CS 422 Program #01

1. Columnsort results

An array of size 2^{26} was used for the speedup measurements, and testing was done on my local machine. The reported timings are the median of three runs for each respective timing.

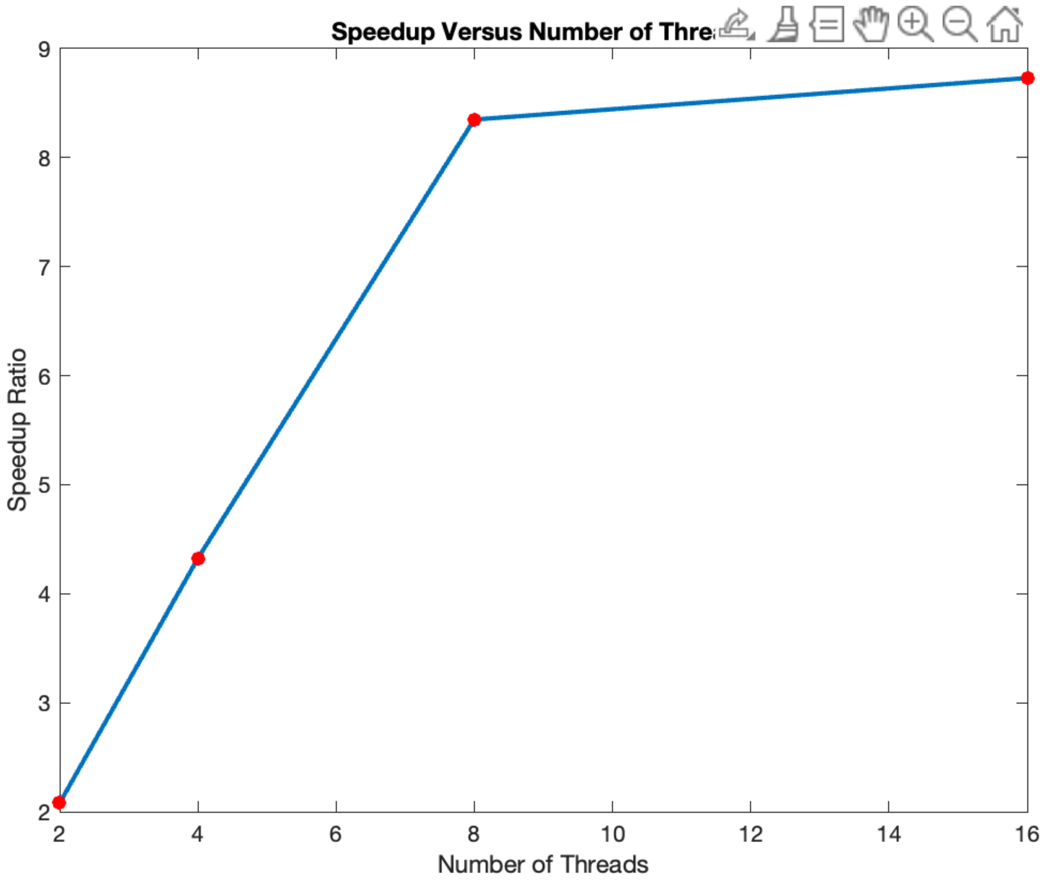

Figure 1: A plot of speedup of multi-threaded columnsort compared to sequential columnsort versus the number of threads for a 2^{26} size array. Diminishing returns start past 8 threads which indicate limits of shared L3 cache (RAM) and the number of CPU cores.

`threadColumnSort.c` for a 2^{26} size array with 2 threads took 3.128 seconds, and with 4 threads took 1.504 seconds. `seqColumnSort.c` for the same-sized array took 6.504

seconds. The ratio of the speedup for 2 threads and 4 threads compared to sequential columnsort is computed as follows.

$$\frac{time\ for\ sequential}{time\ for\ 2\ threads} = \frac{6.504\ s}{3.128\ s} = 2.079$$

$$\frac{time\ for\ sequential}{time\ for\ 4\ threads} = \frac{6.504\ s}{1.504\ s} = 4.325$$