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Concepts of Parallel and Distributed Systems – Project 1

For this assignment, I attempted several methods to parallelize the gaussian elimination algorithm using pthreads in C. One failed attempt of note was trying to iterate through the outer k loop simultaneously with N threads, but this ran into some issues with thread scheduling and thus the results were often incorrect at N>10. The most successful version I was able to create simply threaded the I loop within the k loop, using as many threads as the computer I ran it on had processors.

Due to Kraken being in use by another professor for research, it was running slow and so I could not run my program on its 22 cores. Instead, I ran on regular CS lab machines which have 2 hyperthreaded cores, and I believe this is why I had a speedup of only 1.2 for N=16384, although my speedup was actually higher for N=4096,1024, and 256, obtaining 1.4, 6.9, and 6.3 respectively. There was some difficulty in completing the test runs for N=16384, because RIT CS accounts only have half a gigabyte of storage space initially, and the input file I produced, including only the required numbers and spaces, was over one and a half gigabytes.