Today’s agenda

• Administrivia
  – course overview
  – course staff
  – general structure
  – the text
  – policies
  – your to-do list
  – course registration

• OS overview
  – functional
    – resource management, etc.
  – historical
    – batch systems, multiprogramming, timeshared OS’s, PCs,
      networked computers, p2p, embedded systems

Course overview

• Everything you need to know is on the course web page:
  http://www.cs.washington.edu/451/

• But to tide you over for the next hour …
  – course staff
    • Brian Bershad
    • Epilepsia Aziel
    • Marissa Roden
  – general structure
    • read the text prior to class
    • class will supplement rather than regurgitate the text
    • homework exercises provide added impetus to keep up with the
      reading
    • sections will focus on the project (several separate
      components)
    • we really want to encourage discussion, both in class and in
      section
Course registration

- If you’re going to drop this course
  - please do it soon!
- If you want to get into this course
  - plan for the worst case
  - but, make sure you’ve filed a petition with the advisors
  - give things a few days to settle down

What is an Operating System?

- The text:
  - “an intermediary between the user of a computer and the computer hardware”
  - “manages the computer hardware”
  - “each [piece] should be … well delineated …, with carefully defined inputs, outputs, and functions”
  - “an amazing aspect of operating systems is how varied they are in accomplishing these tasks … mainframe operating systems … personal computer operating systems … operating systems for handheld computers…”
  - “in 1998, the United States Department of Justice filed suit against Microsoft, in essence claiming that Microsoft included too much functionality in its operating system … for example, a web browser was an integral part of the operating system”

- your to-do list …
  - please read the entire course web thoroughly, today
  - please get yourself on the cse451 email list, today, and check your email daily
  - keep up with the reading
  - homework 1 (reading + problems) is posted on the web now
    - reading due Friday
    - problems due at the start of class on Monday
  - project 0 is posted on the web now
    - will be discussed in section on Thursday
    - due at the start of class next Wednesday (but if you don’t get started this week you’ll be in trouble)

- the text
  - Silberschatz, Galvin & Gagne, Operating System Concepts, seventh edition
    - if using an earlier edition, watch chapter numbering, exercise numbering
- other resources
  - many online
    - some required
    - some optional
    - some prohibited (!)
- policies
  - collaboration vs. cheating
  - homework exercises
  - late policy

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What is an Operating System?

- An operating system (OS) is:
  - a software layer to abstract away and manage details of hardware resources
  - a set of utilities to simplify application development
  - “all the code you didn’t write” in order to implement your application

What is Windows?

- Applications
- OS
- Hardware

What is Windows Really?

- Microsoft Word
- Browser
- TCP/IP
- Installer
- Printing

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The OS and hardware

- An OS mediates programs’ access to hardware resources (sharing and protection)
  - computation (CPU)
  - volatile storage (memory) and persistent storage (disk, etc.)
  - network communications (TCP/IP stacks, Ethernet cards, etc.)
  - input/output devices (keyboard, display, sound card, etc.)
- The OS abstracts hardware into logical resources and well-defined interfaces to those resources (ease of use)
  - processes (CPU, memory)
  - files (disk)
  - sockets (network)

Programming an OS

- C is the Language of Choice
- High enough level to hide most hardware attributes
  - Portable
  - Abstractable
  - Programmable
  - Modular
- Low enough level to reveal most hardware attributes
  - Efficient
  - Predictable
  - Controllable
  - Magicable

CSE 451

- In this class we will learn:
  - what are the major components of most OS’s?
  - how are the components structured?
  - what are the most important (common?) interfaces?
  - what policies are typically used in an OS?
  - what algorithms are used to implement policies?
- Philosophy
  - you may not ever build an OS
  - but as a computer scientist or computer engineer you need to understand the foundations
  - most importantly, operating systems exemplify the sorts of engineering design tradeoffs that you’ll need to make throughout your careers – compromises among and within cost, performance, functionality, complexity, schedule …