Topic 0: Introduction

• What are you supposed to learn from this course and why?

• Readings for this topic: Silberschatz/Galvin/Gagne: Chs. 1 and 2

• Why are operating systems interesting?
  • Combine things:
  • Dynamic behavior:
  • Number of interesting concepts: scheduling, virtual memory ...
  • Concurrent systems: doing things in parallel

• What is “Operating system”? What does it do?
  • Major goals

• Different views
  • Abstract virtual machine
  • Resource manager
  • Magician

• Historical perspective
  • History Phase 1
    • Simple batch monitor
    • Buffering and interrupt handling in OS
    • SPOOLing
    • Multiprogramming
  • History Phase 2
• Time-sharing
• Protection and security
• Networking and distributed/parallel systems

• A few terms
  • Distributed systems
  • Parallel systems
  • Grid/cluster computing systems
  • Real-time systems

• Expectations of OS
  • powerful, simple, extensible, easy to use, robust, inexpensive

• Reality
  • enormous, complex, poorly understood, unreliable

• OS as a coordinator/manager: efficiency and fairness
  • concurrency: notion of process
  • I/O devices: I/O processor and interrupts
  • memory: protection, swapping, relocation, virtual memory
  • file management:
  • networking
  • security: authentication, authorization, access control

• OS-related hardware features
  • interrupts: interrupt vector, masking, enabling/disabling
  • protection -- why necessary?
    • dual-mode operation: examples?
  • I/O protection
  • memory protection
  • CPU protection

• OS design approaches
  • monolithic, layered, kernel-based, virtual machine

• Principle: separation of policy and mechanism.
  • Why important?
  • Examples?