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: Jatin Jaywant Kadu Roll No: 9548

Practical No:	**2**
Title:	Tic Tac Toe game implementation by Magic Square Method
Date of Performance:	
Date of Submission:	

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.

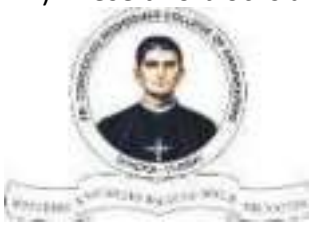
1) Board is considered to be a magic square of size 3 X 3 with 9 blocks numbered by numbers indicated by the magic square.
2) This representation makes the process of checking for a possible win simpler.
   Board Layout as magic square. Each row, column and diagonals add to 15.

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:

```
PS C:\Users\hacke\OneDrive\Desktop\SEM VI\AI> & C:/Users/hacke/AppData/Local/Programs/Python/Python311/py
thon.exe "c:/Users/hacke/OneDrive/Desktop/SEM VI/AI/TicTacToe_Magic_Square.py"
-  -  -
-  -  -
-  -  -
Enter your move (1-9): 6
-  -  -
-  -  X
-  -  -
-  -  -
-  -  X
O  -  -
Enter your move (1-9): 5
-  -  -
-  X  X
O  -  -
-  -  -
-  X  X
O  O  -
Enter your move (1-9): 4
-  -  -
X  X  X
O  O  -
X wins!
```

Post Lab Assignment:

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

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Class: TE Comps A

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Post lab: Experiment 2

Q1 What is relation between Tic Tac Toe and magic game?
→ 1 Tic Tac Toe and Magic Square are related through arrangement of game board
2 In Tic Tac Toe player aim to create winning combination of marks on row, column or diagonal
3 A magic square is good when sum of number in each row, column or diagonal same
4 The number on magic board can represent position of Tic Tac Toe
5 By using number of magic square we can easily identify winning combination of Tic Tac Toe

Q2 What is magic square of order n?
→ 1 A magic square grid containing number arranged in way that each row, column & diagonal add up to same constant.
2 The order of magic square refer to number of rows or column it has.
3 For a magic square of order n, it has n rows & n columns
4 The number used in a magic square of order n range from 1 to n^2
5 The sum of each row, column & diagonal a magic square of order n is called magic constant.
Formula for calculating magic constant of magic order n

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

Where M → Magic Constant
n → order of magic square