OpenMP Exercises, set 1

Exercise 1

Fill in the details and run the hello.c example.

Exercise 2

Take the examples of use of the OpenMP directives from the slides and test them in real programs. In particular, you should test the shared, private and nowait clauses, the various forms of the schedule directive, including the runtime option.

Exercise 3

Test the `IF`, `NUM_THREADS` and `FIRSTPRIVATE` clauses.

Exercise 4

Write an OpenMP code that implements and tests a dot product using the `CRITICAL` construct; then, try the `REDUCTION` clause. What differences can you detect?

Exercise 5

Starting from the serial code `matrix_add.c`, modify it according to the instruction in the source and parallelize with OpenMP. What parallel efficiency can you obtain? When obtaining timings of the best serial algorithm, remember that implementing the OpenMP API has a performance cost.

Exercise 6

Study the serial code `sorting.c`: how does it work? Can you parallelize it with OpenMP? What parallel efficiency can you obtain?

Exercise 7

Execute the EPCC OpenMP microbenchmarks to measure the implementation overheads. Find the benchmark online and use `wget` to download. You will need to edit `Makefile.defs` to use the correct compiler and C flags, since the `Makefile` imports this file.