

Introduction to Operating System

General Information

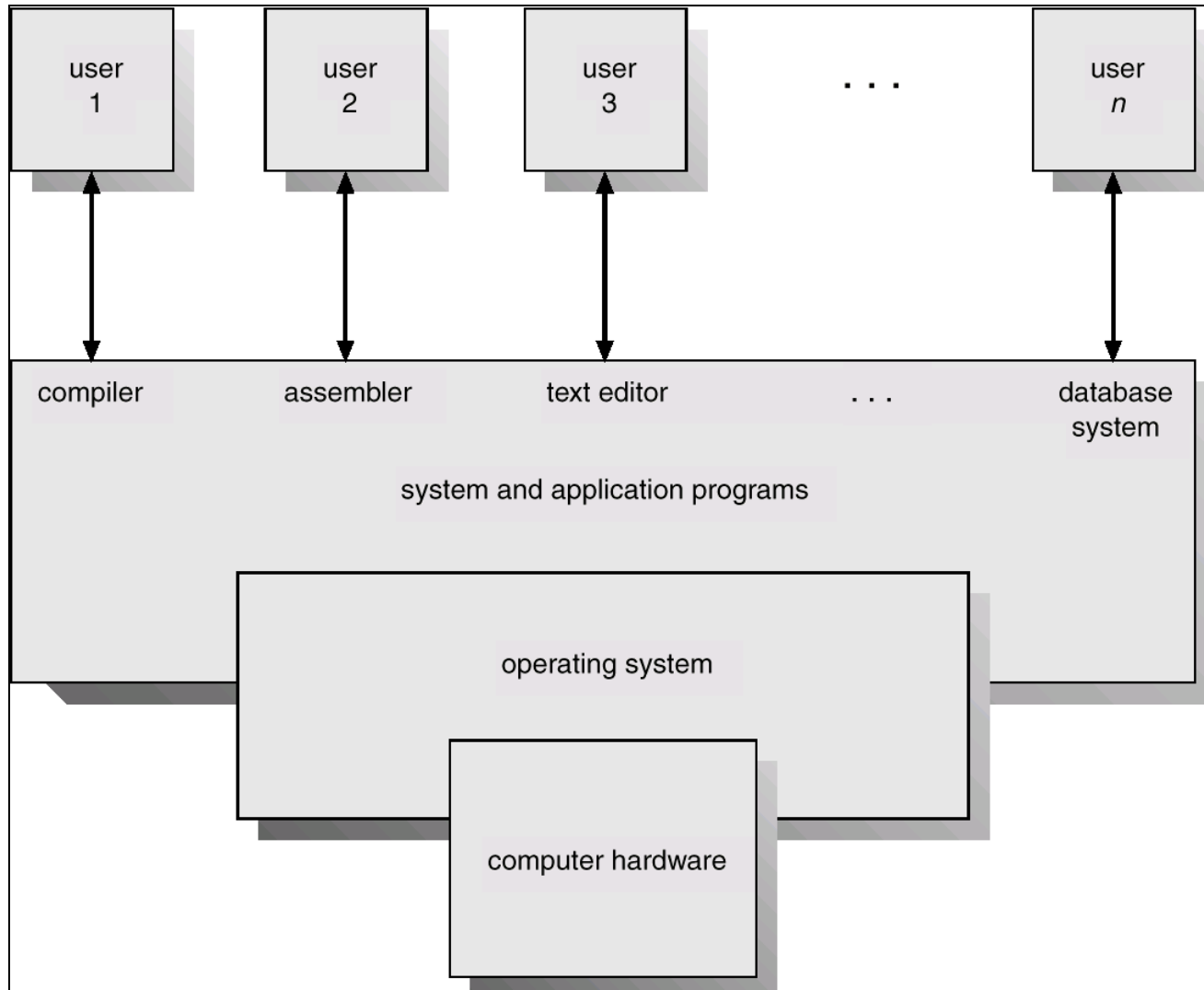
- Textbook:
 - Operating System Concepts, 8th or 9th Ed, by Silberschatz, Galvin, and Gagne
- Reference Books:
 - Operating Systems: Principles and Practice by Anderson and Dahlin
 - Modern Operating Systems by Andrew Tanenbaum
- Programming assignments will be covered in associated E-Lab.

What is operating system?

- User-centric definition
 - A program that acts as an intermediary between a user of a computer and the computer hardware
 - Defines an interface for the user to use services provided by the system
 - Provides a “view” of the system to the user Converts what the hardware gives to what the user wants
 - The view can hide many details of the hardware that the user does not need to know
 - Can even give a very different view of the operating environment to the user than what is actually there

- System-centric definition
 - Efficiently manages and allocates resources to users
 - Controls the execution of user programs and operations of I/O devices
 - Provides isolation/protection between different user programs

Abstract View of System Components



Types of System

- Batch Systems
 - Multiple jobs, but only one job in memory at one time and executed (till completion) before the next one starts
- Multiprogrammed Batch Systems
 - Multiple jobs in memory, CPU is multiplexed between them
 - CPU-bound vs I/O bound jobs
- Time-sharing Systems
 - Multiple jobs in memory and on disk, CPU is multiplexed among jobs in memory, jobs swapped between disk and memory
 - Allows interaction with users

- Personal Computers
 - Dedicated to a single user at one time
- Multiprocessing Systems
 - More than one CPU in a single machine to allocate jobs to
 - Symmetric Multiprocessing, NUMA machines ...
 - Multicore
- Other Parallel Systems, Distributed Systems, Clusters...
 - Different types of systems with multiple CPUs/Machines
- Real Time Systems
 - Systems to run jobs with time guarantees
- Many other types
 - Embedded systems, mobiles/smartphones,