Operating System Security

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Operating System Concepts

- An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

- An operating system is software that enables applications to interact with a computer's hardware. The software that contains the core components of the operating system is called the kernel.

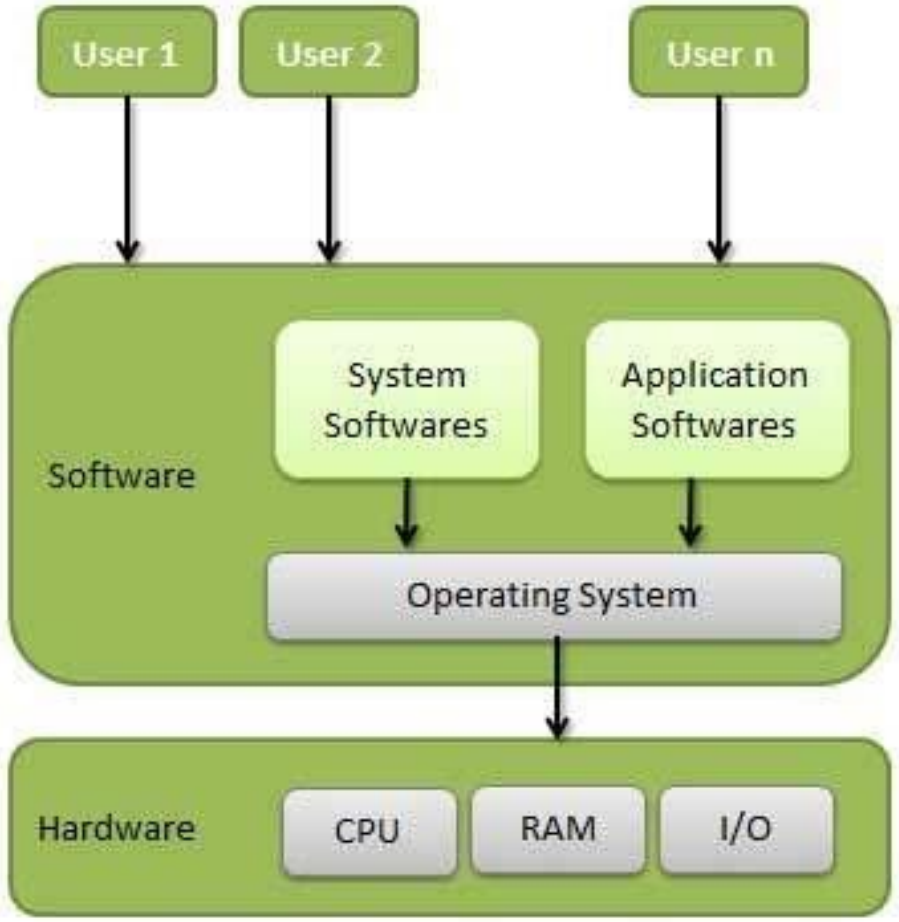
- The primary purposes of an Operating System are to enable applications (softwares) to interact with a computer's hardware and to manage a system's hardware and software resources.

Operating System Definition and Basic Architecture

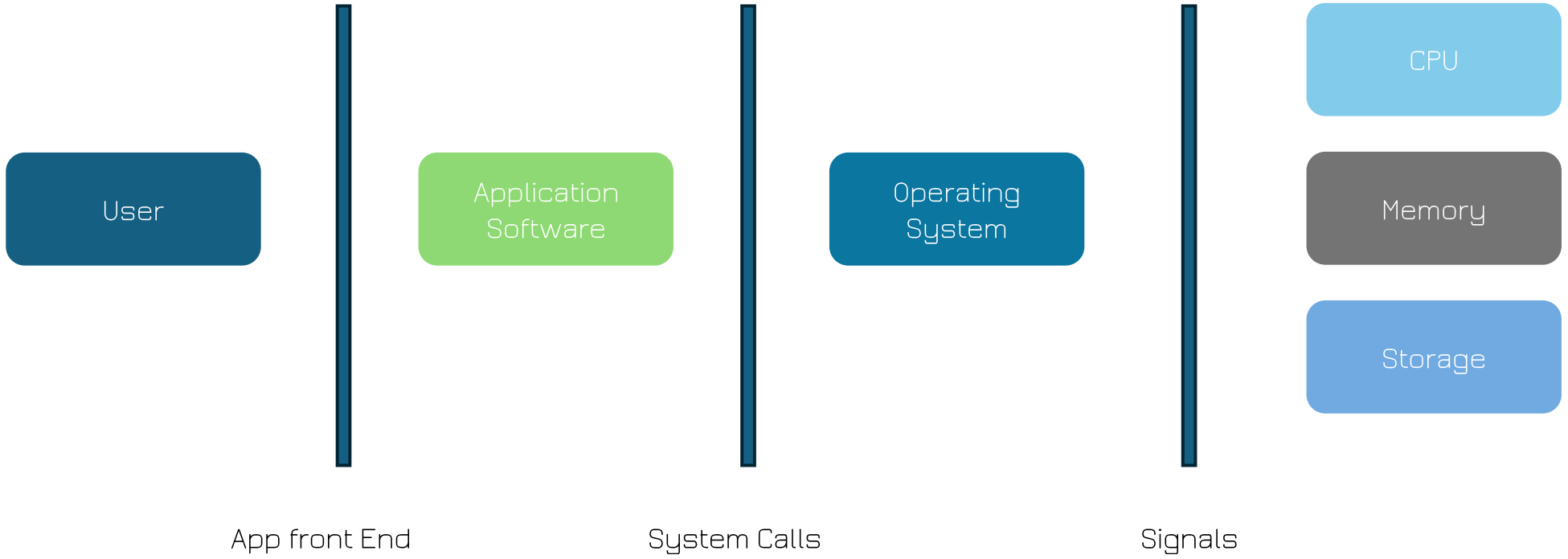
- An Operating System is the low-level software that supports a computer's basic functions, such as scheduling tasks and controlling peripherals.

- An operating system is a program that acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs.

- An operating system (OS) is system software that manages computer hardware, software resources, and provides common services for computer programs.



Operating System Definition and Basic Architecture



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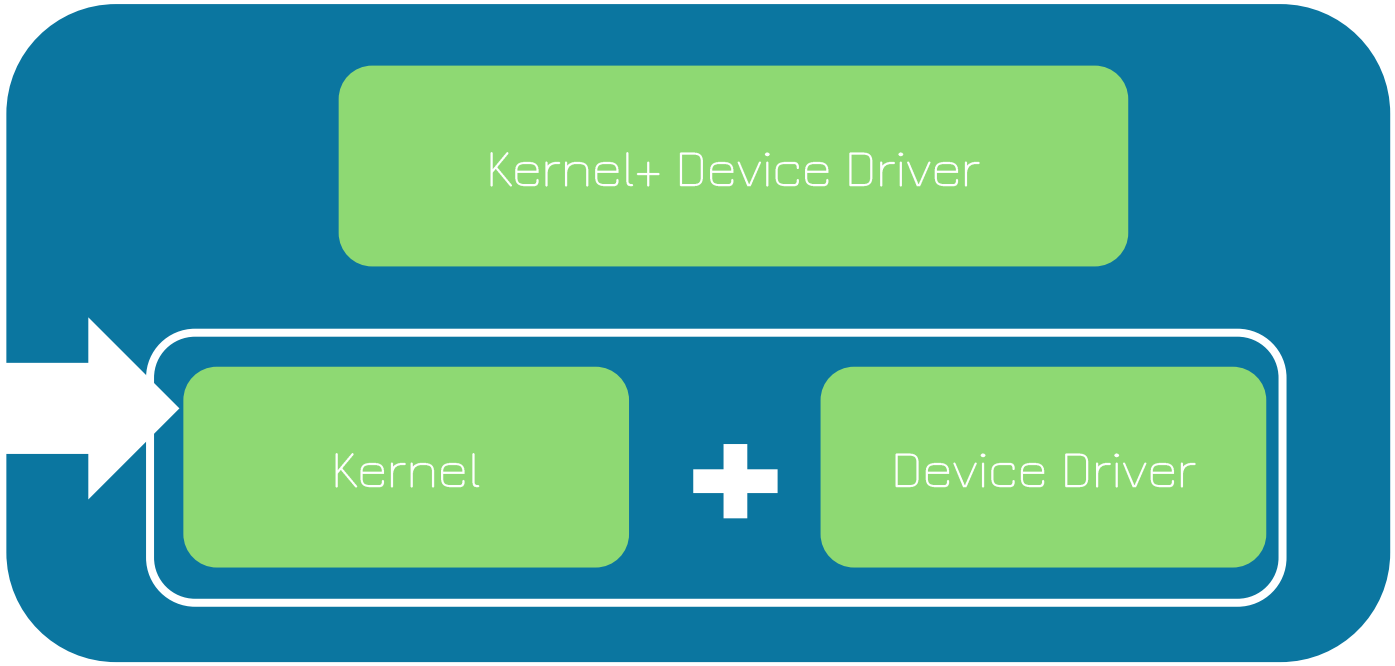
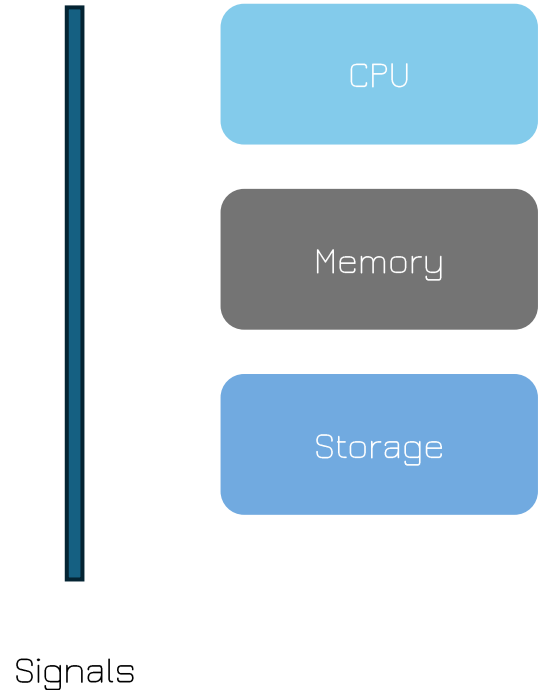




RISC (Reduced Instruction Set Computing) based processor

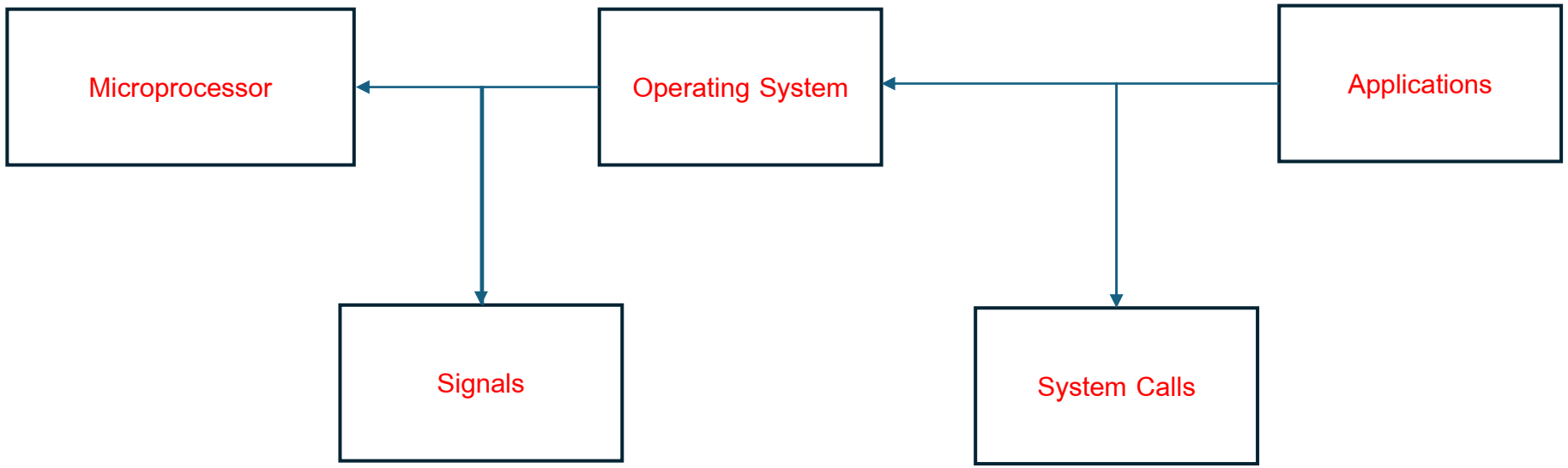
CISC (Complex Instruction Set Computing) based processor

Operating System Components and Services

- Process Management
- Main Memory Management
- File System Management
- I/O System Management
- Storage Management
- Networking
- Security System

- Kernel
- Command Interpreter
- System Calls
- Signals

Operating System Components and Services



Process Management (Scheduling)

A program in running state is called a process. A process is program or a fraction of a program that is loaded in main memory. A process needs certain resources including CPU time, Memory, Files, and I/O devices to accomplish its task. The process management component manages the multiple processes running simultaneously on the Operating System.

Process Management is responsible for the following activities:-

- Create, load, execute, suspend, resume, and terminate processes.
- Switch system among multiple processes in main memory.
- Provides communication mechanisms so that processes can communicate with each others
- Provides synchronization mechanisms to control concurrent access to shared data to keep shared data consistent.
- Allocate/de-allocate resources properly to prevent or avoid deadlock situation.

A process is a program in execution. It consists of the followings:

- Executable program
- Program's data
- Stack and stack pointer
- Program counter and other CPU registers
- Details of opened files