**Project Part 4**

Implementation decisions

We decided on using TCP to make sure that any data transferred is not lost to ensure the most accurate calculation.

The server creates a log file as it is calculating and then copies the contents of the log file to the client to put into a client-side log file using a printstream.

Challenges

Learning to use sockets was the first challenge we faced but we figured out a way to make it work after some research.

Communicating between client and server was another challenge we ran into. By trying to use a buffered reader, the message would not be transferred correctly. We fixed this issue by changing the buffered reader to a scanner.

Log file writing was extremely slow with large number of elements. Severely impacts performance because there is a lot of overhead because it is opening the file every time it needs to write anything. We fixed this by keeping the file open the whole time that it is being written to. This drastically improved performance times. With 10 000 elements, at first it took several minutes, and after the fix with 100 000 elements, it took seconds.

Compilation Instructions

1. Open root directory (“Group\_1\_Part\_4”) in a terminal.
2. Run the following commands to compile and run the program.
   1. javac src/\*.java -d compiled
   2. cd compiled
   3. java Server
   4. input 1200 as the port and the log file directory
3. Open a second terminal window
4. Follow Step 1 and 2 replacing 2-c with java Client and 2-d with input 0.0.0.0 as the IP and 1200 as the port and the path to a desired log file
5. Input info into Client as required.