Assignment - 5

Problem Statement:

Write a program in C to perform basic matrix operations such as:

1. Addition of two matrices
2. Saddle point of a matrix
3. Inverse of a matrix
4. Magic square of a matrix

Code:

```c
#include <stdio.h>

int main()
{
    int n, i, j;
    int a[10][10], b[10][10], sum[10][10];
    int saddle = 0;
    int magic = 1;
    int rowSum, colSum, diag1 = 0, diag2 = 0;

    printf("Enter order of matrix: ");
    scanf_s("%d", &n);

    printf("Enter elements of Matrix A:\n");
    for (i = 0; i < n; i++)
        for (j = 0; j < n; j++)
            scanf_s("%d", &a[i][j]);

    printf("Enter elements of Matrix B:\n");
    for (i = 0; i < n; i++)
        for (j = 0; j < n; j++)
            scanf_s("%d", &b[i][j]);

    // Matrix Addition
    printf("\nAddition of Matrices:\n");
    for (i = 0; i < n; i++)
    {
        for (j = 0; j < n; j++)
        {
            sum[i][j] = a[i][j] + b[i][j];
            printf("%d ", sum[i][j]);
        }
        printf("\n");
    }
```

```
    }

    // Saddle Point
    for (i = 0; i < n; i++)
    {
        int min = a[i][0], col = 0;
        for (j = 1; j < n; j++)
        {
            if (a[i][j] < min)
            {
                min = a[i][j];
                col = j;
            }
        }

        int flag = 1;
        for (j = 0; j < n; j++)
        {
            if (a[j][col] > min)
            {
                flag = 0;
                break;
            }
        }

        if (flag)
        {
            printf("\nSaddle Point found: %d\n", min);
            saddle = 1;
        }
    }
```

```c
    if (!saddle)
        printf("\nNo Saddle Point found\n");

    // Magic Square
    for (i = 0; i < n; i++)
    {
        rowSum = colSum = 0;
        for (j = 0; j < n; j++)
        {
            rowSum += a[i][j];
            colSum += a[j][i];
        }
        if (rowSum != colSum)
            magic = 0;
    }

    for (i = 0; i < n; i++)
    {
        diag1 += a[i][i];
        diag2 += a[i][n - i - 1];
    }

    if (diag1 != diag2)
        magic = 0;

    if (magic)
        printf("\nMatrix is a Magic Square\n");
    else
        printf("\nMatrix is not a Magic Square\n");

    return 0;
}
```

Input & Output: