* Data Structure Lab (DSL) - Practical Number - 3 (Group - A)

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Title :-
Write a python program for magic square.

Aim :-
Write a python program for magic square. A magic square is a n*n matrix of the integers 1 to n^2 such that the sum of each row, column and diagonal is the same.

Objective :-
1) To study the creation of matrix using list in python.
2) To understand the concept of magic matrix.

Theory :-
A magic square is a n×n matrix of integers 1 to n^2, such that the sum of each row, column and diagonal is same. This sum is called magic constant or magic sum. It depends only on N and has the following value

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

Example:-

Magic square when n = 3.

2	7	6
9	5	1
4	3	8

Sum in each row, column and digonal = $\frac{3(3^2+1)}{2} = 15$.

Algorithm:-

Step 1- Start.

Step 2- Display menu to the user.

Step 3- If user wants to generate magic square matrix then accept the size of the matrix.

Step 4- Create magic square matrix for the given order and display it.

Step 5- If user wants to check a matrix for magic square then accept the order of the matrix and all the elements in matrix.

Step 6- Calculate the sum of elements of each row, column and digonal.

Step 7- If all the sum are equal, then it is a magic square.

Step 8 - If user wants to continue then go to step 2.

Step 9 - Otherwise, Stop.

Analysis:-

Time complexity of function are:-

1) Magic Matrix () → $O(n)$
2) print Matrix () → $O(n^2)$
3) check Matrix () → $O(n^2+n)$

Conclusion:-

Hence, we have created and checked magic square matrix.