

CS 518

Hints for System-Building and Effective Communication

Randy Wang
Fall 2002
Princeton University

Outline

- Hoare's Turing award lecture
- Lampson's hints
- Meta-approaches for research
- Effective communication
- How to give a bad talk
- Tips for a good talk

Target Audience

- The engineer + manager
- Engineers need to manage
- Managers need to understand engineering

Hoare's Turing Award Speech

- "2nd-system effect"
- Simplicity
 - So simple, obviously no deficiencies, or
So complex, no obvious deficiency
 - Price of reliability: utmost simplicity
- Learn from mistakes
- Luck

Lampson Hints (Functionality)

- Simplicity
 - Zero sum game: complexity costs something
 - Prioritize tasks
- Speed, not power
 - Design the core to be fast, flexible **primitives**
- Stable interfaces
 - Flipside: single most important feature of evolution is death
- Plan on revision
- Don't hide power
 - Flipside of abstraction
- Separate normal and special cases
- Procedure arguments (protocol vs. code)

Lampson Hints (Speed)

- Static vs. dynamic
- Caching
- Hints
 - May be inaccurate, but can check its accuracy
 - And can recover from inaccuracy
- Pay attention to constant factors
- Do things in the background
 - Throughput-centric vs. latency-centric view
- Don't try for 100%
 - Avoid instability
- Shed load

Lampson Hints (Reliability)

- End-to-end recovery
 - Recover at intermediate stages only for performance
- Transactional techniques
 - Logs
 - Atomic actions
 - Typically expensive, do it end-to-end, selectively
- Design for reliability from beginning
 - Hard to retrofit

Good Meta-Approaches to Research

- Go to the extreme
- Follow technology trends
 - Exploiting new technologies
 - Exploiting new shifts in technology
- Focus on concepts instead of environment
 - What is the high level big idea
 - Steal from other fields
 - Abstract the problem

Effective Writing

- Concepts
 - Focus on key ideas
 - Expose, weave it in in the body, conclude
 - Why, not what
 - Don't get trapped by details and artifacts
- Flow: be a good story teller
 - Pay attention to order, and smooth transitions
- Simplicity
 - Simple exposition, simple styles
 - Make it intuitive rather than formal
 - Be specific, use examples
- Problems
 - Too vague: for example, no examples
 - Contributions none-obvious
 - Too much "what", not enough "why"

Ten Commandments of Giving a Bad Talk

- Thou shalt not be neat
- Thou shalt not waste space
- Thou shalt not covet brevity
- Thou shalt not write large
- Thou shalt cover thy naked slides
- Thou shalt not use color
- Thou shalt not illustrate
- Thou shalt not make eye contact
- Thou shalt not skip slides in a long talk
- Thou shalt not practice

Audience and Rhetorical Goals

- Conferences
 - Give gist of your contribution
 - Make people want to read your paper
 - Never try to cover the whole paper, not even close
- Interview
 - Goal is to get hired
 - Need to reach two key audiences
 - + Impress people in your area with depth
 - + Do not lose the rest of the department
 - Both will use this to gage your ability to teach
- Class project presentation
 - Goal is to get good grade :-)
 - Target is prof first, fellow students second
 - Need a bit more detail than a conference talk

Tips - Edit

- Focus on key ideas
- Construct a coherent sub-story out of a full story
- Understand the nature of oral communication (no pause, no rewind, not random access)
- KISS (keep it simple, stupid)
- Repetition is useful
- Give outline: some amount of predictability is comforting
- Explain, interpret, justify, not just describe
- Write large
- Use color, but sparingly, consistently
- Use pictures (and even animations)
- No full sentences (just terse phrases)
- Make the slides coherent and self-contained
- One corollary: no standalone graphs

Tips - Preparation

- Practice
- Dry run followed by slide-by-slide analysis
- Pay attention to time and practice for time
- Practice for varying audience backgrounds
- Pay attention to your manner of speaking
- Taping yourself?

Tips - Presentation

- Speak clearly
- Don't read slides
- Relaxed posture and movement
- Maintain eye contact, shift gaze
- Plan on shedding slides
- Admit shortcomings, don't wait for questions
- Analogies and jokes can help