Intro

#### What is an Operating System?

Three views of an operating system

**Application View:** what services does it provide?

System View: what problems does it solve?

Implementation View: how is it built?

An operating system is part cop, part facilitator.

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# **Application View of an Operating System**

- The OS provides an execution environment for running programs.
- and memory space that it needs to run. The execution environment provides a program with the processor time
- can use networks, storage, I/O devices, and other system hardware The execution environment provides interfaces through which a program components.
- Interfaces provide a simplified, abstract view of hardware to application programs.
- The execution environment isolates running programs from one another and prevents undesirable interactions among them.

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### Other Views of an Operating System

System View: The OS manages the hardware resources of a computer system.

- Resources include processors, memory, disks and other storage devices, network interfaces, I/O devices such as keyboards, mice and monitors, and
- The operating system allocates resources among running programs. It controls the sharing of resources among programs.
- The OS itself also uses resources, which it must share with application programs.

Implementation View: The OS is a concurrent, real-time program.

- Concurrency arises naturally in an OS when it supports concurrent applications, and because it must interact directly with the hardware.
- Hardware interactions also impose timing constraints.

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## The Operating System and the Kernel

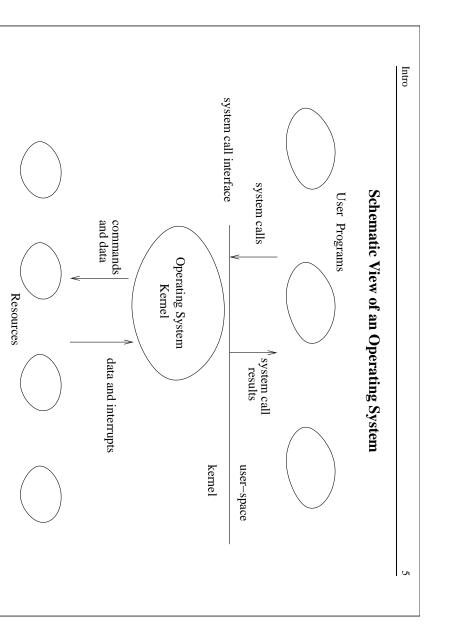
Some terminology:

kernel: The operating system kernel is the part of the operating system that responds to system calls, interrupts and exceptions.

operating system: The operating system as a whole includes the kernel, and may include other related programs that provide services for applications. This may include things like:

- utility programs
- command interpreters
- programming libraries

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### **Operating System Abstractions**

entities that can be manipulated by a running program. Examples: The execution environment provided by the OS includes a variety of abstract

files and file systems: abstract view of secondary storage

address spaces: abstract view of primary memory

processes, threads: abstract view of program execution

sockets, pipes: abstract view of network or other message channels

- This course will cover
- why these abstractions are designed the way they are
- how these abstractions are manipulated by application programs
- how these abstractions are implemented by the OS

CS350 Intro • Interprocess Communication and Networking (time permitting) Scheduling Virtual Memory Synchronization Threads and Concurrency Introduction File Systems • Devices and Device Management Processes and the Kernel **Course Outline** Operating Systems Spring 2011