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PA3

Programming Assignment 4
Synchronization

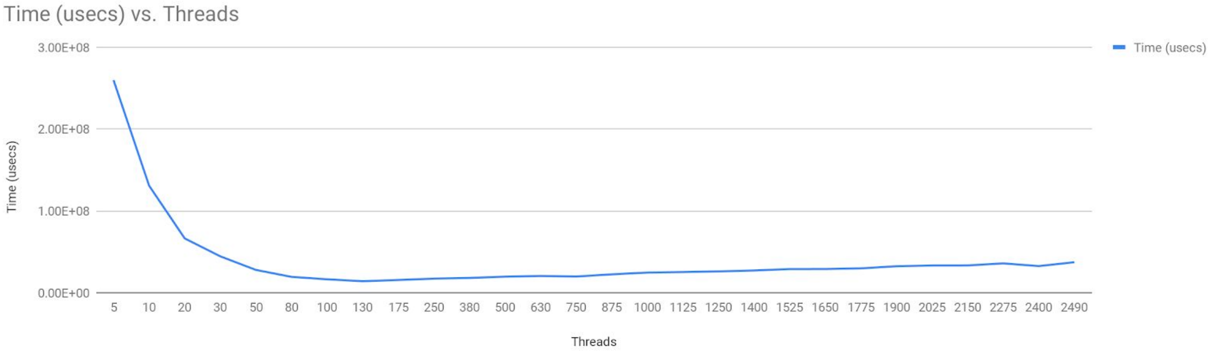
1. Code

My program takes in 3 arguments n (number of requests per user), b (size of buffer) and w (number of threads).

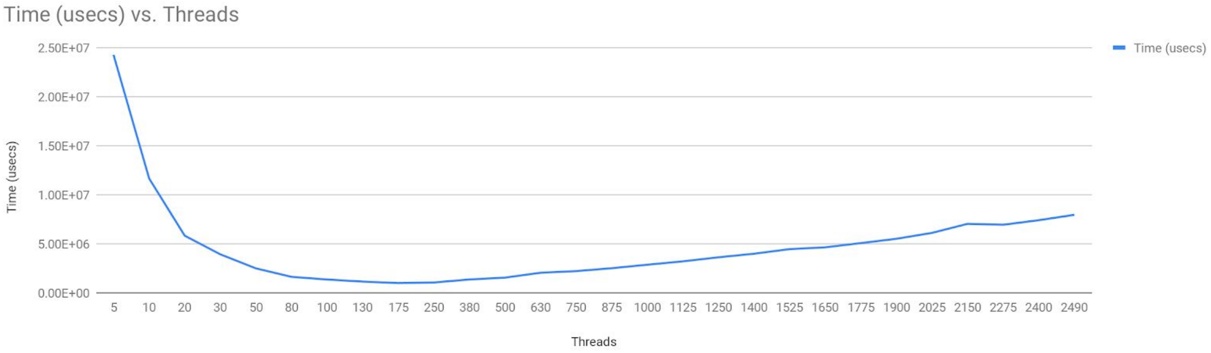
The main difference between my code and the starter code is that the starter code utilizes only one request channel and it basically only uses one thread since it does not create others to execute requests parallely while my code populates, works and updates the histogram using 3, w and 3 threads respectively.

2. Graph
The number of requests (n) is held constant at 10000
n=10000

PA3 w = variable [1..2490] n = 10000

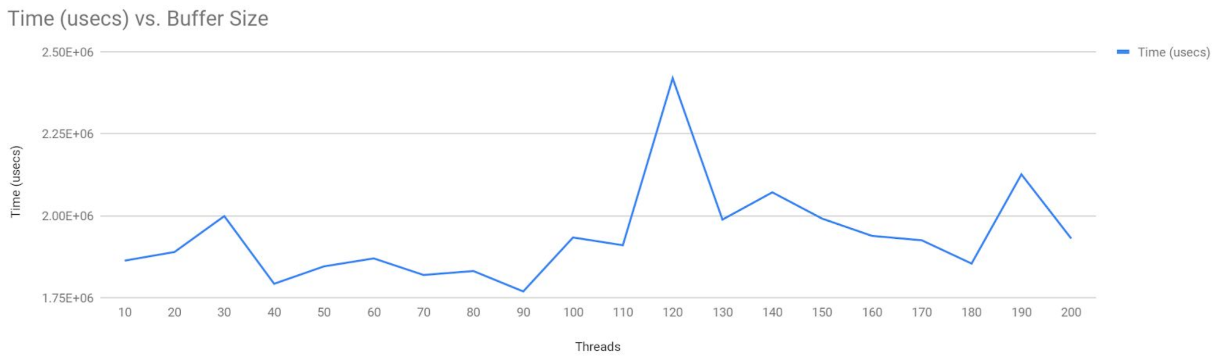


The number of threads (w) is changed to clearly view the benefit of multiple threads and the disadvantage of too many threads. w goes from 1 to my system's limit which was 2497.
w=variable [1..2490] n = 10000 b = 3*n



When compared to PA3 PA4 times are significantly faster as threads do not have to wait for certain stages to finish.

The number of threads (b) is changed to clearly view the benefit of the buffer size and the disadvantage of a small buffer size. b goes from 1 to 200
b=variable



3.System

Windows 10 HP Laptop using Windows Linux Subsystem to run Ubuntu 18
Intel i5 CPU @3.5 Ghz

- Original Maximum number of threads: ~500
  Error message: Too many open files
  Increased max file descriptors to 5000
  New Maximum number of threads: 2497

- When the program tries to create more threads than allowed the OS terminates the program since no more file descriptors are available.

- The client program stops since a thread failed to run.