jobandtalent

Challenge 3: Determinant

In linear algebra solving the determinant of a matrix is an important operation.

The way is taught in school is by taking any row or column and suming the multiplication of each of the elements (alternating its sign) with the determinant of the submatrix that results when the row and column of the element is eliminated.

An example would help to understand this better.

Given the matrix A = $\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$

Its determinant could be obtained by taking the first row and alternately sum the submatrices determinants:

$$det(A) = a * (1) * det(\begin{bmatrix} e & f \\ h & i \end{bmatrix}) + b * (-1) * det(\begin{bmatrix} d & f \\ g & i \end{bmatrix}) + c * (1) * det(\begin{bmatrix} d & e \\ g & h \end{bmatrix})$$

where the determinant of a 2 * 2 matrix is:

$$det(\begin{bmatrix} a & b \\ c & d \end{bmatrix}) = a * d - c * b$$

1. Implement a program in any programming language of your choice to calculate the determinant of matrix:

$$B = \begin{bmatrix} 3 & -3 & 3 \\ 3 & 8 & -4 \\ 9 & 4 & 2 \end{bmatrix}$$

2. Implement a program that could solve n * n size matrices. The input for the program could either be a reading a text or csv file or input manually by the command line. Show us the program.

3. How long will it take to calculate a 100 * 100 size matrix? Assume that the number of multiplications a cpu can do is on the same order of their frequency ex 3.7Ghz would be aprox 3 Giga flops.