

How Does a Computer Work A Visual Guide for Beginners in Technical Support

An Introduction to Computer
Fundamentals



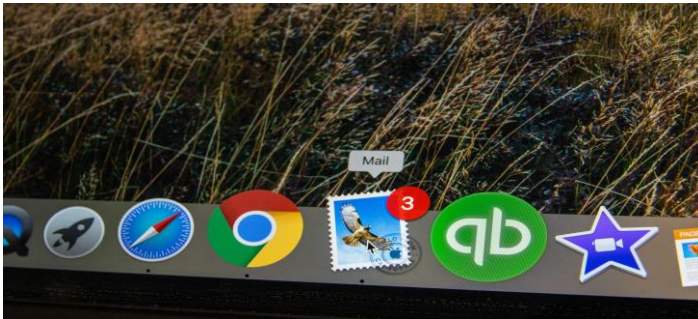
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What Is a Computer and What Is It Used For?

A computer is an electronic machine that processes information by following predefined instructions called programs. Its main function is to automate repetitive tasks, quickly process large amounts of data, and allow user interaction through graphical interfaces.

Who are programs made for? Who runs the code we write? That's the job of the **hardware or computer**, and to understand how it works, we need to understand some key concepts.



Evolution of the Computer

Computers were born out of **human need for tools that make daily work easier**. Weapons for hunting and farming, the steam engine, electricity, and the internet are examples of tools that allowed humanity to advance.

In the beginning, computers were used to **perform calculations more efficiently** than any person. You entered a value (input), the computer stored the information, you indicated the operation to execute (addition, subtraction, multiplication, division), and after several processes, it returned an output.

Today, computers are **highly advanced technology**, enabling the development of smartphones, voice assistant speakers, space-traveling robots, and more.



What Happens Inside a Computer?

A computer only understands **binary language**. Binary language refers to the type of signals your computer processes.

These signals have two states: current flows or doesn't flow, represented by "1" and "0", respectively. This allows the representation of *yes/no* or *true/false* in computing.

This piece of data, which can be either zero or one, is called a bit. **A bit is the smallest unit of information.** Transistors, electronic components inside the computer, store the bits.



Binary System

The binary system is the base for handling numbers, letters, text, audio, images, video, and more — all represented as zeros and ones. For example, the number 9 is represented as 1001 in binary.

Decimal to Binary Number Representation

In binary, the **first position from right to left equals one unit and doubles with each position**. For example:

- $1111 = 8 + 4 + 2 + 1 = 15$
- $1011 = 8 + 0 + 2 + 1 = 11$
- $1001 = 8 + 0 + 0 + 1 = 9$

Letters or Character Representation in Binary

Letters are represented using the [ASCII code](#), which assigns a decimal number to each letter. For example, the letter “T” is 84 — you can confirm this with the keyboard shortcut `Alt + 84`. The computer interprets the letter “T” as an 8-bit binary number:

- “T” = 84 = 01010100
- “A” = 65 = 01000001

A group of 8 bits is called a byte.

File Representation

A text file is a group of characters, which are themselves groups of ones and zeros that the computer understands.

An image file is a group of pixels. Just like characters, pixels follow a standard, meaning they are also represented by groups of ones and zeros.

A video file, a music file, or any kind of file are **more complex representations of binary numbers**.

What Is a Program or Software?

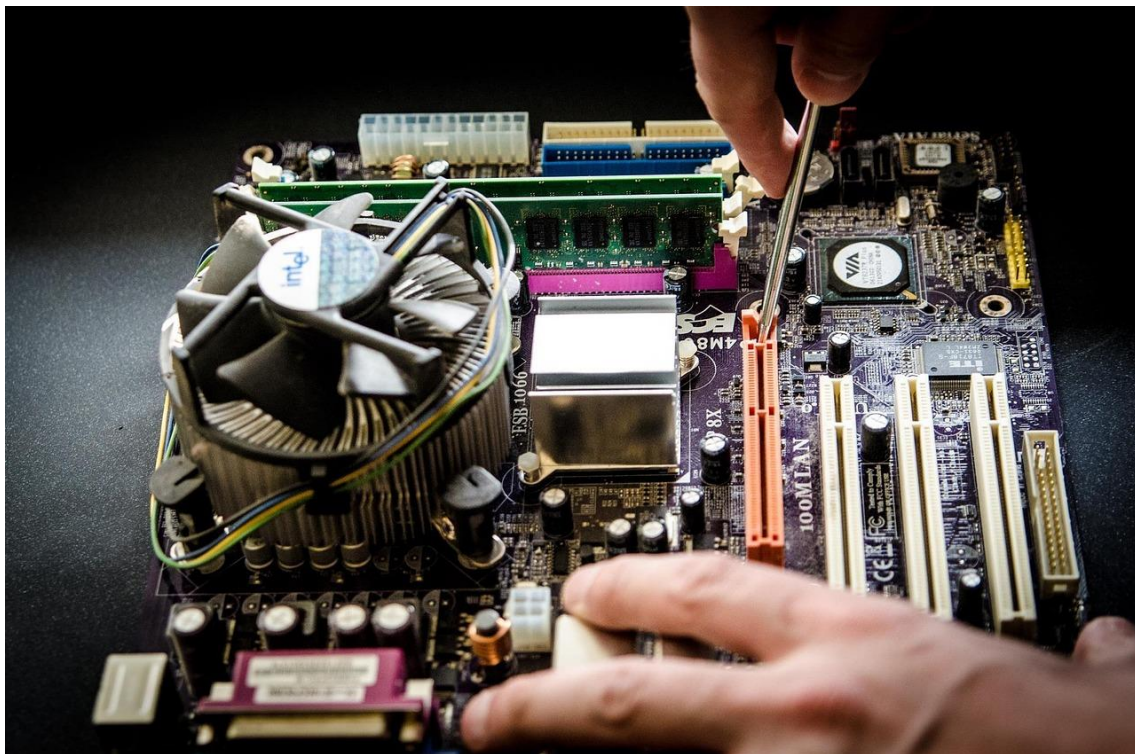
A program or software is a series of instructions that tell the computer how to execute tasks. Through an input, a processor, and memory, you get a final output.

Internal Hardware

Internal hardware is the **set of physical components** inside a computer or information system.

Its main components are:

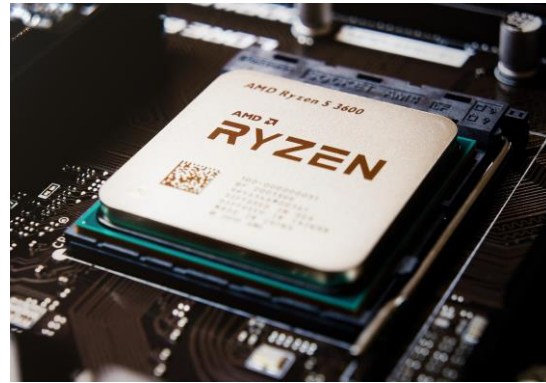
- CPU (Central Processing Unit)
- GPU (Graphics Processing Unit)
- Storage Drive
- [RAM \(Random Access Memory\)](#)
- Screen Type



Central Processing Unit (CPU)

The **CPU processes program instructions using basic operations**, receiving information from an input or output device in binary format. So, the better the CPU, the better your computer's **performance**.

There are two main CPU brands: **Intel and AMD**, each with different product lines.



Tier	Intel	AMD
Low-end	i3	Ryzen 3
Mid-range	i5	Ryzen 5
Upper-mid	i7	Ryzen 7
High-end	i9	Ryzen 9

The number after the processor model indicates its generation. Generations tell us **how recent the CPU is**. For example:

- Intel: Intel® Core™ i7-**10710U** is 10th generation because the number 10 follows i7.
- AMD: Ryzen 7 **3700X** is 3rd generation because the number 3 comes after Ryzen 7.

This helps you **avoid buying outdated processors**. It's recommended to choose a computer no more than two generations older than the latest. (At the time of writing, Intel's latest is 11th gen, AMD's is 5th gen.)

Graphics Processing Unit (GPU)

The GPU handles a program's graphical tasks based on instructions from the CPU. The GPU is important for running video games, watching videos, and working with photos. The better the GPU, the better the graphics processing on your computer.

- [Nvidia GeForce GPU Ranking](#)
- [2022 GPU Hierarchy Chart](#)

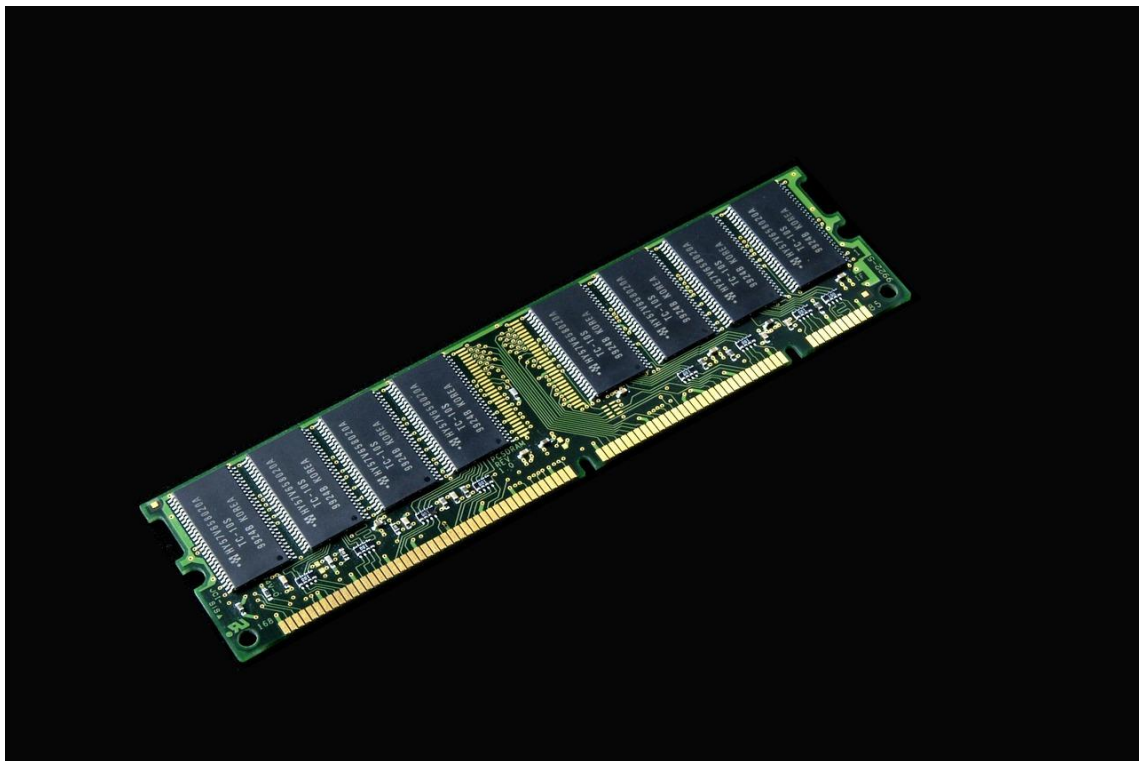
RAM (Random Access Memory)

RAM temporarily stores data that the CPU is processing. When you turn off your computer, this information is lost.

The more RAM you have, the more programs and processes you can run at once. If data exceeds RAM capacity, the CPU stores it on the storage drive, which slows performance.

So, the more RAM, the more information you can store and programs you can run. RAM sizes range from 4 GB to 64 GB depending on price.

Gigabytes? Don't worry, we'll explain that soon.



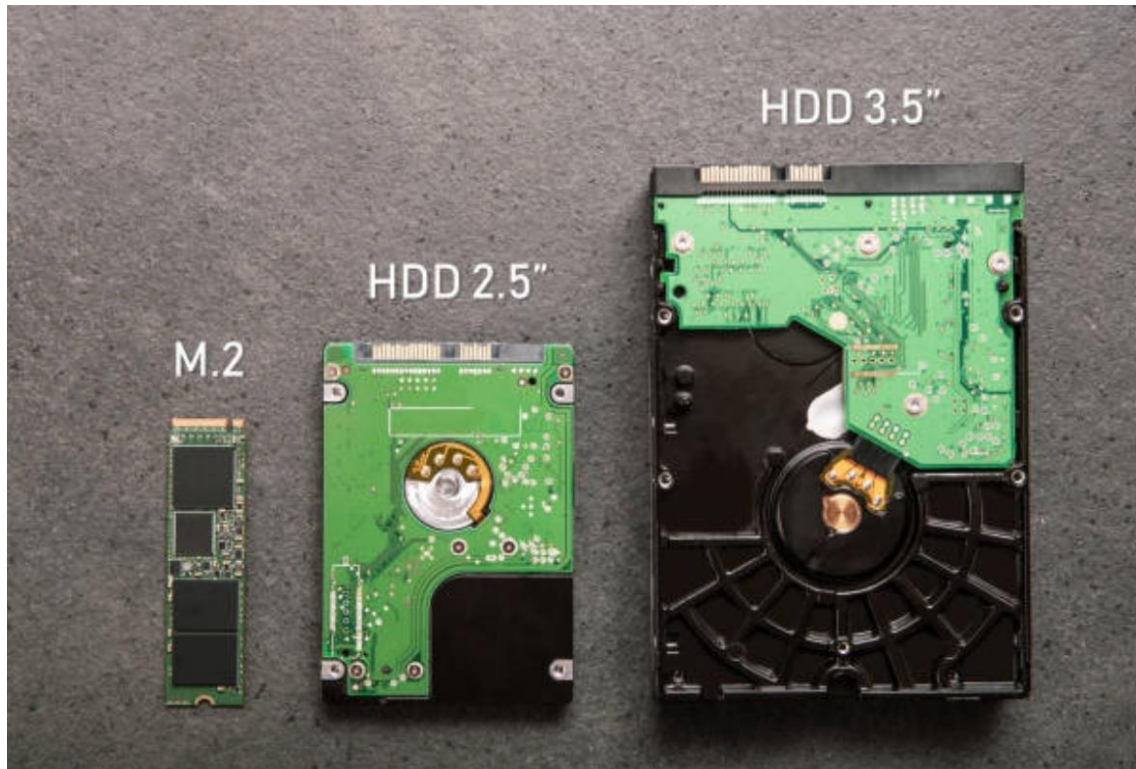
Storage Drive or Hard Disk

The storage drive (HDD or SSD) permanently stores data, so the information remains even after turning off the computer, unless manually deleted.

When you save a file, the temporary data in RAM is released and saved permanently on the storage drive.

Why do we need RAM if we have a storage drive? **Because storage drives are much slower** — RAM is fast since it communicates directly with the CPU.

So, **the more storage you have, the more files you can save**. Storage sizes range from 256 GB to 1 TB (terabyte).



Types of Storage Drives

When checking a computer's specs, you might see **HDD or SSD**. These are storage types. What's the difference?

- **HDD (Hard Disk Drive)** is **mechanical storage** using magnetic disks. It offers **larger storage at lower prices**, but being mechanical, it **slows down over time** and can be **damaged by shocks or drops**.
- **SSD (Solid State Drive)** uses **microchips and flash memory**. SSDs are **much faster**, but **more expensive** than HDDs.

Which is better? Neither is universally better — they both serve different needs.

Want speed? Go with an SSD.

Want affordable storage space? Choose an HDD.

