# SERIES TWO

## Constant Correlation

In my early days of engineering, Steve Fairchild taught me a valuable lesson. Steve drew out a little diagram like this.

Steve explained that system design was primarily a matter of ratios. In this drawing, the length of the sides represents the ***latency*** of the CPU, memory, storage and network subsystems. Latency is *the delay before a transfer of data begins following an instruction for its transfer*.

Back then the fastest storage media were hard-disk drives (HDDs). The usage of networks was different in those days, so the primary factor in system performance was the speed of the storage. CPUs and memory were very fast, but they were the most expensive parts of a system and consumed the most power. If the storage could not keep the CPU fed with data, then the system was wasting energy waiting. Though the ratios have changed since that time, this is still the primary challenge of system design.

Steve was responsible for HDD in the systems we designed. When a HDD was

# Lab One

Build a dash-cam system for ride share drivers.

## **Lab One:** https://github.com/fairchildlabs/Lab1

## Recursive Learning

We cover the lab material as fast as our skills allow, the team working together to move to the next level. We expect the first class to teach the next class, and to get their teams through the lesson in shorter amounts of time. The time that is reduced is the rate of recursion. This is recursive integration applied to an education system.

### Key Skills Covered

* Computer Hardware
* SoC (System on a Chip)
* Linux
* Digital Cameras
* Data Storage
* SSH
* Github/Git
* Python
* Field Testing
* Problem Characterization
* Data Analysis
* Scripting/Shell
* C/Make

## Lab One Validation Criteria

* Beta-test working camera unit
* Questions: Why are we building a dash-cam system? What is the value of video data? How can we use this system to solve a bigger problem?

## Lab One Exam

Make an engineering Mount Rushmore. Create a list of the 4 greatest engineering achievements in the 100 years before you were born.

Example: I was born in 1970.

1. 1969 – NASA Apollo – Man on the Moon
2. 1945 – Manhattan Project
3. 1887 - Electrification (Nikola Tesla)
4. 1914 – Panama Canal

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