OS BASICS

Module 1.2

Richard Newman

University of Florida

WHY AN OPERATING SYSTEM?

- How to load a program onto computer?
  - Mini-toggle switch per bit in data register
  - Mini-toggle switch per bit in address register
  - Button to load data from register into memory
- How to access I/O devices?
  - Use same read/write routines in many programs
- What about running multiple programs?
  - Manage resources
  - Protect private info
  - Facilitate interactions

WHERE OS FITS IN

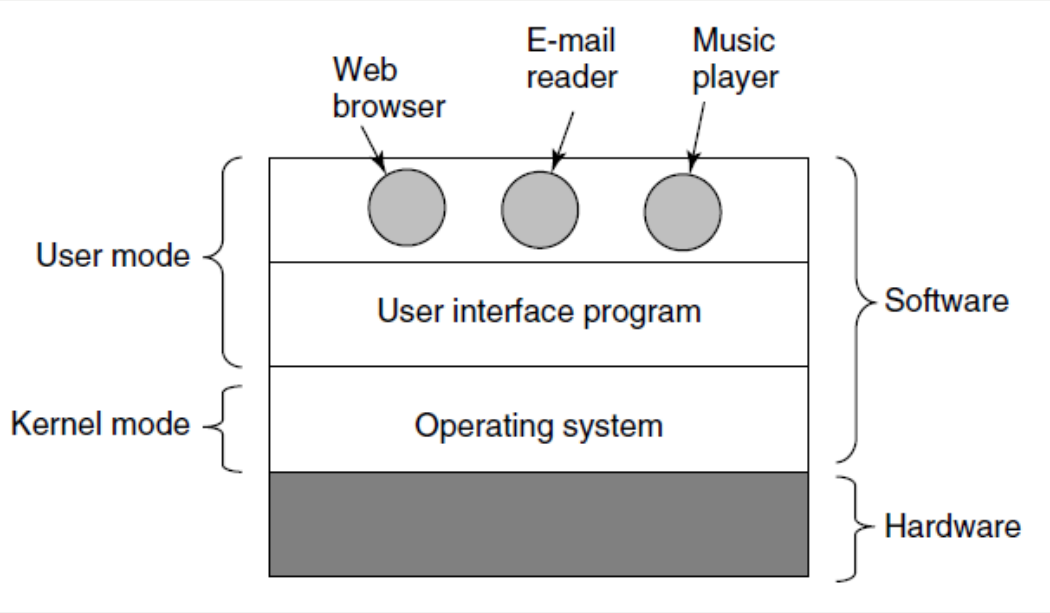

Figure 1-1. Where the operating system fits in.

THE MODERN COMPUTER SYSTEM

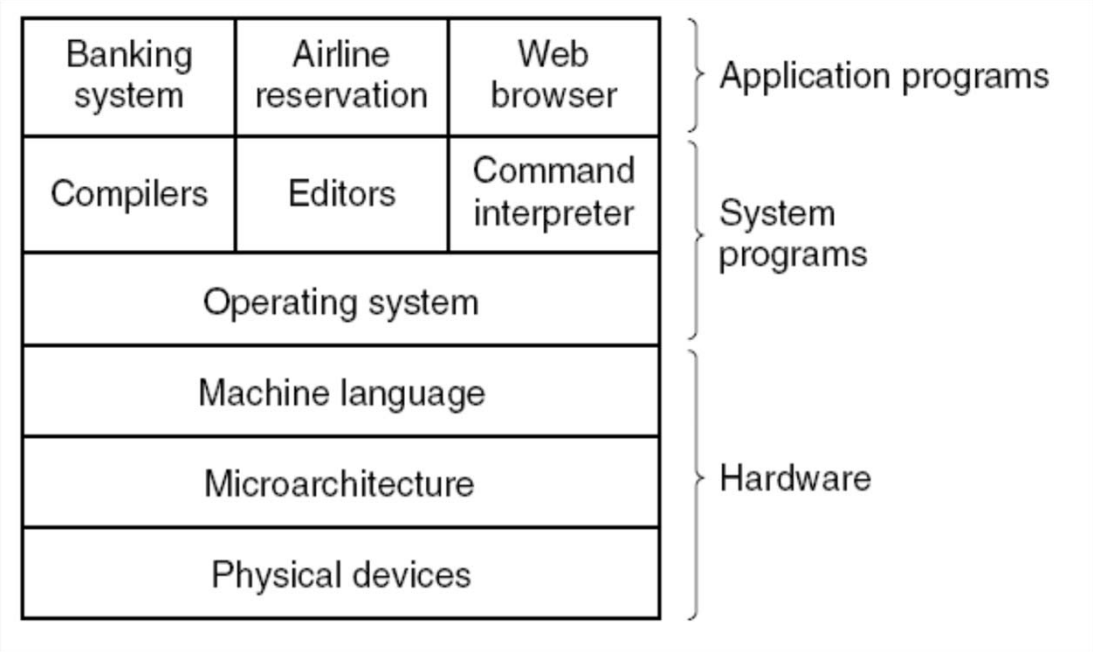

Figure 1.1 A computer system consists of hardware, system programs, and application programs.

THE OPERATING SYSTEM AS AN EXTENDED MACHINE

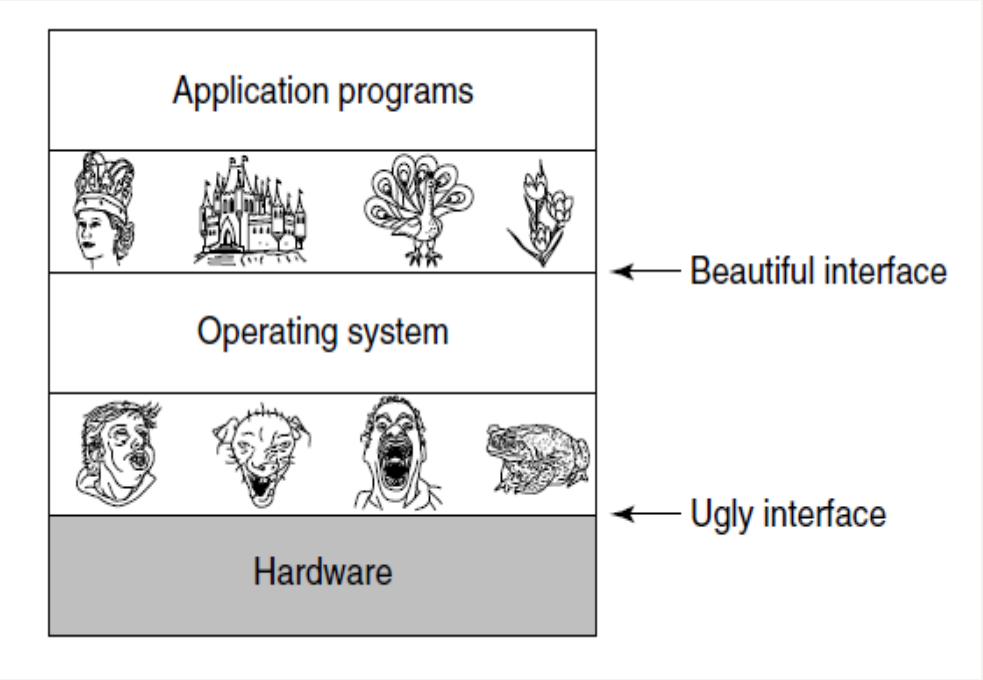

Figure 1-2. Operating systems turn ugly hardware into beautiful abstractions.

WHAT IS AN OPERATING SYSTEM?

- Top down view
  - Provide abstractions to application programs
- Bottom up view
  - Manage pieces of complex system
- Alternative view
  - Provide orderly, controlled allocation of resources

WHAT AN OPERATING SYSTEM IS NOT

- User Interface
  - UI is just another program
- Systems Tools
  - Tools are programs to facilitate development of programs, manage system
- Libraries
  - Libraries are reusable packages of code

THE OPERATING SYSTEM ZOO

- Mainframe Operating Systems
- Server Operating Systems
- Multiprocessor Operating Systems
- Personal Computer Operating Systems
- Handheld Computer Operating Systems
- Embedded Operating Systems
- Sensor Node Operating Systems
- Real-Time Operating Systems
- Smart Card Operating Systems

ONTOGENY RECAPITULATES PHYLOGENY

- Each new "species" of computer
  - Goes through same development as "ancestors"
- Consequence of impermanence
  - Text often looks at "obsolete" concepts
  - Changes in technology may bring them back
- Happens with large memory, protection hardware, disks, virtual memory

Summary

- Role of Operating System
  - Extended machine – layers of abstraction
  - Resource manager
- Types of OS
  - Goals and capabilities depend on environment