Matrix Multiplication

## Description

Given TWO square matrices of size ***N***×***N***, implement an **efficient algorithm** based on **Strassen’s** method to multiply them?

**NOTE:**

* ***N*** is power of 2 (i.e. 2, 4, 8, 16, 32… 2i)

## Complexity

The complexity of your algorithm should be **less than O(N3)**

## Evaluation

|  |  |  |
| --- | --- | --- |
| **Sample Cases**  (Correctness) | **UNSEEN Large Cases**  (Efficiency) | **Total** |
| 2 Marks | 6 Marks | 8 MARKS |

## Bonus & Competition#2

|  |  |  |
| --- | --- | --- |
|  | **Criteria** | **BONUS** |
| **Vs.** **Naïve**  (on Large Cases) | **Just Faster** | +1 Mark |
| **1x Faster** | +3 Marks |
| **[N]x Faster** | +**[N]x2** Marks |
| **TOP5** | Correct & Speed | 2~4 Marks |

Function: **Implement it!**

static public int[,] MatrixMultiply(int[,] M1, int[,] M2, int N)

MatrixMultiplication.cs includes this method.

## Examples

|  |  |  |  |
| --- | --- | --- | --- |
| **EX#1** | | **EX#2** | |
| **M1:**   |  |  | | --- | --- | | 1 | 1 | | 1 | 0 | | **M2:**   |  |  | | --- | --- | | 1 | 1 | | 1 | 0 | | **M1:**   |  |  |  |  | | --- | --- | --- | --- | | 1 | -1 | 1 | -1 | | 1 | -1 | 1 | -1 | | 1 | -1 | 1 | -1 | | 1 | -1 | 1 | -1 | | **M2:**   |  |  |  |  | | --- | --- | --- | --- | | -1 | 1 | -1 | 1 | | -1 | 1 | -1 | 1 | | -1 | 1 | -1 | 1 | | -1 | 1 | -1 | 1 | |
| **Res:**   |  |  | | --- | --- | | 2 | 1 | | 1 | 1 | | | **Res:**   |  |  |  |  | | --- | --- | --- | --- | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | |

# C# Help

## Getting the size of 1D array

int size = array1D.GetLength(0);

## Getting the size of 2D array

int size1 = array2D.GetLength(0);

int size2 = array2D.GetLength(1);

## Creating 1D array

int [] array1D = new int [size]

## Creating 2D array

int [,] array2D = new int [size1, size2]

## Sorting single array

Sort the given array "items" in ascending order

Array.Sort(items);

## Sorting parallel arrays

Sort the first array "master" and re-order the 2nd array "slave" according to this sorting

Array.Sort(master, slave);