Welcome to CS 241 Systems Programming

University of Illinois at Urbana-Champaign

Tarek Abdelzaher
Lawrence Angrave

What's my End Result?

Before CS 241: ☹

After CS 241:

- Can design and code interesting applications:
  - Simple Web servers
  - Internet multiplayer games
  - Chatrooms, instant messaging software

The Team

Tarek Abdelzaher (Instructor)
- Office: 4126 SC
- Office Hours: Thu 9-10am, Fri 11-12noon,
- Tel: (217) 265-6793
- **zaher@cs.uiuc.edu**

Lawrence Angrave (Instructor)
- Office: 2217 SC
- Office Hours: Mon 3-4pm, Fri 3-4pm,
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TAs: Lucas Cook, Stephen Kloder
- e-mail: **cs241help@uiuc.edu**

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Need Help?
Have Questions?
This is your one-stop help-line!
Will get answer in 24 hours.

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Newsgroups

- We encourage discussion on classroom issues
- Please subscribe to these newsgroups:
  - **class.cs241** (general discussion)
  - **class.cs241.announce** (announcements)

The Textbook

Coming soon (not in stored yet)…

Introduction to Systems Concepts and Systems Programming
University of Illinois Custom Edition
Copyright © 2007
Pearson Custom Publishing
ISBN 0-536-48928-9

Taken from:
Operating Systems: Internals and Design Principles, Fifth Edition
by William Stallings

UNIX™ Systems Programming: Communication, Concurrency, and Threads
by Kay A. Robbins and Steven Robbins

Computer Systems: A Programmer's Perspective
by Randal E. Bryant and David R. O'Hallaron

Your CS 241 "Mission"

- Come to class, MWF, 10-10:50am
  - Please participate actively…
- Sign up for one discussion section per week (starting next week)
  - Discussion section times will be announced at the end of this week
- Read textbook
  - Reading assignments posted on webpage (none this week)
- Do 2 homeworks
- Code 6 Short programming assignments (in teams of 2)
  - Short Machine Problems (SMPs)
- Code 2 Long programming assignments (in teams of 2)
  - Long Machine Problems (LMPs)
- Take Midterm, Wednesday 10/17
- Take Final (finals week)

Grading

- **Final** Exam: **30%**
- **Mid-term** Exam: **20%**
- **Homework** (two total): **10%**
- Team **Machine Problems** (8 total): **30%**
  - 6 Short Machine Problems (SMPs) @ 3%
  - 2 Long Machine Problems (LMPs) @ 6%
- **Participation**: **10%**
  - Class involvement
  - Pop quizzes

Please…

- No late homework/MP submissions
- 1 week window for re-grades from return date

Introduction

- What is an operating system?
- What is it for?
- What is system programming?

Course Objectives

- Identify the basic components of an operating system, describe their purpose, and explain how they function.
- Write, compile, debug, and execute C programs that correctly use system interfaces provided by UNIX (or a UNIX-like operating system).

More Detailed Objectives

Understand the Basics (week 1-2)
- Use UNIX system calls correctly from within C programs

Make the OS do tasks (week 3-8)
- Create and manage processes and threads on UNIX.
- Exploit OS semaphores and mutexes
- Control OS scheduling policy parameters.
- Take advantage of OS signals and signal handlers.
- Set OS timers and clocks.

Manage machine resources (week 9-12)
- Manage files and I/O on UNIX.
- Manage memory
- Exploit DMA

Write networked applications (week 13-15)
- Use communication protocols (TCP/IP) and interfaces (Sockets)
- Write distributed multi-threaded apps that talk across a network.

Machine Problems

SMP0	Advanced C
SMP1	Programs and Processes
SMP2	Processes and Threads
SMP3	Synchronization
SMP4	Scheduling
LMP1	File Systems
LMP2	Memory Management
SMP5	Networking

Schedule

- See class webpage

http://www.cs.uiuc.edu/class/fa07/cs241

Your to-do List

Today:

- Visit the class webpage and check out all the info (especially schedule, grading policy, homework & MP hand-in instructions, and resources).
  http://www.cs.uiuc.edu/class/fa07/cs241
- Familiarize yourself with newsgroups
  (see http://news.cs.uiuc.edu) and subscribe to: **class.cs241** and **class.cs241.announce**
- Visit Compass http://compass.uiuc.edu
  and familiarize yourself with it. You will be using it to hand in homework and machine problems!
- Find a reference to refresh your C programming skills (e.g., see tutorial below)
  http://www.lysator.liu.se/c/bwk-tutor.html

Your to-do List

Soon:

- Sign up for a discussion section (look out for an announcement at the end of this week)
- Pair up for upcoming machine problems
- Read "How to study" Guide (see lecture notes on class webpage)