The INF(4)3331 speed challenge

This challenge gives no points, but the best submissions will get prizes :). The results will be discussed (and prizes handed out) on Nov 3rd.

Challenge 1: Fastest timestep loop

In this challenge, we are looking for the fastest implementation (in terms of CPU-time) of the heat equation solver (exercises 5.1-5.4). You may choose which implementation to use (Numpy, swig, cython, . . .).

Your submission must solve the heat equation and report the total time spent in the time-loop (that is reading command line arguments, initialisation of the arrays, etc. are not included in the runtime). The model must be set up with following parameters:

- nu = 1
- n = 100
- m = 200
- t0 = 0
- t1 = 5000
- dt = 0.1
- f = 1 everywhere
- u0 = 0 everywhere

The solution should be submitted to `week8/speedcompetition/challenge1` before Sun, Nov 1st, 23:59. The directory should contain

- All required source code to reproduce the submission
- A Readme.txt file that states the achieved CPU time (submit the smallest time if you performed multiple experiments), the machine used, and explains how to rerun the benchmark.

Challenge 2: Smallest error

In this challenge, we are looking for the setup that produces the smallest error in exercise 5.3. The size of the rectangle, the viscosity (nu), the final time and the timestep may be changed to achieve a smaller error.

The solution should be submitted to `week8/speedcompetition/challenge2` before Sun, Nov 1st, 23:59. The directory should contain

- All required source code to reproduce the solution

- The solution at the final timestep as a pickle file (a link to an external file is allowed if it is too big)
- A Readme file that states the error achieved and explains how to reproduce the result. It should also state the machine used and the (approximate) runtime required run the program.

Happy coding!