CS372
Introduction to Operating Systems

Lorenzo Alvisi
Weijiang Yu
Department of Computer Sciences
The University of Texas at Austin
lorenzo@cs.utexas.edu
wjyu@cs.utexas.edu
http://www.cs.utexas.edu/~lorenzo/corsi/cs372/03F/CS372.htm

Why Study Operating Systems?

- Not many Operating Systems (OS) under development
- It is unlikely that I will build new OS in your job
- ... So, why should I study operating systems?
- Because...
  - OS is everywhere – it managed all computing resources
  - OS is a wizard – it provides to users an illusion of infinite memory, CPU, resource
  - OS provides abstractions – it makes systems convenient to use
  - Tradeoffs between convenience, simplicity and performance
  - OS provides services that enable application programs
  - OS is the point where hardware and software meet
  - ... knowledge of how OS works makes you a more effective computer user!!

Do I really want to do this?
What will I learn?

- Learn how to write multi-threaded programs
  - Learn the fundamentals of management of concurrency
- Learn how programs can execute in an environment protected from other programs
  - Memory management
  - Processor scheduling
- Learn how files can be accessed seamlessly from anywhere in the world
  - Caching, file system design and content distribution
- ...
Three-levels of Learning

- How to approach problems
  - Example: problem definition, design-space exploration, case studies
  - Goal: When faced with a similar problem, you should be able to devise a solution
  - Timescale: big long-term payoff
- Specific techniques and algorithms
  - Example: concurrent programming, two-phase commit, transactions, ...
  - Goal: Be a good engineer
  - Timescale: immediately useful – but also useful in long-term
- Details of modern OS
  - Example: Linux, Windows, Solaris, BSD, Darwin, ...
  - Problem: lots of material, changes quickly
  - Not a priority for this course

Administrivia

Textbooks

- Textbook:
- Other useful books:
  - Operating System Internals and Design Principles, William Stallings
  - ...
  - ... and an assorted collection of C++ and Unix references

Administrivia

Grading Policy

- Exams
  - Midterm (25%)
  - Final examination (25%)
- Projects and programming assignments (50%)
  - Tentative plan: 2 programming assignments
- No homework (to be formally submitted)
  - Practice problems and solutions will be posted
  - Plan to hold recitation sections to help you gain practice in solving problems

Administrivia

Homework and programming assignments

- Programming assignments are due at the start of class on the due date
  - Anything handed in after I start lecturing is considered late
  - Late submissions will not be accepted
- Grading will focus on correctness
- Requests for re-grade must be made within a week after you receive your graded assignments
- Programming assignments to be done in groups of two
### Administrivia

#### Collaboration and Cheating

- Working in groups on homeworks is OK but:
  - You can only collaborate with other students in the course
  - Every student must craft their own final solution
  - Every student must fully write up their solution
  - All collaborators must be acknowledged in writing

- Collaboration
  - Discuss problem sets and programming assignments
  - Discuss possible interpretation of questions, technical details

- Cheating
  - Copying solutions code or programs from someone else, previous year’s solutions, or public domain
  - Participate in discussion group where one person writes solution and everyone else copies it

### Administrivia

#### How to get an “A” in this course

- Attend class regularly
  - Ask questions!
  - Take notes
  - Understand key concepts

- Read the book
  - Keep up with the lectures

- Do the homework and programming assignments
  - Try problems on your own

- Study!

### Administrivia

#### How to get an “D” in this course

- Assume getting copies of handouts is sufficient
- Don’t take notes in class
- Miss classes
- Start assignments at the last minute
  - Assignments are designed to require several hours of work outside of class each week
- Memorize details without understanding concepts

### Administrivia

#### Where to go for help?

- Ask questions in class!
  - Exercise your understanding of the course material on a daily basis
- Attend office hours
  - Lorenzo’s office hours are T/TH 2:00 - 3:00PM in ACES 6.244
  - Weijiang’s office hours: M: 2:00-3:30, W: 1-2:30 in ACES 5SEo3C
- Don’t send questions via e-mail
  - I want to get to know you
  - I don’t want to be subject to denial of service attacks
- Your primary avenue for resolving questions is office hours
  - If you can’t come to office hours, setup an appointment
**Administrivia**

Course Information and Handouts

- Slides will be made available
- Updates will be available from