



Exercise Sheet #02

Learning Objectives

After completing the exercise sheet, you should be able to:

- Apply learned basics in two more realistic use-cases

Exercise 1 – Basic OpenMP directives

The file `e2_1.c` contains simple code snippets each containing a different error. Please fix.

Exercise 2 – Sudoku

The file `sudoku.c` contains the functions for solving a Sudoku with a brute-force method to find the fitting numbers. Please complete the code using parallel methods.

Use different SCHEDULE options to see the difference in the performance. Summarize your conclusion

Exercise 3 – Partial differential equation

The file `partial.c` contains the basics for the solving the time dependent partial equation also called the heat equation. It uses a 3rd order Runge-Kutta time stepping scheme. Please increase the performance by using OpenMP. What can be parallelized and what can't. Summarize your conclusions.

After compiling the code you can call it with two arguments, e.g. `partial 100 0.01`, where the first parameter gives you the number of grid points and the second the length of the timestep. When using more grid points you have to use a smaller time step. If the time step is too big you will get NaN.

Exercise 4 – Synchronization Clauses

- a) Please describe the difference between the “critical” and the “atomic” clause.
- b) Please describe the “firstprivate” clause.