

Task 04

General requirements

Please submit the assignment as a ***.zip** archive, where every problem is stored in its own subdirectory. All the code must be well-commented and must come with a Makefile which builds a program. Notes and explanations may come in a separate file in the problem's directory. For notes and explanations use text or pdf format.

1 Problem 1.1

Write a sequential C program that initialises two static arrays **a** and **b** with 1000 integer values each and then adds **b** to **a** element-wise. Repeat the additions many times so that you obtain several seconds overall runtime. You may use 100.000 iterations as a first guess.

2 Problem 1.2

Write a parallel version of the program which implements the addition as a data-parallel operation using **n** pThreads where **n** can be specified as a commandline parameter.

3 Problem 1.3

Compare the runtimes of your two versions (sequential/parallel). Make sure you test several different numbers of threads up to at least 30 threads. Write a little summary of your observations (<200 words) and present your measurements. Make sure you include a brief description on how you obtained your measurements and what architecture/hardware you used for your measurements.

4 Problem 1.4

This particular data-parallel operation can be implemented without any synchronisation other than a final synchronisation of all threads. Investigate the impact of a

F29OC OPERATING SYSTEMS AND CONCURENCY

barrier synchronisation after each individual addition for varying numbers of threads. Write a little summary of your observations and try to come up with an explanation for your results (<200 words).

Hand-out: 26/02/2013

Hand-in: 12/03/2013