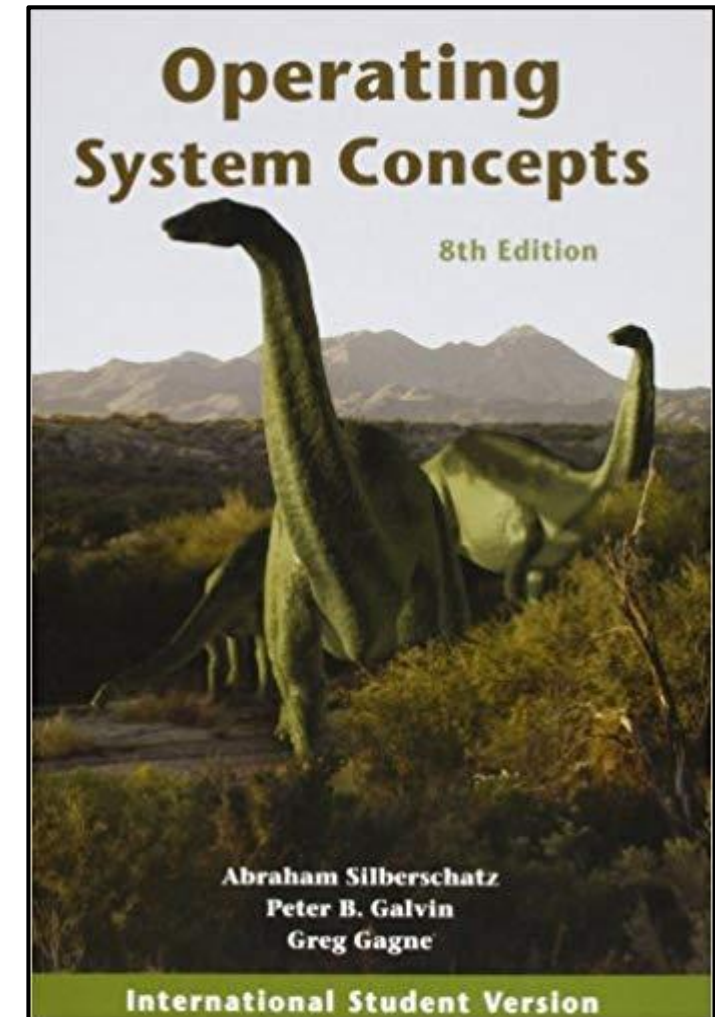
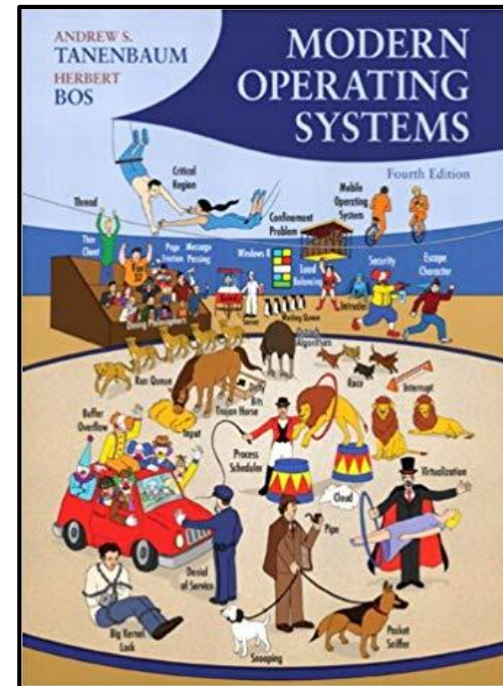
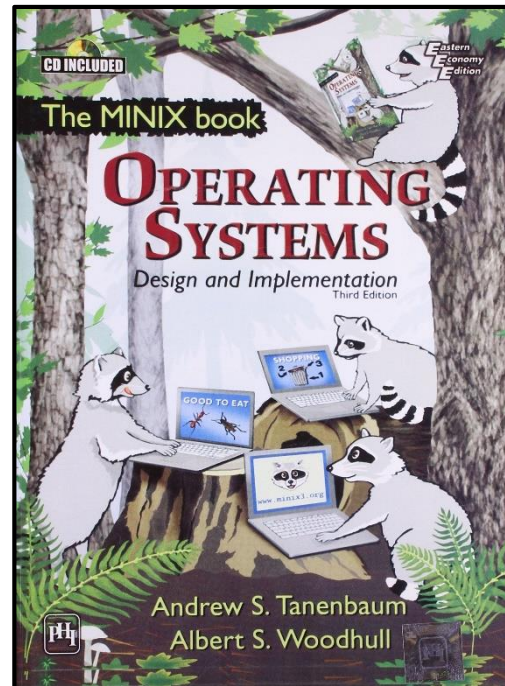
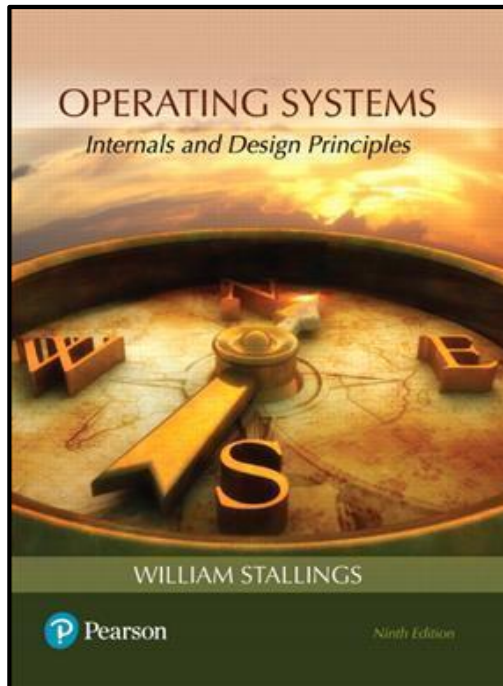


Modern Operating Systems

Unix
Operating System



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18 October 2019

Modern Operating Systems

References

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2. *Operating Systems: Internals And Design Principles (8th Edition)*, William Stallings, Pearson, 2015.
3. *Operating System Concepts Essentials, 2nd Edition*, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Wiley, 2013.

Introduction to Operating Systems

1.1 What is an operating system

1.2 History of operating systems

1.3 The operating system zoo

1.4 Computer hardware review

1.5 Operating system concepts

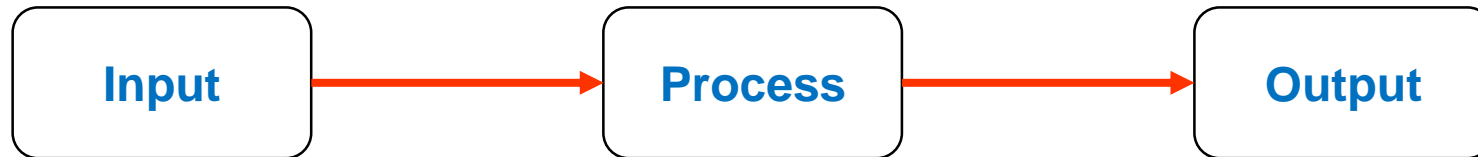
1.6 System calls

1.7 Operating system structure

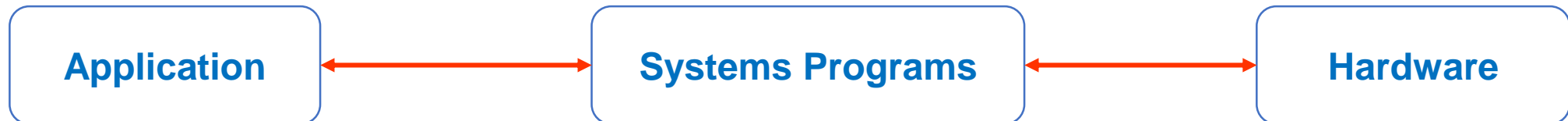
Types of Computer Programs

There are two categories of programs:

- **Application programs** (usually called just "applications") are programs that people use to get their work done.

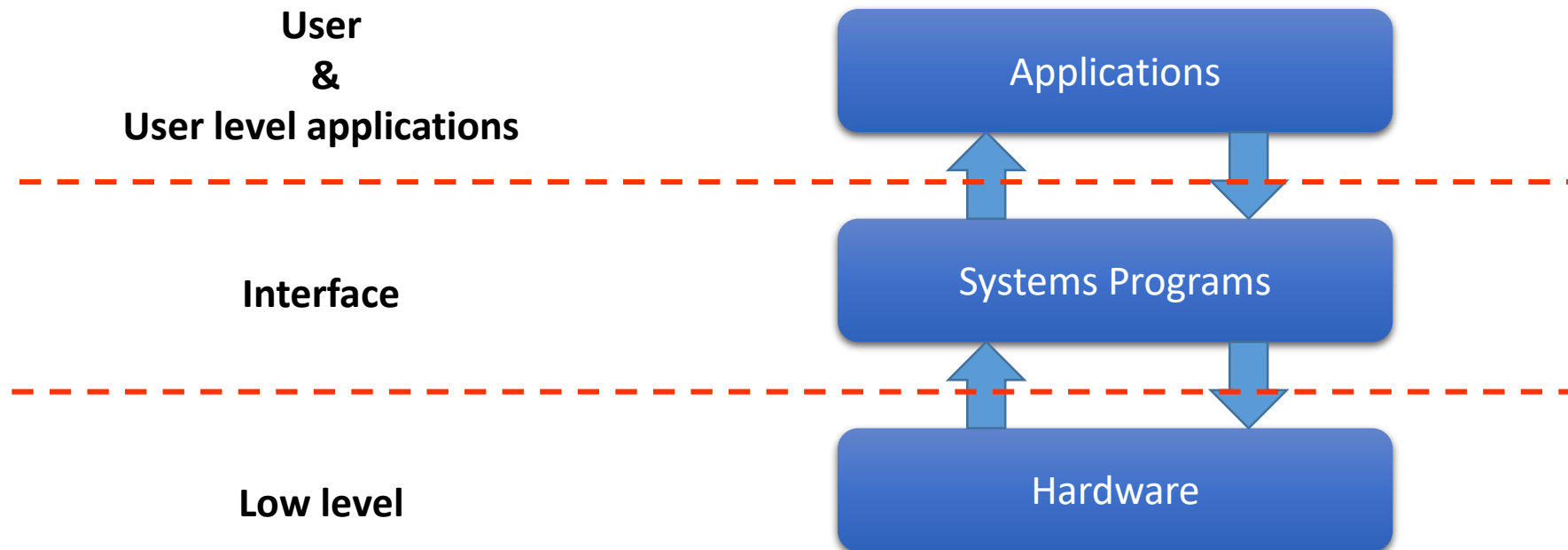


- **Systems programs** keep the hardware and software running together smoothly.



Types of Computer Programs

- The difference between «**Application Program**» and “**System Program**” is fuzzy. Often it is more a matter of marketing than of logic.



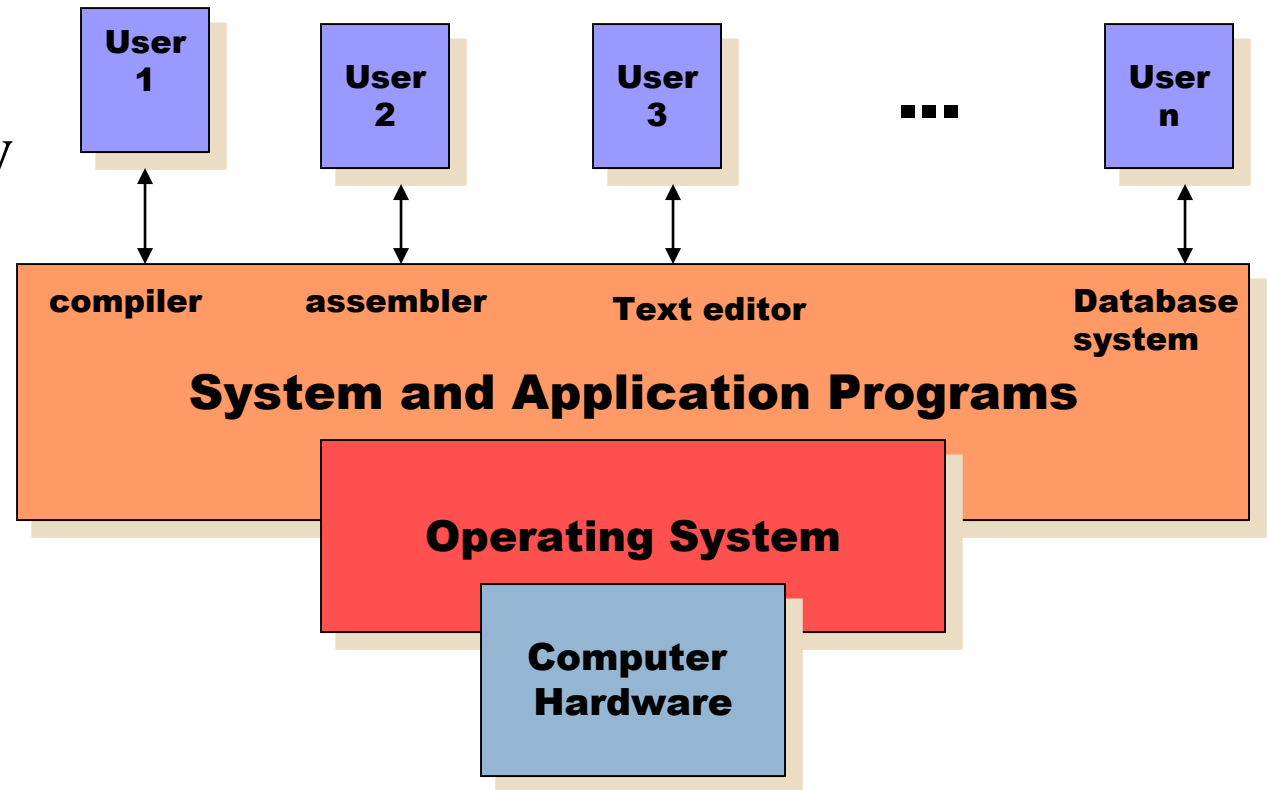
Types of Computer Programs

Application Programs	Systems Programs
<ul style="list-style-type: none">• Word processors• Game programs• Spreadsheets• Data base systems• Graphics programs• Web browsers	<ul style="list-style-type: none">• Operating system• Networking system• Programming language software• Web site server• Data backup

- The most important systems program is the **operating system**.

What is an Operating System?

- An Operating System is a program that acts an intermediary between the user of a computer and computer hardware.



What is an Operating System?

- An operating system is a complex program that keeps the hardware and software components of a computer system coordinated and functioning.
- It is like the owner of a small shop, who keeps everything in order by attending to customers, accepting deliveries, stocking the shelves, doing the bookkeeping, and so on.
- The shopkeeper must promptly attend to tasks as they arise. Without the shopkeeper the shop could not function.

Operating system features

- The operating system is always present when a computer is running.
- It coordinates the operation of the other hardware and software components of the computer system.
- The operating system is responsible for starting up application programs, running them, and managing the resources that they need.
- When an application program is running, the operating system manages the details of the hardware for it.
- **For example**, when you type characters on the keyboard, the operating system determines which application program they are intended for and does the work of getting them there.

Operating system features

- **Extended Machine**
 - Presents user with a virtual machine, easier to use.
- **Interface Between Application And Hardware**
 - Hides the messy details which must be performed.
- **Resource Allocator**
 - To allocate resources (software and hardware) of the computer system and manage them efficiently.
 - Each program gets time with the resource.
 - Each program gets space on the resource.
- **Control program**
 - Controls execution of user programs and operation of I/O devices.
- **Kernel**
 - The program that executes forever (everything else is an application with respect to the kernel).

Modern Operating system

- Some embedded systems do not use an operating system, but run their programs directly on the processor.
- Modern operating systems for desktop computers come with a user interface that enables users to easily interact with application programs (and with the operating system itself) by using windows, buttons, menus, icons, the mouse, and the keyboard.
- Examples of operating systems are Unix, Linux, Android, Mac OS, and Windows.



Operating system roles

- **Referee**

- Resource allocation among users, applications
- Isolation of different users, applications from each other
- Communication between users, applications

- **Illusionist**

- Each application appears to have the entire machine to itself
- Infinite number of processors, (near) infinite amount of memory, reliable storage, reliable network transport

- **Glue**

- Libraries, user interface widgets, ...
- Reduces cost of developing software

Goals of an Operating System

- **Simplify the execution of user programs and make solving user problems easier.**
- **Use computer hardware efficiently.**
 - Allow sharing of hardware and software resources.
- **Make application software portable and versatile.**
- **Provide isolation, security and protection among user programs.**
- **Improve overall system reliability**
 - error confinement, fault tolerance, reconfiguration.