CS 241: Wrap-up and beyond

CS 241

May 2, 2012

University of Illinois

Announcements

Review material, review session info posted by Friday

- Check Piazza

Brighten's office hours today

- Make that office *hour...*
- 4-5 pm only (due to departmental meeting)

Final grade cutoffs

- Likely ≥ +3% to your grade

What have we learned?

We've come a long way...

- Write, compile, debug, and execute C programs
- Interact with the operating system via POSIX system calls
- Understand memory allocation and virtualization
- Create and manage many processes and threads
- Control scheduling of proc./threads
- Communicate & share resources between threads
- Use communication protocols (TCP/IP) and interfaces (Sockets)
- Write distributed multi-threaded apps that talk across a network

What have we learned?

We got real.

- A real memory allocator
- Multiple real nontrivial parallel applications (sort, make)
- A real big data processing framework
- A real web server

Great Ideas in Computer Systems

The power of layered abstractions

- Modularity to help deal with many complex interacting parts
- Virtualization of physical resources for flexibility

It's all just bits

- Appreciate the lower level that produces the abstractions

Concurrency

- to match the logical flow of events
- to deal with big data and big computation

Defensive programming

- Making your code robust to unexpected errors or strange inputs

Courses building on 241

411 Database Systems

414 Multimedia Systems

418, 419 Computer Graphics

420 Parallel Programming

421 Prog. Languages & Compilers

423 Operating Systems Design

424 Real-Time Systems

425 Distributed Systems

426 Compiler Construction

427 Software Engineering, I

431 Embedded Systems

433 Comp. Sys. Organization

438 Communication Networks

439 Wireless Network

461 Computer Security I

463 Computer Security II

...and more!

CS 423: Operating Systems Design

Topics

- In-depth knowledge of how basic OS functions work
- Knowledge of virtual machines
- Introduction to advanced OS topics
- Distributed system issues, embedded system issues, quality of service, etc.
- Ability to modify OS code

Prof. Tarek Abdelzaher, Fall 2012

CS 425: Distributed Systems

Design, implementation, & management of distributed systems

- Failure detectors
- Election, distributed agreement
- Replication
- Security
- Probabilistic protocols
- Self-stabilization
- Measurements, etc.

Context: real-life and deployed systems

- clouds and datacenters, databases, peer to peer systems, clusters, etc.

Prof. Indy Gupta (Fall 2012)

CS 438: Communication Networks

Networked communication: How to build the Internet

- Ethernet, IP, TCP, routing, congestion control, DNS, security, content distribution

- Performance measurement and basic notions of probability and statistics for performance prediction

Fall 2012 and Spring 2013

CS 498 LA: Undergrad Research Lab

Apprenticeship-style, hands-on laboratory

Goals

- Pose testable research questions
- Write competitive grant proposals
- Create novel solutions using software and/or hardware
- Draw valid scientific conclusions
- Present and publish results

For more

- https://wiki.engr.illinois.edu/display/cs498la/Home
- https://wiki.engr.illinois.edu/display/url/Project+Proposals

Discussion of (networking) research

ICES forms