

OPERATING SYSTEM



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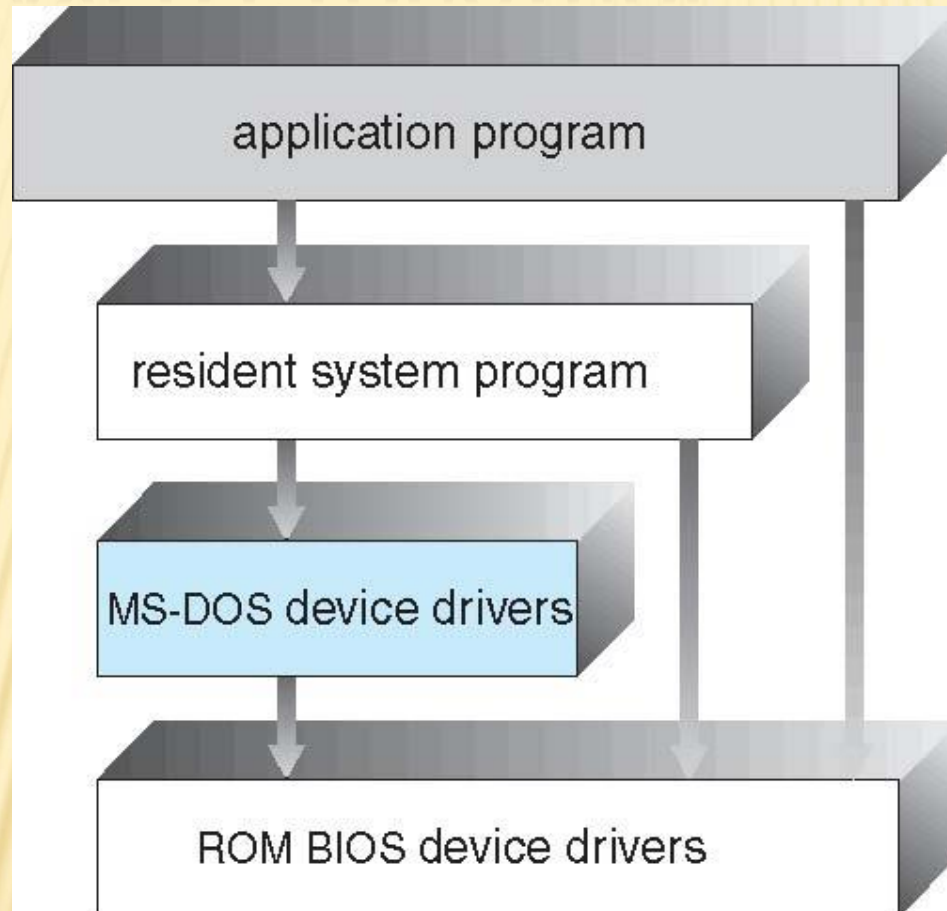
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OPERATING-SYSTEM STRUCTURES

SIMPLE STRUCTURE

- ✘ MS-DOS – written to provide the most functionality in the least space
 - + Not divided into modules
 - + Although MS-DOS has some structure, its interfaces and levels of functionality are not well separated

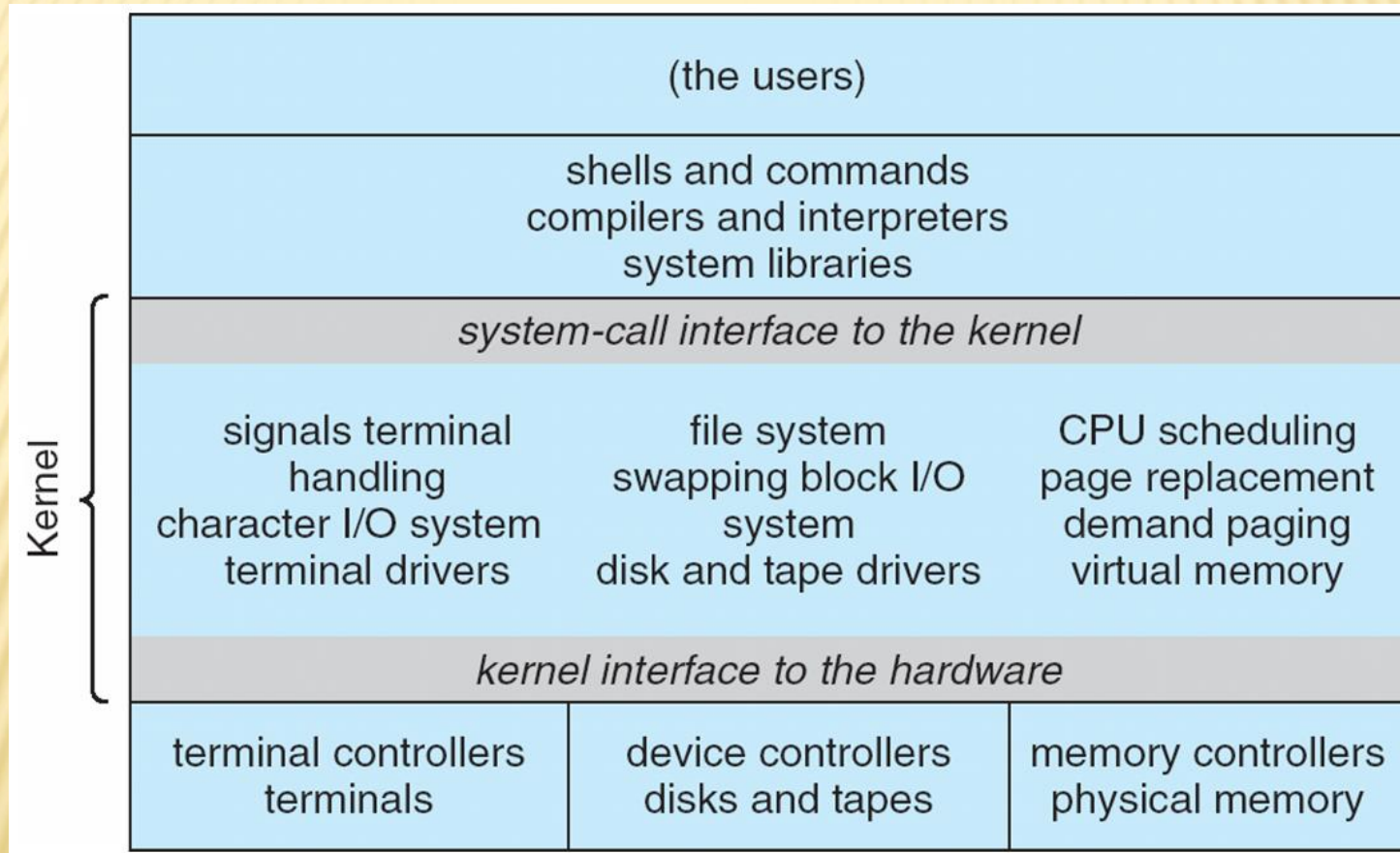
MS-DOS LAYER STRUCTURE



LAYERED APPROACH

- ✘ The operating system is divided into a number of layers (levels), each built on top of lower layers. The bottom layer (layer 0), is the hardware; the highest (layer N) is the user interface.
- ✘ With modularity, layers are selected such that each uses functions (operations) and services of only lower-level layers

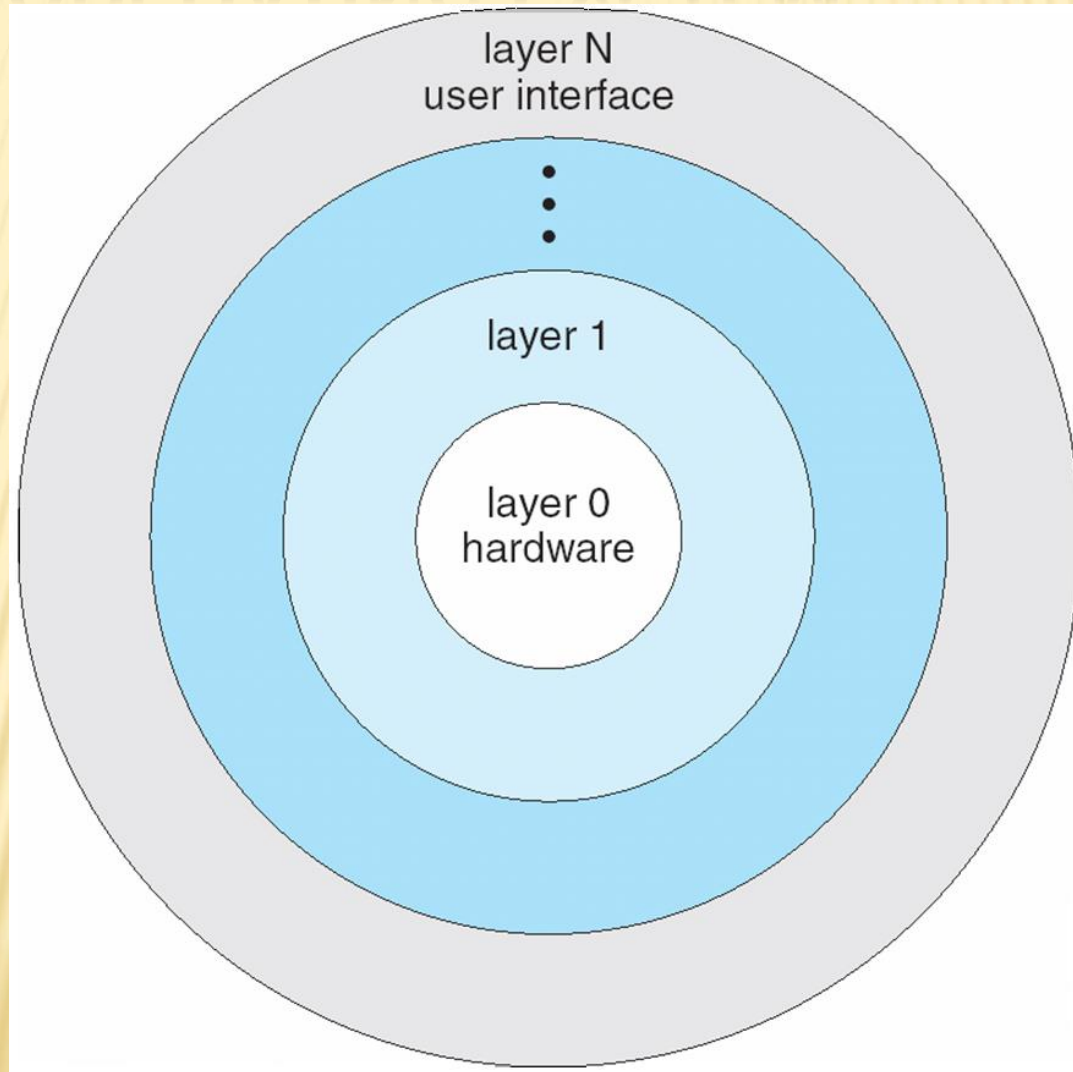
TRADITIONAL UNIX SYSTEM STRUCTURE



UNIX

- ✘ UNIX – limited by hardware functionality, the original UNIX operating system had limited structuring. The UNIX OS consists of two separable parts
 - + Systems programs
 - + The kernel
 - ✘ Consists of everything below the system-call interface and above the physical hardware
 - ✘ Provides the file system, CPU scheduling, memory management, and other operating-system functions; a large number of functions for one level

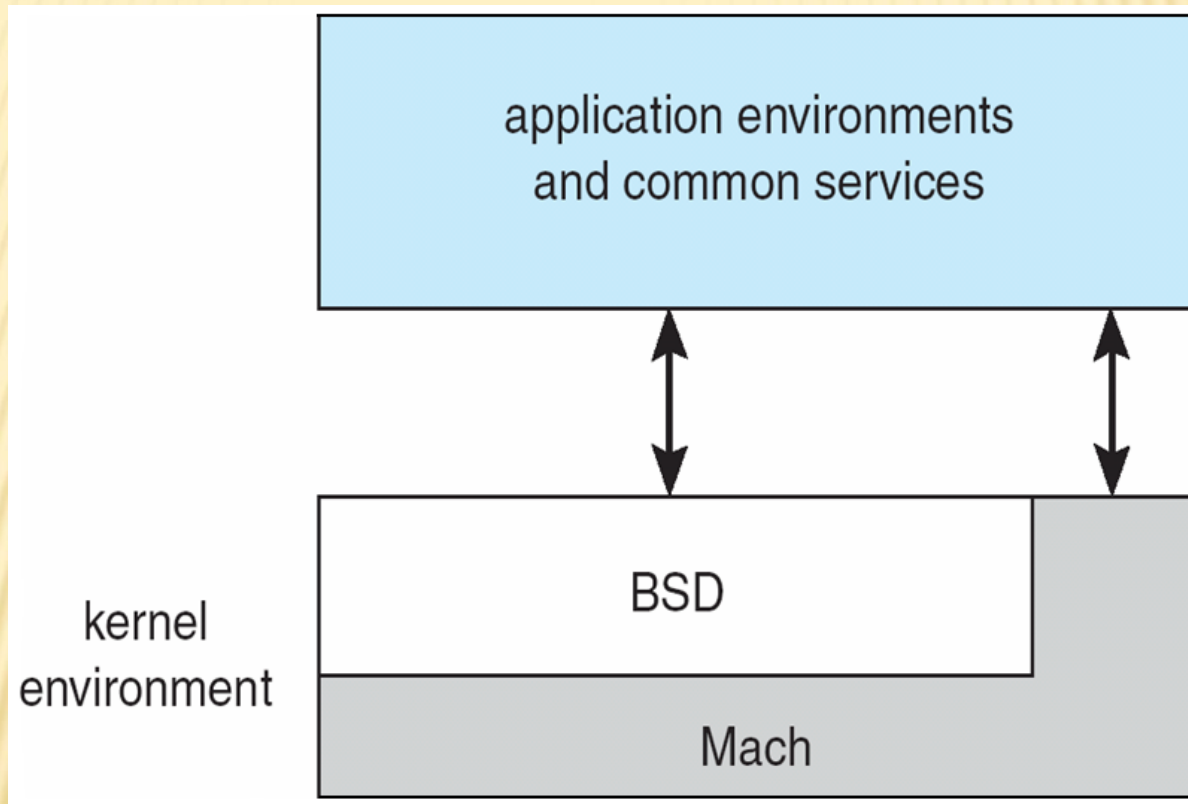
LAYERED OPERATING SYSTEM



MICROKERNEL SYSTEM STRUCTURE

- ✘ Moves as much from the kernel into “*user*” space
- ✘ Communication takes place between user modules using message passing
- ✘ Benefits:
 - + Easier to extend a microkernel
 - + Easier to port the operating system to new architectures
 - + More reliable (less code is running in kernel mode)
 - + More secure
- ✘ Detriments:
 - + Performance overhead of user space to kernel space communication

MAC OS X STRUCTURE



MODULES

- ✘ Most modern operating systems implement kernel modules
 - + Uses object-oriented approach
 - + Each core component is separate
 - + Each talks to the others over known interfaces
 - + Each is loadable as needed within the kernel

- ✘ Overall, similar to layers but with more flexible

SOLARIS MODULAR APPROACH

