1. The LU decomposition of a matrix produces a matrix as a product of its lower triangular matrix and upper triangular matrix. The LU in LU Decomposition of a matrix stands for Lower Upper.

   Given matrix is:
   1 1 0
   2 1 3
   3 1 1
   The L matrix is:
   1 0 0
   2 -1 0
   3 -2 -5
   The U matrix is:
   1 1 0
   0 1 -3
   0 0 1

   Also explain the Time Complexity of the Approach.

2. You are given an n x n integer matrix. You can do the following operation any number of times:
   Choose any two adjacent elements of matrix and multiply each of them by -1.

   Two elements are considered adjacent if and only if they share a border.

   Your goal is to maximize the summation of the matrix's elements. Return the maximum sum of the matrix's elements using the operation mentioned above.

   Input: matrix = [[1,-1],[-1,1]]

   Output: 4

   Explanation: We can follow the following steps to reach sum equals 4:

   - Multiply the 2 elements in the first row by -1.

   - Multiply the 2 elements in the first column by -1.

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   Input: matrix = [[1,2,3],[-1,-2,-3],[1,2,3]]

   Output: 16

   Explanation: We can follow the following step to reach sum equals 16:

    - Multiply the 2 last elements in the second row by -1.
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3. Given an 2-d Array in which each row and column is sorted. Find that the given element is present in the given matrix in better than O(n^2) approach. Also, explain the solution complexity.