Chapter 1: Introduction
Administrivia

- Assignment: Read Chapter 1.
- Review syllabus.
- Next time: Pointers and memory allocation in C; Project 0.
Outline

- What is an operating system?
- Computer system structure and components.
- Booting an operating system.
Chapter Objectives

- To provide a grand tour of the major operating systems components
- To provide coverage of basic computer system organization
What is an Operating System?

- A program that acts as an intermediary between a user of a computer and the computer hardware
- Operating system goals:
  - Execute user programs and make solving user problems easier
  - Make the computer system convenient to use
  - Use the computer hardware in an efficient manner
Computer system can be divided into four components

- Hardware – provides basic computing resources
  - CPU, memory, I/O devices

- Operating system
  - Controls and coordinates use of hardware among various applications and users

- Application programs – define the ways in which the system resources are used to solve the computing problems of the users
  - Word processors, compilers, web browsers, database systems, video games

- Users
  - People, machines, other computers
Four Components of a Computer System

- User 1
- User 2
- User 3
- ... user n

- Compiler
- Assembler
- Text editor
- ... database system

System and application programs

Operating system

Computer hardware
Operating System Definition

- OS is a **resource allocator**
  - Manages all resources
  - Decides between conflicting requests for efficient and fair resource use

- OS is a **control program**
  - Controls execution of programs to prevent errors and improper use of the computer
Operating System Definition (Cont)

- No universally accepted definition
- “Everything a vendor ships when you order an operating system” is good approximation
  - But varies wildly
- “The one program running at all times on the computer” is the kernel. Everything else is either a system program (ships with the operating system) or an application program
Computer Startup

- **bootstrap program** is loaded at power-up or reboot
  - Typically stored in ROM or EPROM, generally known as **firmware**
  - Initializes all aspects of system
  - Loads operating system kernel and starts execution