CSCE 451/851
Operating Systems Principles

History of Operating Systems
&
Basic Operating System Concepts

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What is an Operating System?

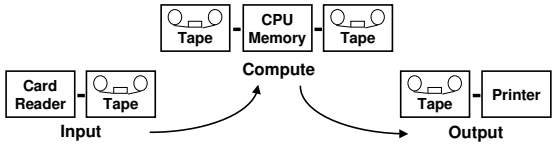
- A program
- An interface
- A programming environment
- A resource manager
- A service provider

Why do we need operating systems?

- They provide a high-level abstraction of physical resources
- They allow sharing of limited or expensive physical resources

A brief history of Operating Systems

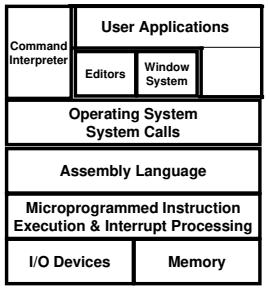
- Hand programmed machines ('45-'55)
- Batch processing/Off-line processing ('55-'65)



A brief history of Operating Systems

- On-line processing (‘62-’69)
- Multiprogramming (‘65-’80)
- Timesharing (‘70-)
- Personal computing (‘80-)

What is an Operating System Today?

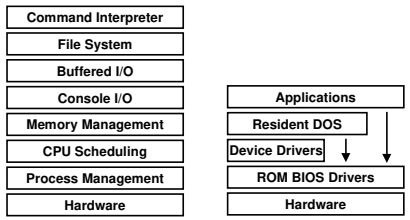


Basic Operating System Functions

- Device management
  - » Programmed I/O
  - » DMA
- Secondary storage management
- File systems
- Memory management
- Process management
- Protection & Security
- Network communications

Operating System Structures

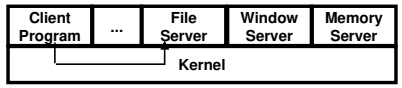
- Layered



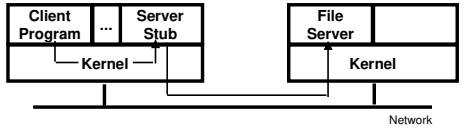
- Monolithic

Operating System Structures

- Client/Server or "Microkernel"
  - » Centralized



  - » Distributed

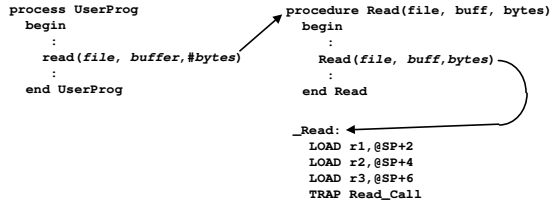


Basic Operating System Concepts

- A process
- An address space or context

Basic Operating System Concepts
A system call

Example: Programmed I/O



Course Overview
What sorts of things will I learn in CSCE 451/851?

- **Why do I have to reboot my Mac/PC every other day while my workstation runs for months?**
- **Why when I add a faster disk to my system, overall performance degrades?**
- **How can I process a 100MB image on my machine with 10MB of RAM?**
- **How can I edit a file that resides on a remote computer as quickly as a file that resides on my machine?**