Lab 11: Divide & Conquer

CS2110 Programming Lab

November 3, 2014

Introduction

Please solve the following problems using the divide and conquer approach.

1 Inversions

Calculate total number of inversions in an array. An inversion in an array $(a_1, a_2, ...a_n)$ is a pair (a_i, a_j) such that $i < j$ and $a_i > a_j$

1.1 Input

First line contains size of array (N). Second line contains N elements of the array.

1.2 Output

One line containing number of inversions

1.3 Example

Input:
5
2 3 1 5 4
Output:
3
Explanation:
There are three pairs (2,1), (3,1) & (5,4)

2 Block multiplication

Do matrix multiplication using the block method. Assume both input matrices, say A & B are square matrices of size n where n is of the form 2^k

2.1 Input

First line contains size of the matrix (N). It is followed by 2N lines. First N lines corresponds to N rows of matrix A while the following N lines corresponds to matrix B.

2.2 Output

N lines of the output matrix C where C= A*B.

2.3 Example

Input:
2
1 2
3 4
1 3
2 4

Output:
5 11
11 25