

CS 414 : Operating Systems

UNIVERSITY OF VIRGINIA
Department of Computer Science

Spring 2008

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?