

# Introduction to the UNIX Kernel

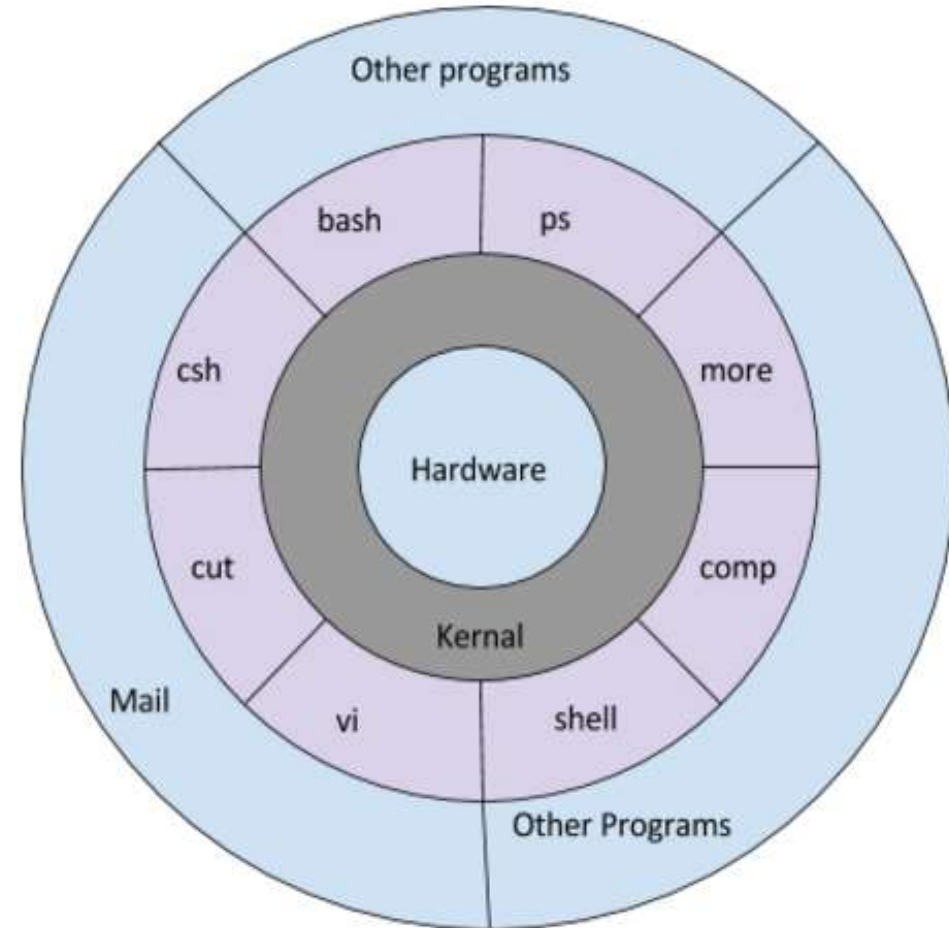
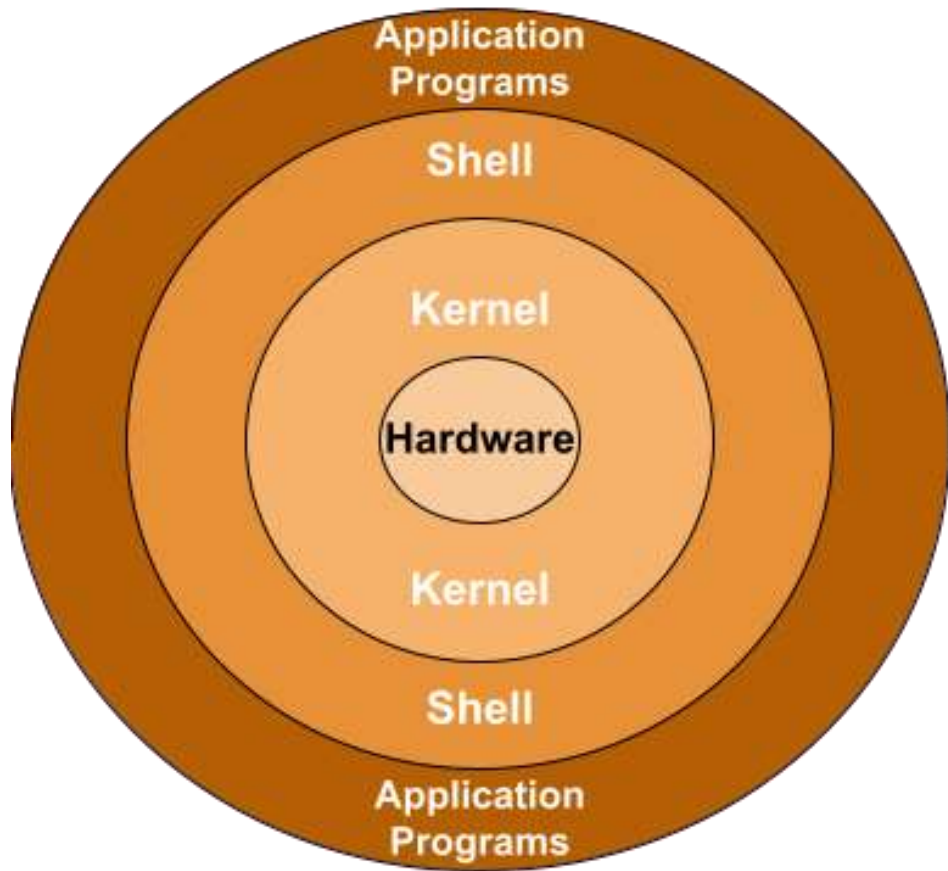
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# The Unix OS

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- Unix is an Operating System was developed in the 1970s by Ken Thompson, Dennis Ritchie, and others in the AT&T Laboratories
- Open Source
- Multi User/Multi Tasking/Multi Programming OS
- Shell Scripting
- Security
- Portability

# Unix OS General Architecture



# The Kernel

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- The core of Unix OS – Performs core operations
- The kernel handles the hardware effectively by using the device drivers.
- Process Management
- File Management

# Shell

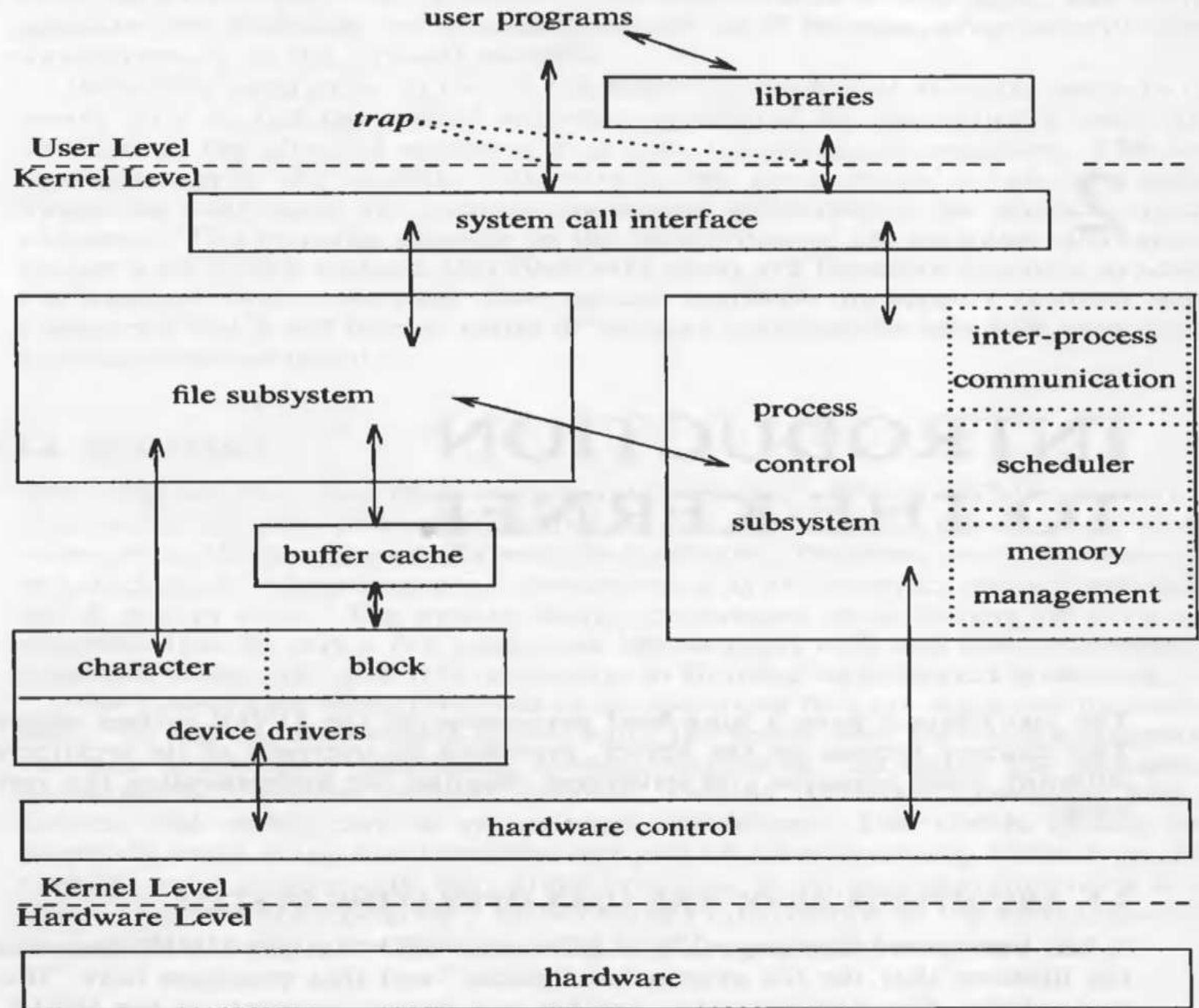
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- Command interpreter of Unix OS
- Shell is an interface between the user and the Kernel



# Architecture of Unix Operating System

## Block Diagram of System Kernel



# Architecture of Unix Operating System

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- The UNIX system supports the illusions that the file system has "places" and that processes have "life".
- The two entities, files and processes, are the two central concepts in the UNIX system model.
  - The file subsystem
  - Process control subsystem
  - The diagram shows 3 levels : user, kernel, and hardware.
- The system call and library interface represent the border between user programs and the kernel.

# Architecture of Unix Operating System

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- System call Interface
  - User interact with kernel using libraries and other applications , which then invokes system calls for performing certain kernel functions.
- System calls for File Subsystem
- System calls for process control sub system



# File Sub system

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- Manages files
- Allocating file space
- Administering free space
- Controlling access to files
- Retrieving data for users

# File Sub system

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- Access file data from permanent storage devices using buffering mechanism.
- Buffer cache – regulates data flow between kernel and secondary storage devices
- Device Drivers – Kernel modules that controls operation of peripheral devices

# Process Sub system

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- Process synchronization
  - Inter process communication
  - Memory Management
  - Process Scheduling
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- The File Sub System and Process Sub System interacts when loading a file to memory for execution

# Process Sub system

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- Fork system call
- Exec()
- Wait()
- Exit()
- Signal()

# Memory Management Module

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- Controls allocation of memory
- Scheduler- allocates CPU for processes.
- Hardware Control – Handling interrupts and communicating with system.