

## Overview

Computers were invented by many teams of people, all working on particular parts. Like most machines, a computer is made of separate pieces with specific functions that all work together. The physical pieces of a computer are called **hardware**, and the virtual pieces of a computer are called **software**. Within both hardware and software, there are individual components, and within those components, there are even more components. This pattern of getting smaller and going lower into the inner workings of a computer continues until the level of transistors and binary. However, thanks to the work of computer scientists, we can leverage these devices without worrying about low level details.

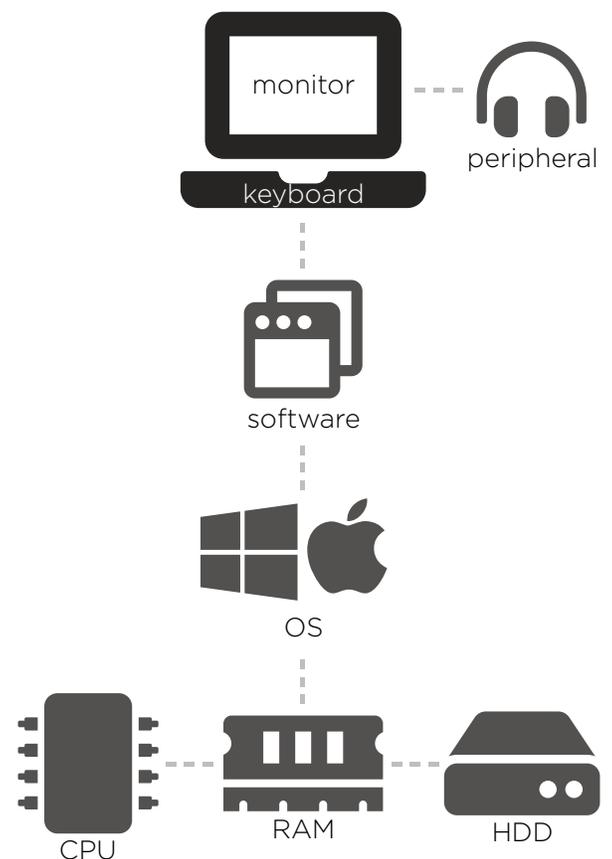
### Key Terms

- hardware
- software
- CPU
- RAM
- HDD
- SSD
- peripherals
- OS

## Hardware

Hardware consists of all of the physical components of a computer. On the outside of a computer, most computers have a keyboard, a mouse, and/or a trackpad, which are used to interact with a computer by inputting information. Computers also have a monitor, or a screen, to output information through computer-generated images. On the inside of a computer, the main components are the CPU and memory. The **CPU**, or processor, is responsible for performing calculations and following instructions. The CPU works tightly with memory to fetch instructions and store calculated results. To fulfill different needs, there are a few types of memory within a computer: RAM and hard disk drives. **RAM**, or Random Access Memory, is the short-term memory that software can use to store data quickly and temporarily. In contrast, hard disk drives (**HDD**) store memory more permanently, but are much slower than RAM. Other drives, known as solid state drives (**SSD**) also store data like hard disk drives, but not without their own trade offs: although they are significantly faster at reading and writing data than HDDs, they are much more expensive.

Not all hardware that's used in computing is inside the computer. Often, devices that are not a part of the computer itself will connect to and work with computers. These devices are known as **peripherals**. Some peripherals include external speakers, flash drives, and drawing tablets. To connect these peripherals to the computer, computers use physical ports, such as HDMI and Universal Serial Bus (USB).



## Software

Hardware components communicate with software components through a piece of low level software called the Operating System, or OS. The **OS** is the computer's manager; it's in charge of translating input from your keyboard and mouse, displaying information on the screen, and moving things around in memory. It provides you with the user interface that you're familiar with and decides how to delegate hardware resources for different software applications. It is through the OS that software applications are able to work with the various hardware components. Because the OS is loaded into RAM when you turn on your computer, you are able to use a computer and even program a computer without directly interacting with the internal hardware yourself.

Engineers can build software applications like word processors and web browsers by writing programs that interacts with the OS. By building on top of what others have done, software can be created directly on a computer using high level tools like code, enabling engineers to develop new and improved applications very quickly.