Operating Systems:
Overview

OSTEP Chapter 2:
 http://pages.cs.wisc.edu/~remzi/OSTEP/intro.pdf

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What is an operating system?

User
Applications
Operating System
Hardware
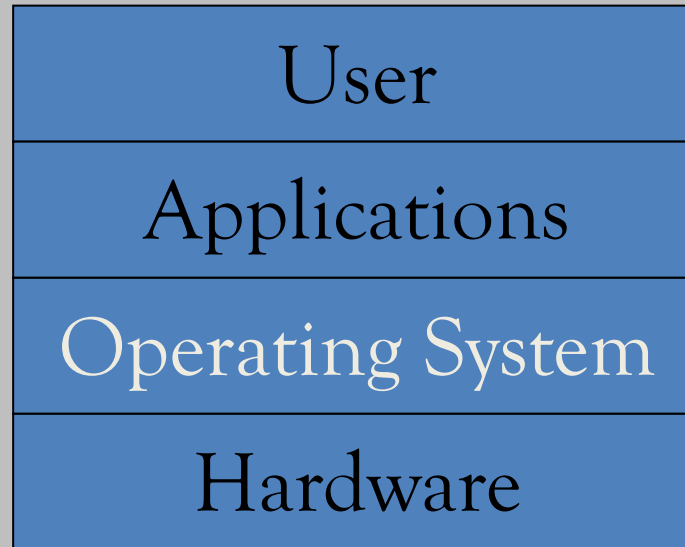
Operating System:
   Software that converts hardware into a "useful form" for applications

Roles of operating systems

Role 1: Abstraction – Standard library for resources

Which abstraction do operating systems provide?

- CPU:
  Processes and threads

- Memory:
  Address space

- Hard disk/Solid state disk:
  File system

Advantages of these abstractions:
- Hiding complexity; different devices look the same (analogous to ISA vs microarchitecture)
- Provide an "extended" machine with increased functionality

Roles of operating systems

Role 2: Resource management

Goals of the operating system:

- **Security**
  Protecting different applications from each other

- **Efficiency:**
  efficient use of shared resources

- **Fairness:**
  fair access to resources

Three areas

- *Virtualization:*
  CPU + Memory

- *Concurrency:*
  Controlled interaction on shared resources

- *Persistence:*
  File systems + I/O devices