• Left over from last time
  – Any questions about the homework?

• Last time was about mistakes we make, this time is about a way to be systematic and avoid them
  – A way, not the way
  – Not linear, we loop back all the time
  – …but be systematic about doing it - ie. re-evaluate the loop
  – Useful to write these things down, version control, keep with code and results
    * Part of why I’m having you submit assignments using a VCS
  – When do you start doing experiments
    * From the beginning!
    * Everything you do is an experiment whether you treat it that way or not
    * So treat it that way!
    * Pretty much any time you think you’re going to do an experiment once, you are wrong
    * Treat experiment hygiene kind of like code hygiene

Steps from the book - moving on to systematic approach:

1. State goals and define the system. Choice of system boundaries eg. include high layers of the network stack? include end users?

2. * List services and outcomes. Services kind of a funny word here, “functions” might be better—fundamentally, what does the system do? Don’t forget to include error/exception outcomes.

3. * Select metrics. List some


5. * Select factors to study. Distinction between parameters and factors

6. * Select evaluation techniques. Model, simulate, measure. Split measure into real world vs. controlled environment

7. * Select workload. Sequence of requests Again, requests is a funny word, but good enough. Trace vs. probabilities. Open loop vs. closed loop. Micro vs. macro benchmarks: system boundaries.

8. Design experiments. Zero in on areas of interest. Start with many factors, low detail, move to few factors that matter, ranges of interest. Refine ranges.
9. Analyze and interpret data. Understand what your analysis is sensitive to. Understand random variance. You **always** have to loop back at this point in research.

10. Present results. Put not only the graph into your paper, but the explanatory text, conclusions, etc.

- Where do the following fit into the sequence?
  - Design your system
  - Write your code
  - Write your paper

- For next time
  - Next week will be a bit heavier on the reading, all assignments posted
  - Read Chapter #3 (all of it) about selecting techniques and metrics
  - HW #3 has been posted.
    * More involved than last one
    * I expect that problem 2 takes more thought than problem 1