

What's an operating system?

What are Windows, Mac, Linux, Android, and iOS?



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The TL;DR

An operating system is the **mastermind** behind your computer: it **orchestrates** all of the **behind-the-scenes magic** that lets something like Excel work on your hardware.

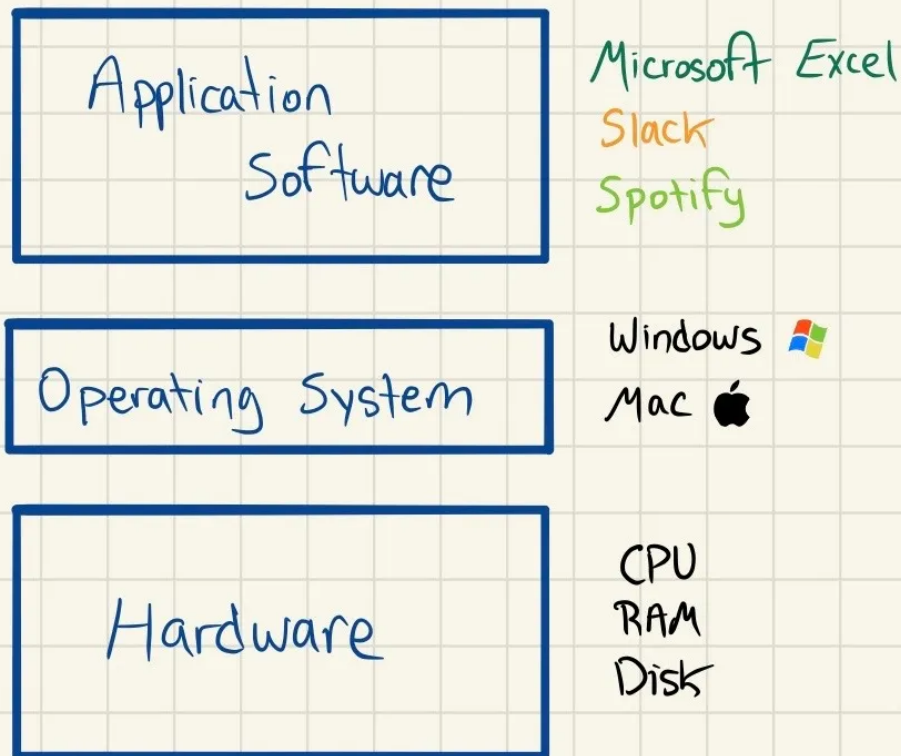
- Operating systems are pieces of software that manage how your **application software works with your hardware**
- An OS also **handles very basic tasks** like keyboard input, displaying things on your screen, and keeping track of files
- The three most popular desktop operating systems are **Windows, MacOS, and Linux**, and you might have heard of **iOS and Android** for mobile
- Application software has to be **written for specific operating systems**, which is why Excel for Windows and Mac are different

An OS is the workhorse of your computer: you don't hear about it a lot, but you'd be lost without it. So read this!

What's an operating system?

An operating system is a piece of software that sits between your applications and your hardware, and makes sure the two play well together.

Where the operating system sits



🙄 Undefined Terms 🙄

The term “application software” refers to applications on your computer: Excel, Slack, Photoshop, etc. Because an operating system is also technically software, it’s important to differentiate between the two.

🙄 Undefined Terms 🙄

The easiest way to think about what an operating system *does* is by splitting it into 2 big categories:

1. *Managing software / hardware interaction*

When we looked at [what computers are](#), we explored the basic elements of computer hardware: CPU, RAM, and Disk. The first (and arguably most important!) task of an operating system is to *manage these* and allocate them properly. What exactly does that mean?

Most operating systems that we use today are *multitasking*, which means exactly what it sounds like: you can run multiple applications at the same time, like Excel and Slack (lol, as if that would work). But your computer has limited resources: how much processing power should Excel get? How much should Slack get? What about RAM (**memory allocation**)? And what happens if you don't have enough for both? The OS takes care of all of this stuff.

Your operating system also deals with *saving* things to your hard drive, and making sure your applications don't butt heads working at the same time.

2. *Basic computer functionality*

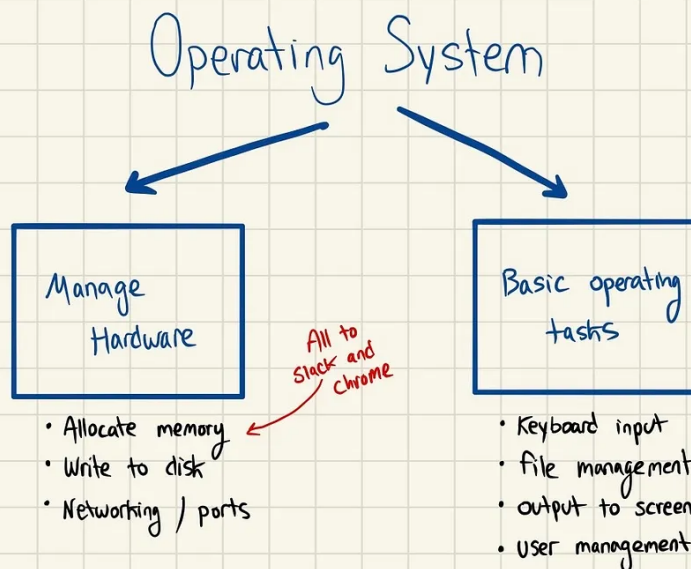
There's a lot of stuff you use daily on your computer that no particular application provides, but is really important: handling security, connecting to the internet, and turning on and off, to name a few. Operating systems take care of all of these. A few other things that your OS is doing to make your life easier:

- Taking input from your keyboard and interpreting it
- Managing basic networking, like your IP address (more on those in another post)
- Displaying things to your screen
- Handling multiple users on the same computer

Another key thing your OS does is building and managing your **filesystem**. It takes your computer's disk storage and manages how you save files to it and retrieve them without losing any of your data.

Basically, the list of what your operating system does goes on and on: the point is that there are **a lot of table stakes** for a functioning computer system, and the OS is a big part of keeping the lights on. So give it some love.

What does an operating system do?



Specific device, specific OS

📖 *If you're reading this on a laptop...*

There are three dominant operating systems for non-mobile computers: **Windows, MacOS, and Linux**. You're probably familiar with the first two, but not the last one (unless you're an engineer, but then why are you here?). Can you guess which is the most popular?

1. Windows

About 80% of desktop computers are running Windows (!), making it *by far* the most popular desktop operating system out there. Microsoft originally developed it in 1985, and a little bit of business strategy and being an asshole later, Bill Gates is a really rich dude. You might hear people making fun of Windows a lot: that's because it's kind of clunky and harder to develop software on if you're an engineer.

One interesting thing about Windows: most laptops that use it aren't actually manufactured by Microsoft. Hardware companies like Dell, Lenovo, and Hewlett Packard *license* Windows from Microsoft (for a hefty fee). You know who *doesn't* allow licensing though?

2. MacOS

Apple's operating system is MacOS (originally released in 2001), and it only runs on computers that Apple manufactures and sells (there's a lesson there somewhere). It's sleeker, and usually the development system of choice for engineers at tech companies on their laptops. MacOS has [something like a 15% share](#) of the market.

3. Linux

Linux is probably new to you, and it's a tiny fraction of the computer market: but it's the default operating system for most [servers in the cloud](#), and it's getting more popular on personal computers too. Linux is *open source*, which means it's free to use and completely auditable (you can read its code).

Confusion Alert


If you're reading or talking about Linux, you might hear people use two new words: **distribution** and **kernel**. [What do those mean?](#)

In short, every operating system is built off of a **kernel**, which is the core of the OS, doing most of the hardware management. Linux is a collection of a kernel and a few other things, not necessarily organized well together like Windows or Mac would be.

A **distribution** gathers all of those components in a specific configuration – like you'd expect from Windows or Mac – and puts them together in an easy to download and use package. The most popular Linux distribution (distro for short) is Ubuntu.

Confusion Alert

There are a couple of other operating systems out there, like Google's ChromeOS, but don't worry too much about them.

 *If you're reading this on a phone...*

There are basically two big players for mobile: Android and iOS. Android is actually the most popular operating system *in the world* (because there are more phones than computers). It was originally released as open source in 2003, but eventually got acquired by Google. More than 2 Billion phones are running Android (!).

iOS is for iPhones, and it's been around since the iPhone was released in 2007.

§ Workplace Example §

Most larger companies are committed to one specific operating system: if you work at a bank or consulting firm, chances are you're using Windows on your computer. Tech companies tend to be more liberal with this stuff: the last place I worked gave you the option to use Windows, Mac, or Linux.

§ Workplace Example §

“Operating system” in conversation

“This software won't work on your operating system”

The application you're trying to use was developed for a different operating system, and won't work on yours. The most popular example of this is Excel (there are different versions for Windows and Mac).

“You can run Windows on this if you use Parallels”

Nowadays, there are special applications that will allow you to run multiple operating systems on one computer: one example is [Parallels](#), which lets you run Windows on a Mac. It used to be pretty janky, but it's rock solid now.

“It looks like this is an OS level problem, not an application one”

The problem you're running into is with your operating system, not the application you're trying to run on top of it.

“_____ is the operating system for _____”

People say this a lot when they're marketing: it usually means that something is the basic system behind something else. Try not to use this if you want me to like you.

Terms and concepts covered

Multitasking

Filesystem

Memory allocation

Windows, MacOS, Linux

Android, iOS

Open source

Kernel

Distribution, distro

Further reading

- [Market share of operating systems](#) is changing as mobile becomes the dominant computing paradigm: Android is king

- There's a whole incestuous [network of operating systems built on top of each other](#): MacOS is built on Unix, Linux is also built on Unix, Unix branched into BSD, and so on and so forth
- Windows and Mac have [GUIs](#) – graphical user interfaces – that let you click, see, and drag instead of typing commands into your Terminal like some hacker

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