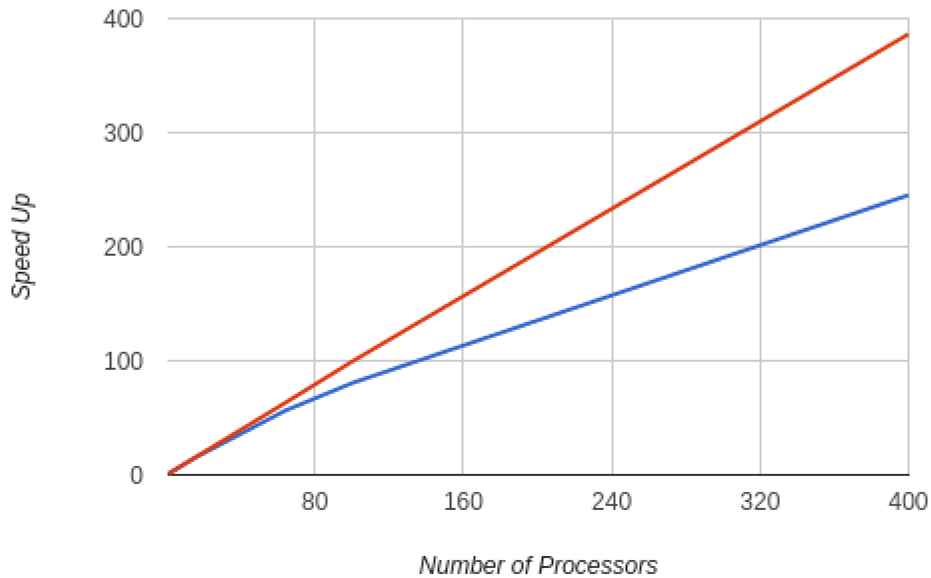
Gary Tang
ICS 632

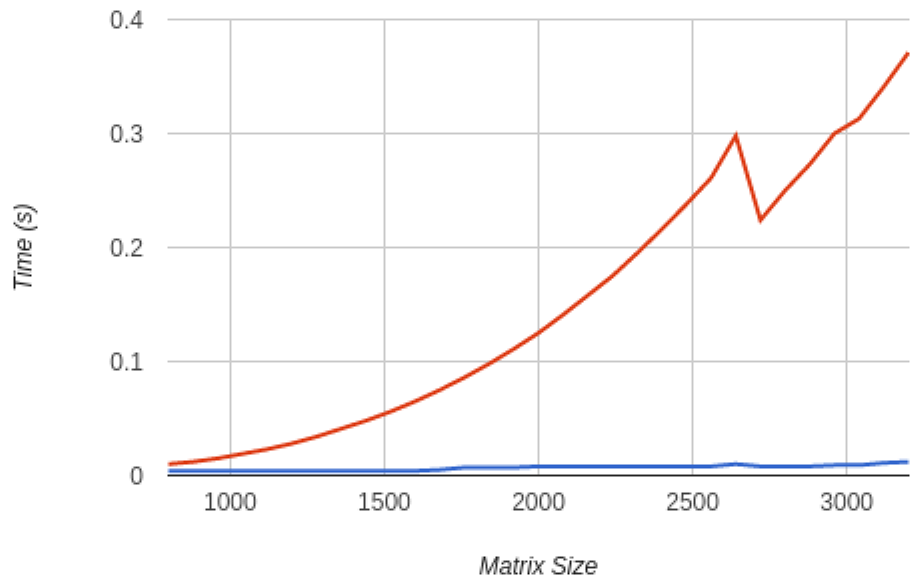
HW 4

3.



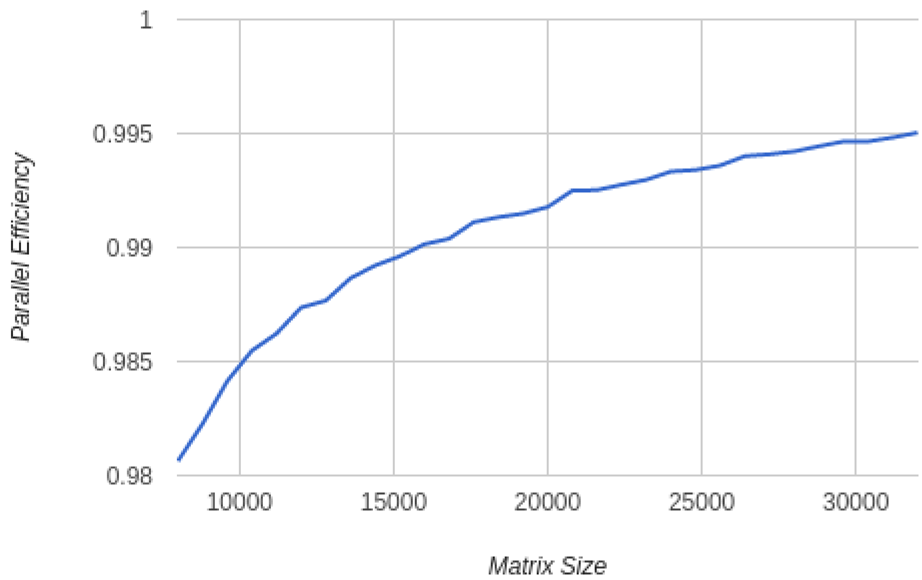
The red line represents the ideal case. The blue line represents the non-ideal case. The ideal case has a maximum parallel efficiency of 99% at 4, 16, and 100 processors. The minimum parallel efficiency is 96% with 400 processors. The non-ideal case has a maximum parallel efficiency at 99% with 4 processors. The parallel efficiency decreases as the number of processors increase. At 400 processors, the parallel efficiency is 61%. On a ideal machine, this application can be scaled well up 400 processors. The parallel efficiency remains greater or equal to 96% and the speedup is linear.

4.



Computation time is represented by red. Communication time is represented by blue. As the matrix size increases, computation time increases. It makes sense larger matrices take more time to compute. Communication time does not increase much as the matrix size increases. This is good news for our non-ideal platform. When computing large matrices, the overall execution time will not be affected much by the non-ideal platform's slower network.

5.



The FLOP_CALIBRATION_FACTOR was discovered empirically to be 9. As the matrix size increases, the parallel efficiency increases. This curve reveals that our non-ideal platform is able to compute large matrices with high parallel efficiency when the matrix size is as large as 30,000 by 30,000.

6.
On a matrix size of 30,000 by 30,000, the first implementation had a speedup of 63.9. The parallel efficiency was 100%. Over 5 trials, the computation times remained consistently 380 s.