

# CS550 Homework #2

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## **Instructions:**

- *Assigned date: Wednesday October 16<sup>th</sup>, 2019*
- *Due date: 11:59PM on Wednesday October 23<sup>rd</sup>, 2019*
- *Maximum Points: 100%*
- *This homework can be done in groups up to 3 students*
- *Please post your questions to the Piazza forum*
- *Only a softcopy submission is required; it will automatically be collected through GIT after the deadline; email confirmation will be sent to your HAWK email address*
- *Late submission will be penalized at 20% per day; an email to the TA with the subject "CS550: late homework submission" must be sent*

**3.1 (15 points)** In this problem you are to compare reading a file using a single-threaded file server and a multithreaded server. It takes 15 msec to get a request for work, dispatch it, and do the rest of the necessary processing, assuming that the data needed are in a cache in main memory. If a disk operation is needed, as is the case one-third of the time, an additional 75 msec is required, during which time the thread sleeps. How many requests/sec can the server handle if it is single threaded? If it is multithreaded?

**3.2 (5 points)** Would it make sense to limit the number of threads in a server process? Explain your answer.

**3.10 (10 points)** Constructing a concurrent server by spawning a process has some advantages and disadvantages compared to multithreaded servers. Mention a few.

**3.13 (10 points)** Is a server that maintains a TCP/IP connection to a client stateful or stateless? Justify your answer.

**4.10 (15 points)** Describe how connectionless communication between a client and a server proceeds when using sockets.

**4.14 (15 points)** Does it make sense to implement persistent asynchronous communication by means of RPCs?

**4.17 (15 points)** With persistent communication, a receiver generally has its own local buffer where messages can be stored when the receiver is not executing. To create such a buffer, we may need to specify its size. Give an argument why this is preferable, as well as one against specification of the size.

**4.25 (15 points)** When searching for files in an unstructured peer-to-peer system, it may help to restrict the search to nodes that have files similar to yours. Explain how gossiping can help to find those nodes.