Assignment 2: practical aspects of polynomial algorithms design

Part 1: parallel algorithm design

- Pick any polynomial problem in your area of interest and write a polynomial deterministic solution using your favorite programming language.
- Implement a parallel version of the same algorithm. Adopt the divide and conquer strategy. The solution must produce the same output on all inputs. Provide the necessary testing.
- Estimate the work and parallelism using Θ-notation.

Part 2: scalability evaluation

- Using results of part 1, quantify real-life scaling effects. Answer the questions: how theoretical parallelism estimation correlates to measurements.
- Establish a benchmarking system (use any available existing tools or create your own). Measure the real scaling factor and compare it to your estimation in part 1.
- Describe the measurement methodology. Quantify observer effects (caches, overheads, HW-modes like hyper-threading, etc).
- Estimate the potential for improvement on the same HW (headroom study; use high-level parameters like TOPS).

Notes on submission

- Deadline: 11:59 pm Nov 15th
- Form: a single PDF per part and/or a link to a GitHub repo. Inline comments for complexity analysis.
- Where to send: petr.kurapov@gmail.com with email topic in the form:
  - <surname> computational complexity 2024 assignment 2