Program for multiplying matrices (sequential and omp)

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Requirements

- calculation of A[n][n] * B[n][n] = C[n][n]
- different sizes of matrices
- dynamical bufferallocation
- time measurement
- logging
- different methods for multiplication (sequential and parallel with openMP)

Installation

- unpack the benno_waldhauer_seq_omp.zip
- copy all files to your preferred folder
- go to these folder
- type in „make“ to compile the program

Use of the programm

To start the program go to the installationfolder.

There are 2 possibilities to start the program.

1. without passing arguments
    1. type ./prog
    2. The program welcomes you and ask for the matrices dimensions. Type them in.
    3. Then you will be asked for the print options. Type in 0,1,2 or 3
    4. The program calculates and prints the results, every execution is logged (see log.txt)
2. with passing arguments
    1. type ./prog (int dimension n) (int dimension m) (int dimension p) (int print option)
       e.g. ./prog 500 400 300 1 (A[p][n] * B[n][p] = C[m][p])
       e.g. ./prog 100 100 100 0 (print option: 0 nothing, 1 screen, 2 file, 3 screen and file)
    2. The program calculate and print like in the first start possibilty

Run a lot of test cases in one step

To execute a line of test cases execute usecases.sh by typing ./usecases.sh. These script runs the program for a line of matrices dimensions. Every dimension size will be repeated 1 times with sequential and parallel (omp) method. Every execution is logged (look at log.txt) but nothing will be printed to screen or file.The script could be easyly costumized for different series of tests. For testcases there will be used two scare matrices (A[n][n] * B[n][n] = C[n][n])

Logfile

In log.txt every execution will be logged.
The Header of log.txt

LogID;Timestamp when Programm starts [s from 01.01.1970];
m,n,p;Dimensions of the matrices (A[m][n] * B[n][p] = C[m][p]);
print option;0=nothing 1=screen 2=file(LogID_xxxxxxxxxx.txt) 3=screen and file;
multipliTime;Time[s] for multiplication;
multipliType;Type of multiplication;
numOfProc;Number of Processors on the machine;

LogID;print option;m;n;p;multipliTime;multipliType;numOfProc;

You can easy import the file log.txt easyly with e.g. open office calc and work with the logs. (Have a look at ods_import.pdf)

If print option 2 or 3 ware chosen, the a file Result_LogID_xxxxxxxxxx.txt will be printed. These file also can be easyly imported in calculation programs.

All log-files are locates in the „log“ folder.

Comparison of sequential and omp method

For very smal square matrices the sequential method for multiplication is faster then the parallel method with omp. When the dimensions of the matrices to multiply becomes bigger then 100 x 100, then the omp method becomes faster. So the strenghts of omp matricemultiplication is the work with great matrixdimensionsl. Also have a look at „ods-import.pdf“. There you will find a visual idea of this.