**Introduction**

**What is an Operating System?**

The operating system is the **interface between the user and the architecture.** The operating system **implement a virtual machine that is easier to program on than raw hardware.**

It is really hard to directly tell the hardware what to do, it speaks a very low level language. The operating system acts as a intermediate step between the user and the hardware. It **hides architectural details** so we don’t have to worry about them. We are being presented with a virtual machine that is bigger faster and more reliable than the underlying hardware all so we can have an easier time using the machine than if we were to talk to the hardware directly. The last responsibility of the OS is as the **government.** The OS divides resources and dictates the order things are done. There are also taxes, the more complex and features you want in your OS, the more “tax” the OS will have on hardware.

**User-level Applications**

**|**

**V**

*Virtual Machine Interface*

**|**

**V**

**Operating System**

**|**

**V**

*Physical Machine Interface*

**|**

**V**

**Hardware (architecture)**

**What are the OS’s Key Features?**

The OS provides **services** such as **file systems, virtual memory, networking, CPU scheduling, and time-sharing.** These are that interface we talked about where we use these services that the hardware implements.

The OS is also responsible for **coordinating** multiple applications and users to achieve fairness and efficiency. We want all users and applications to be able to run and not get left out but we also want efficiency to be considered when resources are allocated. Examples of this are **concurrency, memory protection, networking, and security.**

The goal of the OS is for it to be easy to use for the user with a good interface but also be efficient.

We are always going to be working with the tradeoff between performance and ease of use as well as convince.

**TLDR**

The operating system exists so we can write programs and applications in high level languages without having to worry about how making them talk to the hardware. There are also many complicated extras that we would have to manage if we didn’t have the operating system. Things like file management, memory management, the order and scheduling of processes in the cpu. The OS exists to make our lives easier by **giving us less to manage and making it so we don’t have to directly talk to hardware.**