High-Performance Computing

Laboratory 4:

Performance measurements

Objective:

- benchmark of the processor and the memory-processor system

Tasks:

1. Create a working directory (eg lab_4).
2. Copy and extract files(in two different subdirectories) linpack.tgz and stream.tgz
3. Obtain the information about the theoretical CPU performance (MFLOPS) and the processor-memory interface speed (MB/s) (eg, file /proc/cpuinfo, /proc/meminfo and based on the Internet)
4. Start STREAM test and measure the performance.
    - measurements for different sizes in the range 10000 - 10000000, the results should be presented in the form of a chart (X-axis - size (scale may be logarithmic), Y-axis – time)
5. Comparison of the results obtained from theoretical estimates of the memory access time recalculated to the throughput and capacity of the memory-processor bus.
6. Start LINPACK test - note the complete printout from LINPACK: measurement methodology (repetition of calculations, the use of two sizes of the array - array padding, the accuracy of the system of equations solved), calculate the result in MFLOPS.
7. Carry out performance measurement for the series of 10 measures for sizes from 100 to 1000 (steps of 100) - with options DP and SP, and UNROLL and ROLL)
8. Create tables and charts with the results - performance in GFLOPS for different cases and sizes.
9. Compare the test results and theoretical estimates (which transfer rate from memory to the processor are achieved in individual cases? Whether Linpack performance is limited by the memory access speed, whether by the CPU processing speed?)

Assessment:

- Class attendance and a report with all results and charts for a chosen system. At the beginning of the report should be a table with the benchmarked system specification.