

# Unix & Bash Basics

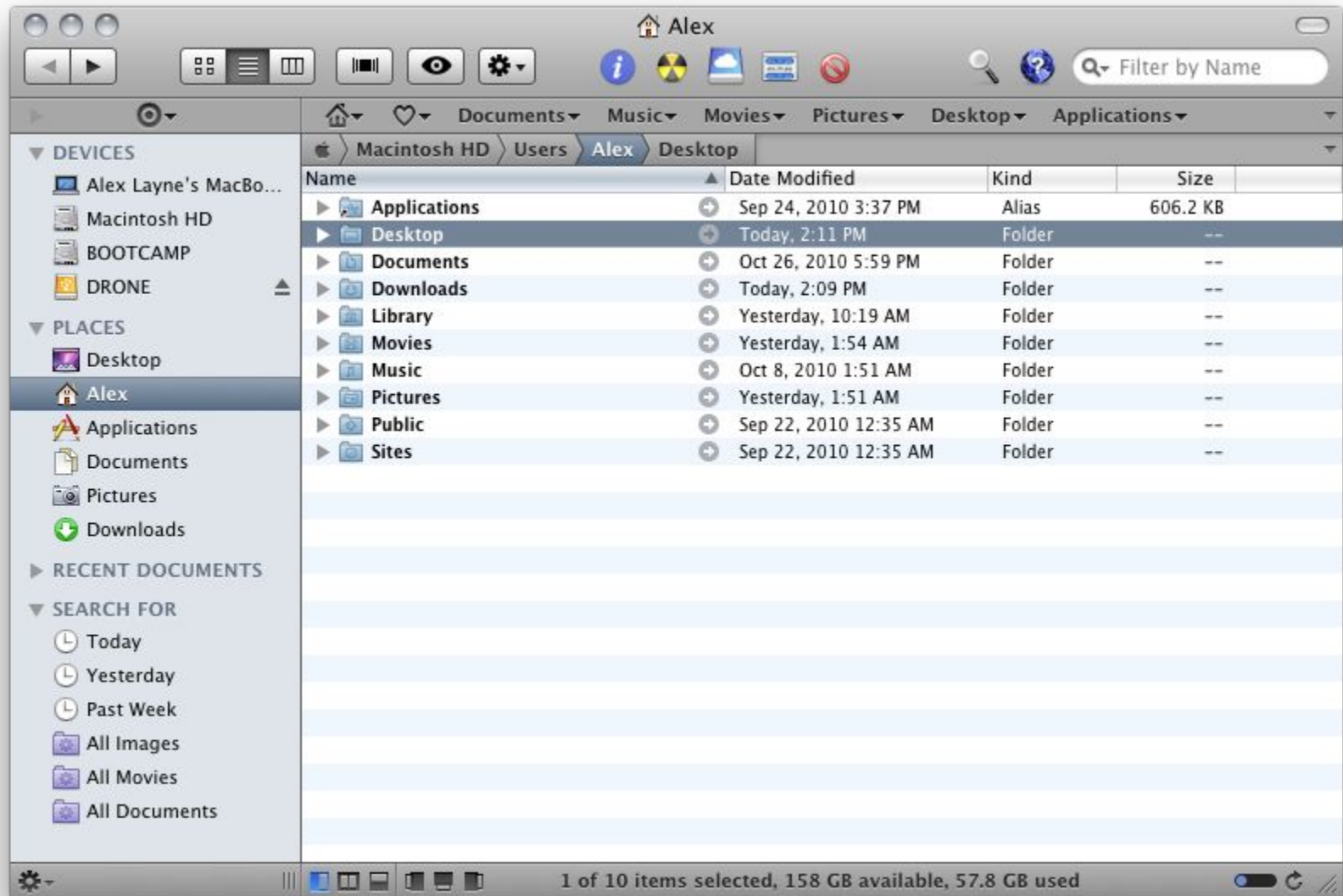
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Stat 133 with Gaston Sanchez

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# GUI & CLI

Windows and Mac use a  
Graphical User Interface  
(GUI) for you to interact  
with the Operating System



MAC Finder: GUI to interact with the OS

# About GUIs

Easy to learn

Rely on visual displays

Can be extremely useful

Have improved the friendliness and usability of computers

GUIs are excellent for ...

Photo editing

Document Layout

Browsing the web

Graphic design

Watching movies

Playing Games

## GUIs Trade-offs

They are limiting

They don't allow you to have more control over what your computer can do

Some operations are labor intensive and repetitive

You use clicking & dragging with the mouse, which reduces reproducibility

## GUIs disadvantages

Lack of repeatability

Lack of reproducibility

Some tasks may be labor intensive

Limit analyses on a cluster of computers



Instead of a GUI,  
you can use a  
**Command-Line Interface**  
(CLI)



Don't touch that  
mouse (or track pad)!

# CLIs

CLI: Command Line Interface

Instead of using a GUI we can use a CLI

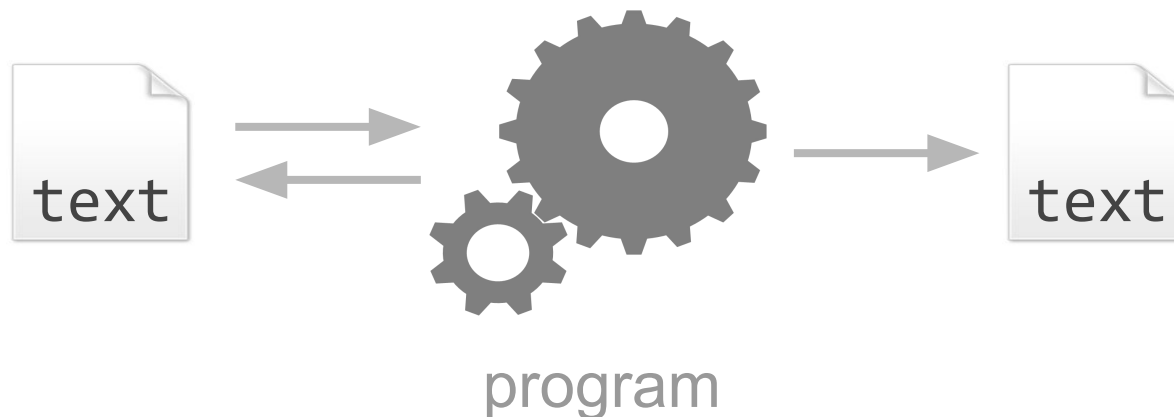
By typing commands we perform tasks on the computer

# CLI

The command-line is a text-based interface

The user issues commands in the form of text

One of the earliest ways of interacting with a computer



# Why use the Command-Line instead of a GUI?

# Software development & System Administration

Don't have or don't need a GUI

Servers, utilities, and other programs run on a server somewhere without a monitor

The CLI started in 1971 with the Thompson shell for Unix

# CLI -vs- GUI

**More convenience**

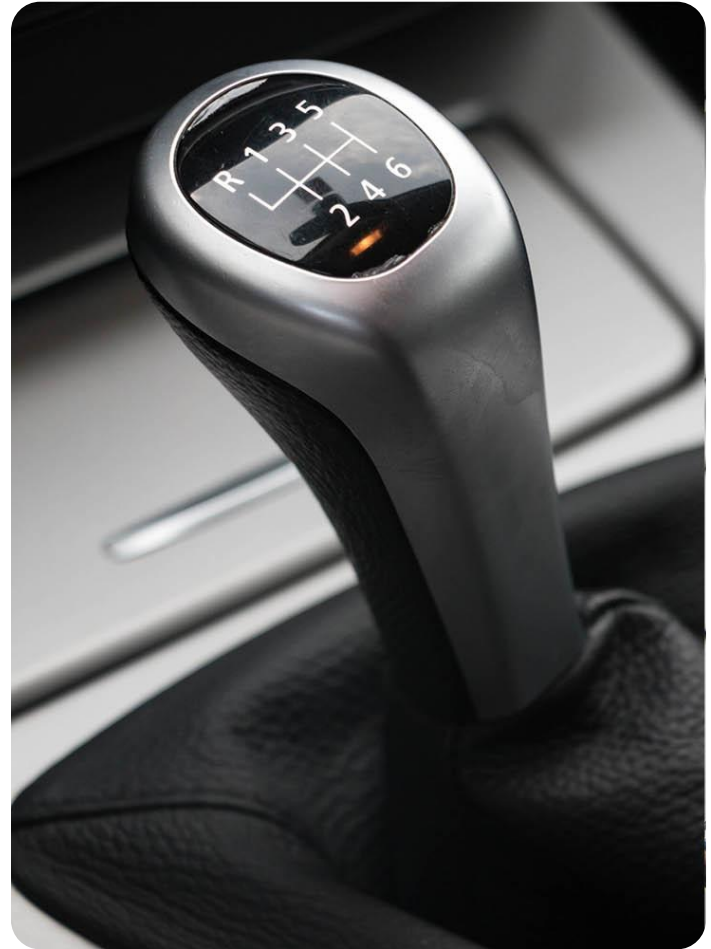
Less Control



GUI is like automatic  
transmission

Less convenience

**More Control**

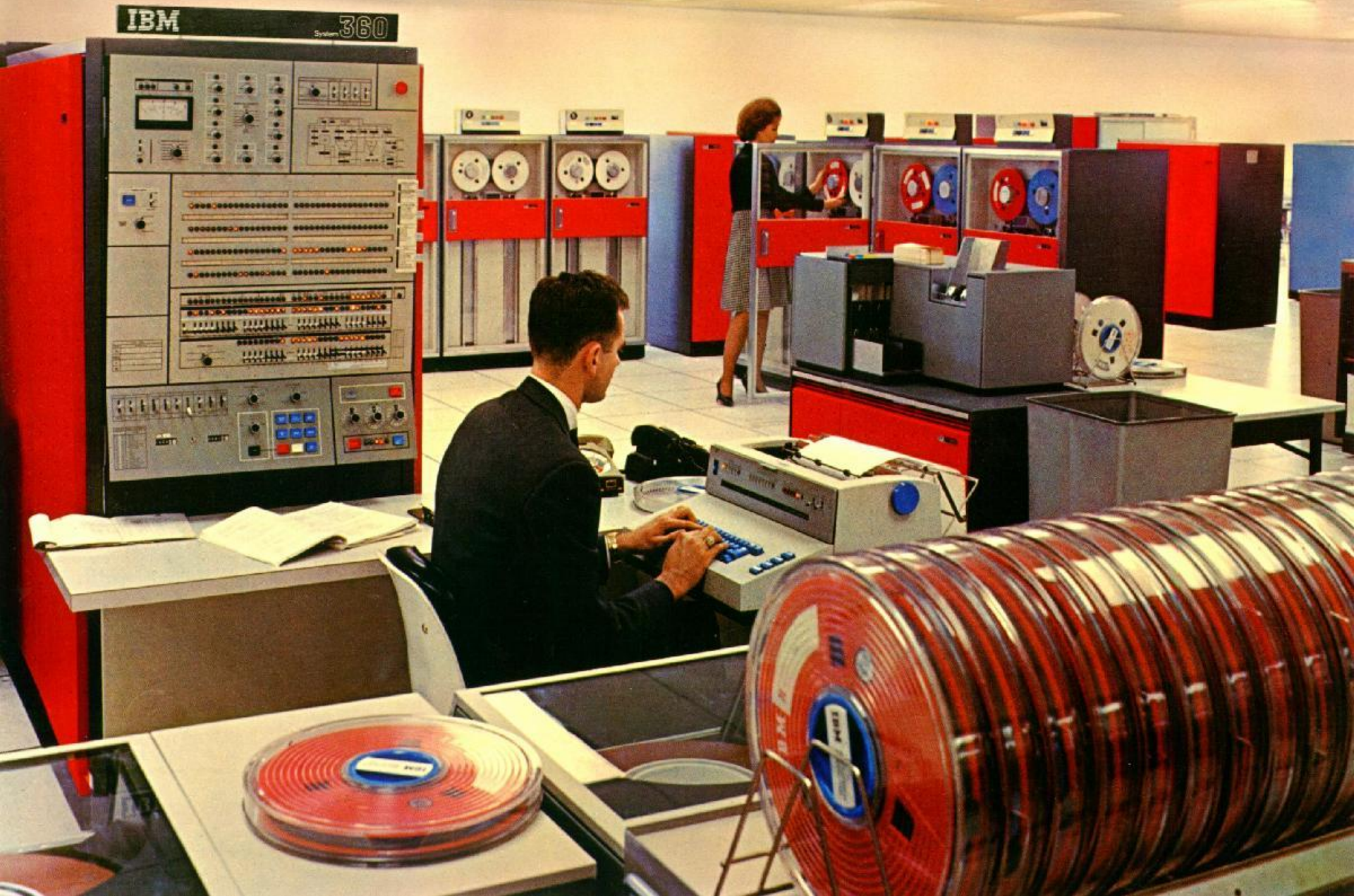


CLI is like manual  
transmission



# Unix-like & Bash Command line

To talk about the CLI we  
need to talk about UNIX



# What is UNIX?

Unix is an Operating System

Developed by AT&T employees at Bell Labs (1969-1971)

Predecessor MULTICS: Multiplexed Information and Computing Service

MULTICS was designed to manage remote login process

MULTICS became a huge and complex project

And Bell Labs decided to cancel it





# What is UNIX?

Employees who worked on MULTICS kept secretly developing a small and simpler version system

Originally, their version only supported one single user

The new project was called UNICS: Uniplexed Information and Computing Service

UNICS became quickly able to support multiple users

It was then renamed to UNIX

# What is UNIX?

Due to an antitrust case, AT&T was forbidden to enter the software business

AT&T starts give UNIX away in 1975 with the first public version “System Five”

Since then, many branches and releases have kept the development of UNIX alive

The most famous one is probably the Berkeley Software Distribution (BSD) that came out in 1977

# Some Versions of UNIX

Linux (open source)

Sun Oracle “Solaris”

IBM “AIX”

Hewlett-Packard “HP UX”

Apple’s “Mac OS X”

*Etc*

If you hear UNIX now it can mean all of these things

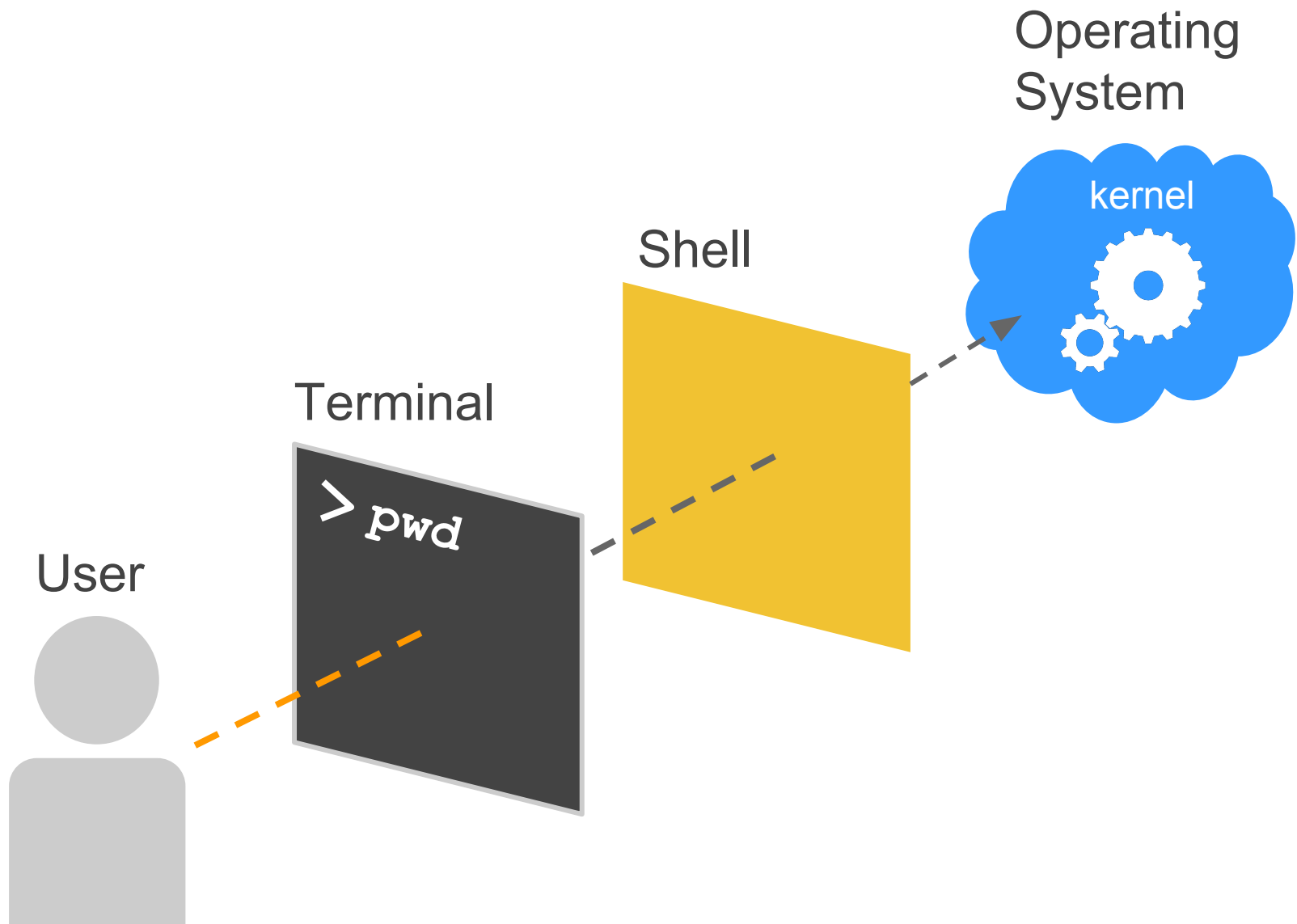


**Kernel**

**Shell**

**CLI**

**Terminal**



## About the Kernel

The **Kernel** is the **core** of the operating system in Unix

It takes care of allocating time and memory to programs

It does very fundamental root level management

## About the Shell

The **Shell** is the outer layer of the OS

That's what we see when we open up a terminal window

We are working in the Shell

It interacts with the user and sends requests to the kernel

The Kernel sends results back to the Shell

## Command-Line Interpreter (Interface)

The command line is a text-based interface where you type commands and direct text-based input and output to the screen, to files, or to other programs

The environment you use is called a shell or a command-line interpreter

The main programs we're going to be concerned with are the **Terminal** and the **Shell**

# Shell

**Shell:** program that takes commands from the keyboard and pass them to the Operating System to be executed

- bash
- zsh
- ksh

# Terminal

**Terminal:** (a.k.a. terminal emulator)  
program that opens a window and lets  
you interact with the shell



