20875 Software Engineering

Tutorial 7 – multithreading challenge

We want to write a multithreaded version of the filtering exercise in Tutorial 5. Specifically:

> Our code must open a file (whose path is passed as an argument) and read it as a stream of unsigned 8-bit integers. It writes to standard output (still as unsigned 8-bit integers), only those who are divisors of 873248763249102240.

Download `filter_c0.c`, and make the code multithreaded.

- **Track 1:** You can use LLMs. One bonus point on Assignment 2 if you finish by 11:00 and your code is 25% faster than a vanilla LLM-generated code.
- **Track 2:** You cannot use LLMs. One bonus point on Assignment 2 if you finish by 11:30 and you get at least 2.5× speedup when run with 8 or more threads.

Details: Send me your code by email and specify whether or not you used LLMs. Tests will be run on a computer with 12 cores (AMD ryzen 9 7900x3d). Input will be a large file with unsigned 8-bit integers following a uniform random distribution. You can assume that the file will be fully cached in memory.