Serial Program:

It iterates through the lines one by one, and records the data in a city struct and processes the data at the end.

Time: 0.56 seconds

Parallel 1:

It iterates through the file in parallel and each thread tries to write to one single array, compiling all the data

Problems: A lot of overhead with only one thread being able to record data at a time. Also, doesn’t efficiently iterate through the file

threads: 1 2 3 4 8

Time: 2.4 2.1 1.7 1.5 2.5 seconds

Parallel 2:

It is much like parallel 1 but instead of every thread trying to write to a single array, each thread has its own array and then the arrays are merged together at the end

Problems: It doesn’t iterate over the file in an efficient manner, reading at several places at once in the same file is expensive

Cores: 1 2 3 4 8

Time: 2.4 1.8 1.4 1.3 2.9 seconds

Parallel 3: Much like parallel 2, it just loads the file into memory before doing any processing, saving the costly penalty of jumping around in the file

Cores: 1 2 3 4 8

Time: 0.52 0.31 0.24 0.22 0.35 seconds

All of this was run on a M1 MacBook air with 8 cores,