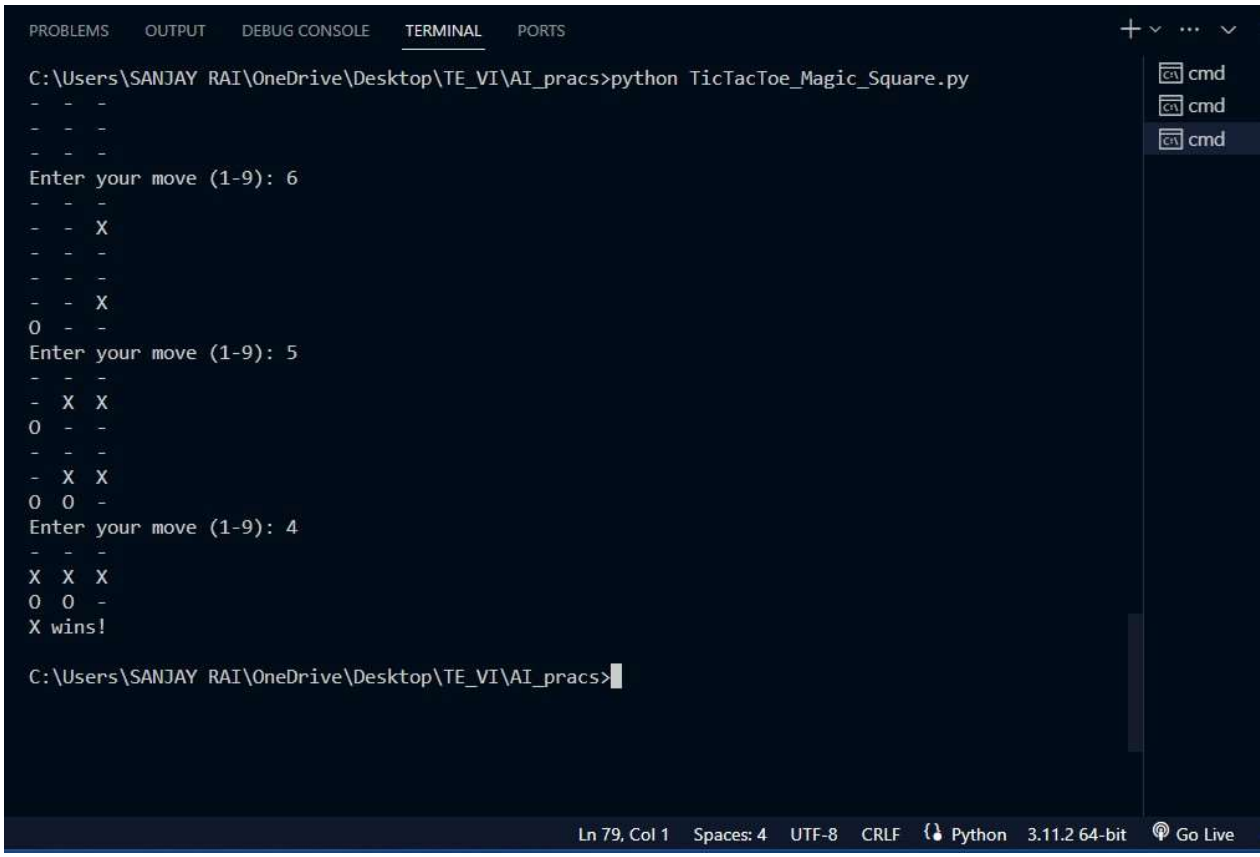
ii) Otherwise, if the block representing difference is blank (i.e., not in either list) then a move in that block will produce a win.

**OUTPUT:**




**Post Lab Assignment:**

1. What is the relationship between tic-tac-toe and magic square?
2. What is a magic square of order n?

Name: Royce Dmello

Postlab Assignment Exp 2

Q.1.) What is the relationship between tic-tac-toe and magic square?

→ 1.) Tic-tac-toe and magic square related through the arrangments game board

2.) In Tic-tac-toe players aim to winning combinations of their mar rows, column and diagonals.

3.) A magic square is a grid where the of numbers position on the tic-tac-t the same

4.) By using the numbers of a magic we can easily identify winning co in tic-tac-toe.

Q2.) What is a magic square of order?

→ A magic square is a square grid containi arranged in a way that each row, column a add up to the same constant sum.

The order of the magic square re the numbers of rows and column for a magic square of order n, it 2 rows and n columns

The number used in a magic square n range from 1 to $n^2$

The sum of each row column, and di in a magic square of order n is call magic constant, denoted by M.

formulas for calculating the magic (M) of the magic square of order

$$M = \frac{n(n^2+1)}{2}$$

where M → magic constant

n → order of magic squa