Project exam

The objective of the project-exam is to experiment parallel programming by means of the implementation of a parallel version of the well-known Bellman-Ford algorithm for solving the single source shortest path problem on weighted graphs. Both languages studied during the lectures should be considered, by implementing the parallel Bellman-Ford algorithm both in C/OpenMP and in CUDA C.

The parallel version of Bellman-Ford to be implemented is left unspecified on purpose; the student can freely decide how to parallelize such algorithm.

Your project work must be described in a PDF document (of at most 6 pages) in which you describe the considered parallel version of the Bellman-Ford algorithm, the way in which it was implemented in C/OpenMP and in CUDA C, and how the two implementations have been experimentally evaluated. Concerning this last point, you should describe the approach taken to evaluate the performances of your implementations, and the final results about their parallel scalability.

All your experiments should be reproducible, namely, you should submit a zip file with your source code, input data, and scripts to compile and launch your project. As a common execution platform, we will consider the hpc cluster *slurm.cs.unibo.it* offered by the DISI department:
https://disi.unibo.it/it/dipartimento/servizi-tecnici-e-amministrativi/servizi-informatici/utilizzo-cluster-hpc

You must submit your zip file via the "virtuale" web page of the course. Your project will be unzipped on *slurm.cs.unibo.it*. Once unzipped, a file named "project.sbatch" should be present, in order to be able to compile and execute your project simply by launching "sbatch project.sbatch". Another file named "project.pdf" will contain the PDF document described above. Notice that, in order to avoid inconsistencies in the format of the files, you should zip your files directly on *slurm.cs.unibo.it*. In fact, zipping files on different operating systems (eg. Windows) could produce script files in a format that cannot be directly launched in Linux.

You can submit your project exam whenever you want. After you have uploaded your project, please send also an email to *gianluigi.zavattaro@unibo.it* to notify the submission. The final deadline for the submissions is September 30th, 2024.