Computer Architecture Homework

October 19, 2012

Abstract

Homework for 2012/10/19

Today's homework:
Take the two matrices:

$$A = \begin{pmatrix} 1 & 0 & 3.14 & 2.72 \\ 2.72 & 1 & 0 & 3.14 \\ 1 & 1 & 1 & 1 \\ 1 & 2 & 3 & 4 \end{pmatrix} \tag{1}$$

$$B = \begin{pmatrix} 1 & 1 & 0 & 3.14 \\ 0 & 1 & 3.14 & 2.72 \\ 0 & 1 & 1 & 0 \\ 4 & 3 & 2 & 1 \end{pmatrix} \tag{2}$$

Do the following:

1. Find the matrix product AB. Do this by hand, and show your work.
2. Count
   (a) the number of real (floating point) multiplications necessary, and
   (b) the number of real (floating point) additions necessary.
3. Express
   (a) the number of real (floating point) multiplications necessary, and
   (b) the number of real (floating point) additions necessary

   as a function of N for multiplying two $N \times N$ matrices.
4. Write pseudocode for a program to multiply two $N \times N$ matrices.