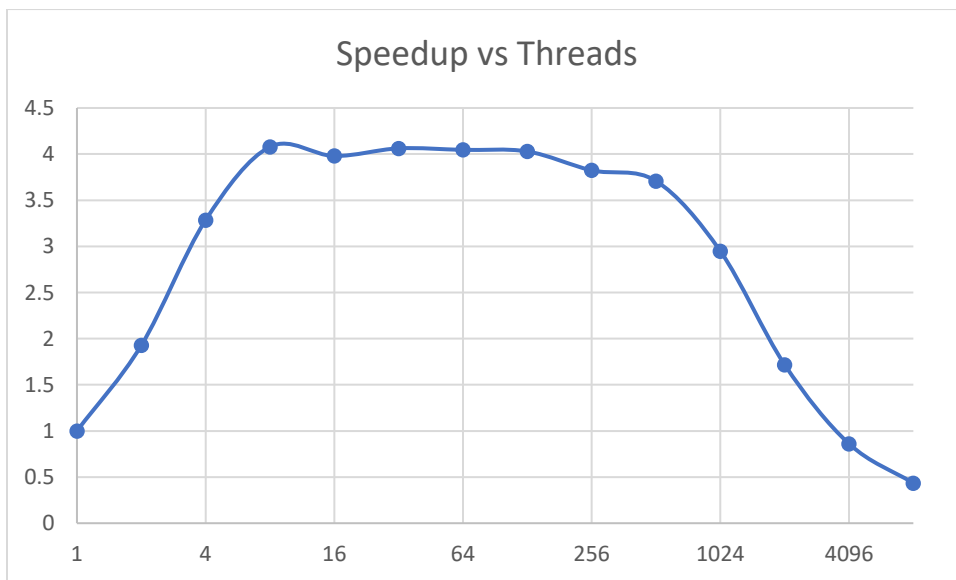
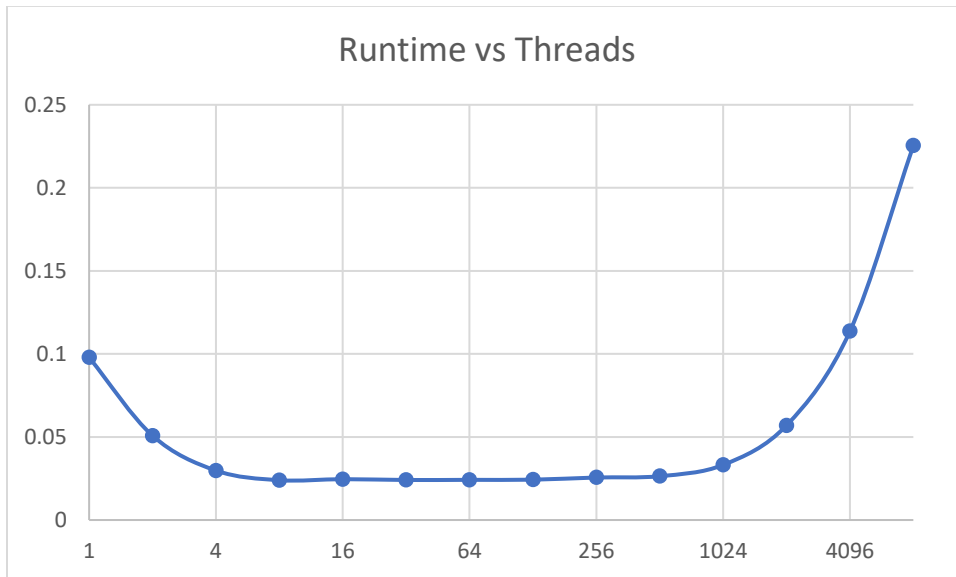


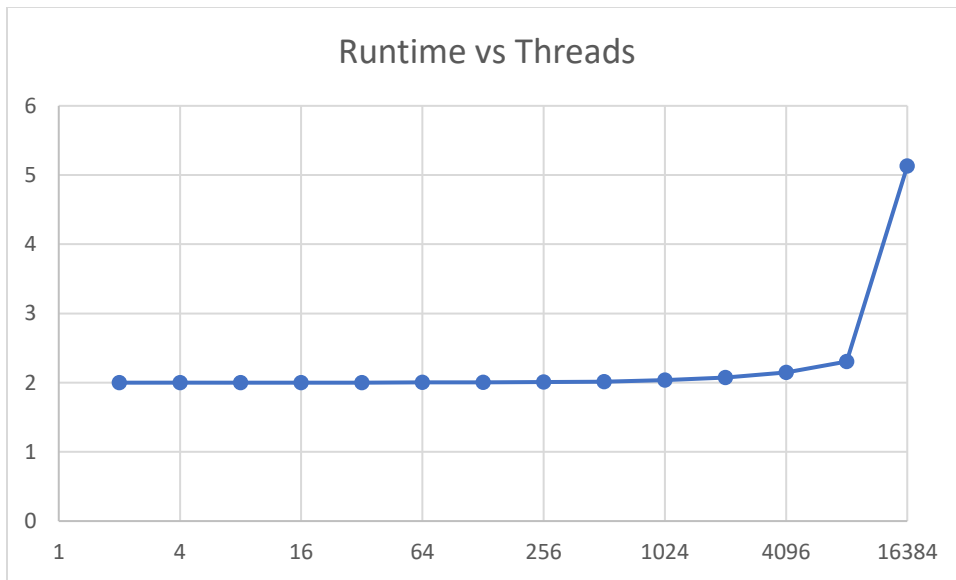
2)



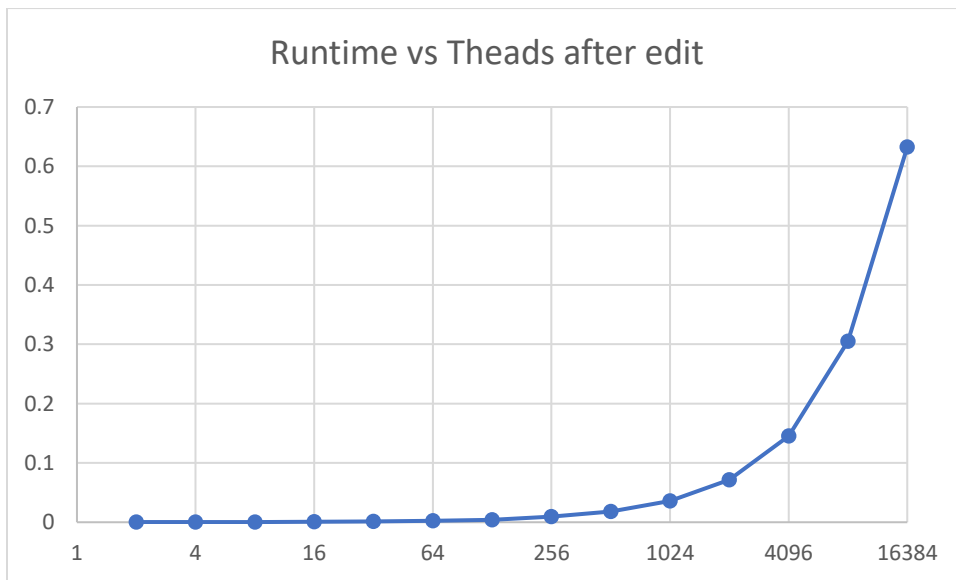
3)

The fastest runtime is 0.0240 seconds with 8 threads. The runtime increases very slightly until 1024 threads at which point it drastically increases with added threads. The main reason for increase in runtime with more threads is the time overhead from context switching between threads and overhead in scheduling threads in and out of the processor.

5)



6)



The increase in time is proportional to the increase in number of threads. The reason for the increase in time with increase in p is simply due to the sheer number of threads entering the barrier. With more threads entering, the rest of the threads have to wait longer until they are released. So the runtime is higher with a higher number of threads.