EPFL

Principles of Computer Systems

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Your POCS Team

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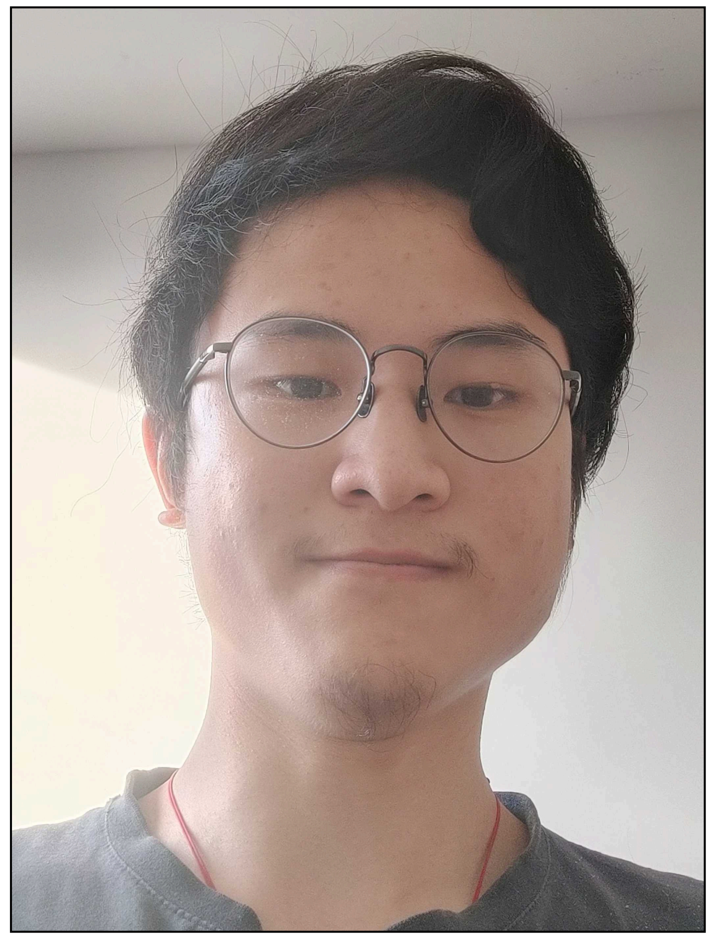

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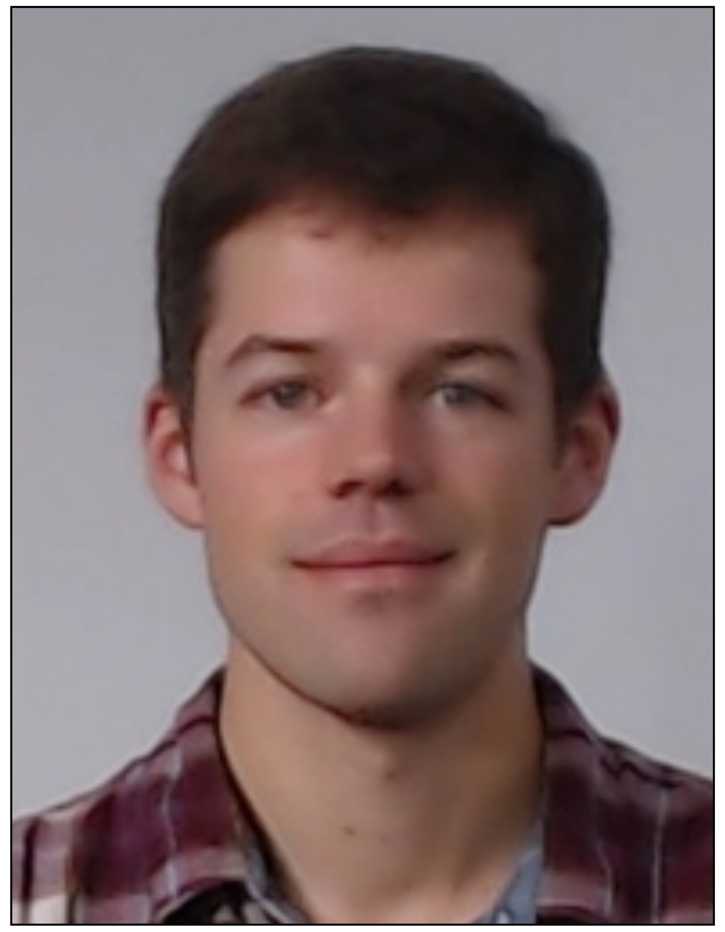
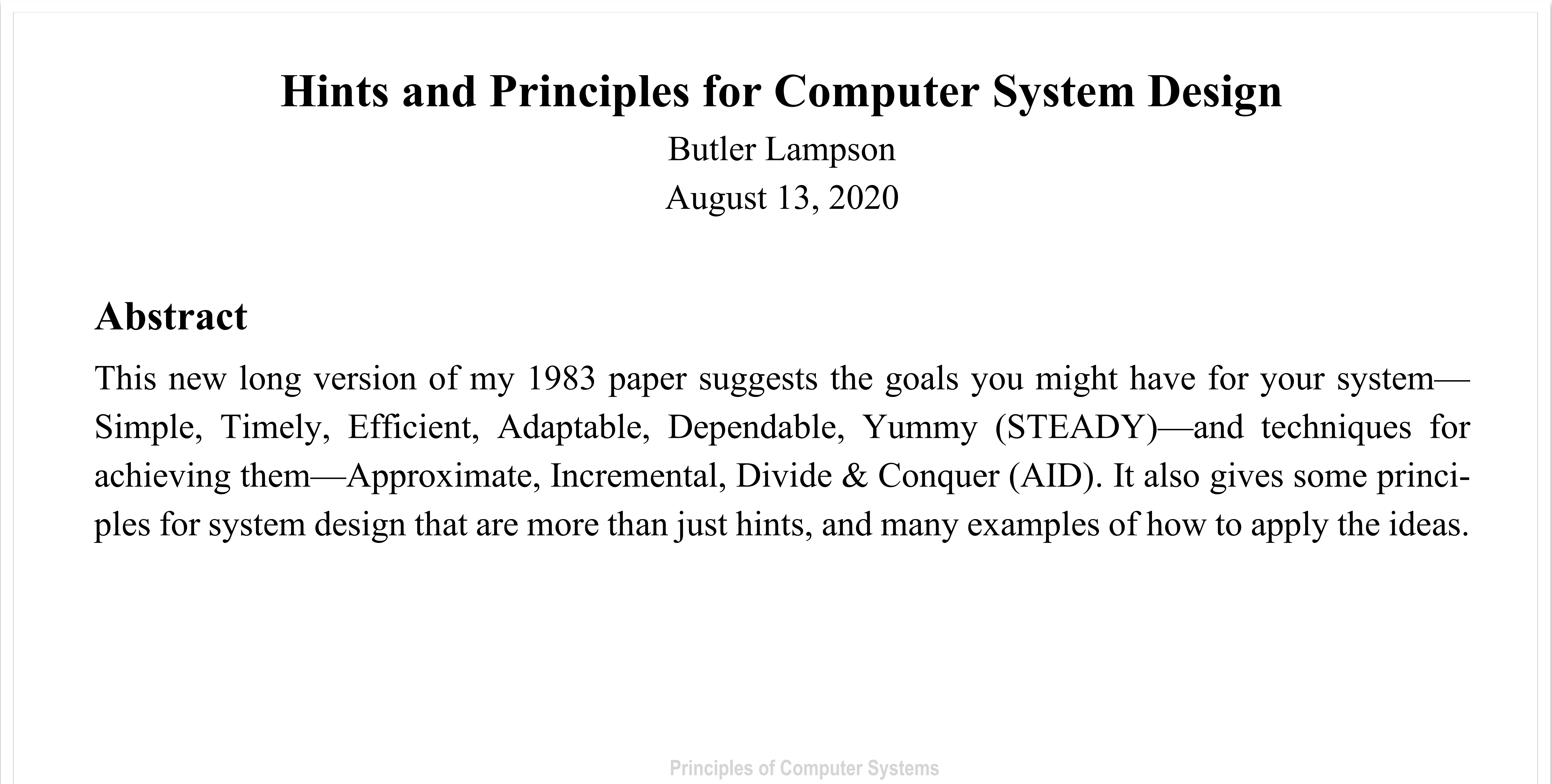


Mark Sutherland
TA

Topic outline

Building blocks	Modules and interfaces
	Names
	Layers
	Client/server
	Design exercise: A DDoS-resistant Internet
Fundamental techniques	Memory virtualization
	Machine virtualization (guest lecture)
	Redundancy and fault tolerance
	Atomicity, consistency, and transactions
	Peer-to-peer systems (guest lecture)
	Data-center systems (guest lecture)
	Design exercise: Multi-path meets congestion control
	Student presentations
	Final exam

Your Guide in POCS



Hints and Principles for Computer System Design

Butler Lampson

August 13, 2020

Abstract

This new long version of my 1983 paper suggests the goals you might have for your system—Simple, Timely, Efficient, Adaptable, Dependable, Yummy (STEADY)—and techniques for achieving them—Approximate, Incremental, Divide & Conquer (AID). It also gives some principles for system design that are more than just hints, and many examples of how to apply the ideas.

Who is Butler Lampson?

- Personal computer (1972)
- Ethernet (1973)
- Mesa programming language (1975)
- Bravo text editor (1973)
- Interpress language (1980)
- Fast RPC (1987)
- Autonet (1987)
- Virtual book (1994)

Prerequisites

- Good knowledge of
  - *Operating systems (e.g., via CS-323)*
  - *Databases (e.g., via CS-422)*
  - *Networks (e.g., via COM-407)*
  - *Compilers (e.g., via CS-320)*
  - *Computer architecture (e.g., via CS-470)*
- Browse through the assigned readings and decide for yourself

Components of POCS

- Weekly modules
- Every week...
  - *papers to read*
  - *lectures (100% virtual)*
  - *mini-quizzes*
  - *recitations*
  - *OPs ("one-pagers")*
- Online discussion forum

Grading

- One-pagers = 30%
  - *learn to solve system design problems*
  - *learn to express your ideas concisely*
  - *individual work, no collaboration permitted*
- Final exam (during exam session) = 50%
  - *covers everything discussed in class, closed-book (maybe printed papers)*
- Presentation = 10%
- Class participation = 10%
  - *ideas, questions, and answers during interactive sessions and on the forum*

Advice

- 7 credits = heavyweight course
  - *15 hours/week*
- Do not fall behind
  - *pace is fast, if you lose one week, it's hard to recover*
- Ask classmates/TAs/instructors when you don't fully grasp something
  - *don't just "let it be", because it may come back to bite you later*
  - *Really, do not fall behind !*