**RAM**

Random access memory, or RAM, is one of the most important components of not only desktop PCs, but laptops, tablets, smartphones, and gaming consoles. Without it, doing just about anything on any system would be much, much slower. Even not having enough for the application or game you’re trying to run can bring things to a crawl, or make it so they can’t even run at all.

But what is RAM? In a nutshell, it’s an extremely fast type of computer memory which temporarily stores all the information your PC needs right now and in the near future. It’s where your computer loads up all the things it thinks it will need to find out soon, so that when it does need something, it can read it super-fast. It’s quite different from your system’s storage, like its hard drive, where information is stored long term.

**Different types of RAM**

RAM is a bit of a catch-all term, like “memory,” and actually covers a few different types. Most of the time when people are discussing RAM or memory, what they’re actually talking about is technically DRAM (dynamic random access memory), or more accurately for modern systems, SDRAM (synchronous dynamic random access memory). The terminology doesn’t really matter beyond technicalities, but it’s useful to know that the terms are relatively interchangeable colloquially.

The most common type of RAM that is sold today is DDR4, though older systems may use DDR2 or DDR3. Those simply denote the generation of RAM used in that particular system, with each successive one offering faster speeds through greater bandwidth — a higher megahertz (MHz) rating. Each generation also saw physical changes, so they are not interchangeable.

Another common term, especially in the video game space, is VRAM, or video RAM. Although once a standalone piece of technology in its own right, VRAM is today used to denote the memory available to a graphics chip or built on to a graphics card. That’s actually called Graphics DDR SDRAM, or more commonly GDDR. Most modern graphics cards will use GDDR5, though some use a newer GDDR5X standard and Nvidia’s new RTX Turing graphics cards use GDDR6.

Some niche graphics cards utilize a form of RAM called High-Bandwidth-Memory (HBM and HBM2) which has some unique performance advantages, though it is typically expensive and supply issues have meant it hasn’t seen widespread adoption.

**ROM**

ROM is an acronym for Read-Only Memory. It refers to computer memory chips containing permanent or semi-permanent data. Unlike RAM, ROM is non-volatile; even after you turn off your computer, the contents of ROM will remain.

Almost every computer comes with a small amount of ROM containing the boot firmware. This consists of a few kilobytes of code that tell the computer what to do when it starts up, e.g., running hardware diagnostics and loading the operating system into RAM. On a PC, the boot firmware is called the BIOS.

Originally, ROM was actually read-only. To update the programs in ROM, you had to remove and physically replace your ROM chips. Contemporary versions of ROM allow some limited rewriting, so you can usually upgrade firmware such as the BIOS by using installation software. Rewritable ROM chips include PROMs (programmable read-only memory), EPROMs (erasable read-only memory), EEPROMs (electrically erasable programmable read-only memory), and a common variation of EEPROMs called flash memory.

CPU

The central processing unit (CPU) is the unit which performs most of the processing inside a computer. To control instructions and data flow to and from other parts of the computer, the CPU relies heavily on a chipset, which is a group of microchips located on the motherboard.

The CPU has two components:

* Control Unit: extracts instructions from memory and decodes and executes them
* Arithmetic Logic Unit (ALU): handles arithmetic and logical operations

To function properly, the CPU relies on the system clock, memory, secondary storage, and data and address buses.

GPU

A graphics processing unit (GPU) is a specialized electronic circuit designed to rapidly manipulate and alter memory to accelerate the creation of images in a frame buffer intended for output to a display device. GPUs are used in embedded systems, mobile phones, personal computers, workstations, and game consoles. Modern GPUs are very efficient at manipulating computer graphics and image processing. Their highly parallel structure makes them more efficient than general-purpose central processing units (CPUs) for algorithms that process large blocks of data in parallel. In a personal computer, a GPU can be present on a video card or embedded on the motherboard. In certain CPUs, they are embedded on the CPU die.

The term "GPU" was coined by Sony in reference to the PlayStation console's Toshiba-designed Sony GPU in 1994. The term was popularized by Nvidia in 1999, who marketed the GeForce 256 as "the world's first GPU". It was presented as a "single-chip processor with integrated transform, lighting, triangle setup/clipping, and rendering engines". Rival ATI Technologies coined the term "visual processing unit" or VPU with the release of the Radeon 9700 in 2002.

HDD

A hard disk drive (HDD), hard disk, hard drive, or fixed disk is an electro-mechanical data storage device that uses magnetic storage to store and retrieve digital information using one or more rigid rapidly rotating disks (platters) coated with magnetic material. The platters are paired with magnetic heads, usually arranged on a moving actuator arm, which read and write data to the platter surfaces. Data is accessed in a random-access manner, meaning that individual blocks of data can be stored or retrieved in any order and not only sequentially. HDDs are a type of non-volatile storage, retaining stored data even when powered off.

CD-ROM

A CD-ROM (compact disc read-only memory) is a pre-pressed optical compact disc that contains data. Computers can read—but not write to or erase—CD-ROMs, i.e. it is a type of read-only memory.

During the 1990s, CD-ROMs were popularly used to distribute software and data for computers and fourth generation video game consoles. Some CDs, called enhanced CDs, hold both computer data and audio with the latter capable of being played on a CD player, while data (such as software or digital video) is only usable on a computer (such as ISO 9660 format PC CD-ROMs).

Motherboard

A motherboard (sometimes alternatively known as the mainboard, main circuit board, system board, baseboard, planar board or logic board, or colloquially, a mobo) is the main printed circuit board (PCB) found in general purpose computers and other expandable systems. It holds, and allows, communication between many of the crucial electronic components of a system, such as the central processing unit (CPU) and memory, and provides connectors for other peripherals. Unlike a backplane, a motherboard usually contains significant sub-systems such as the central processor, the chipset's input/output and memory controllers, interface connectors, and other components integrated for general purpose use and applications.

ML

Machine learning (ML) is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to perform the task.:2 Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop a conventional algorithm for effectively performing the task.

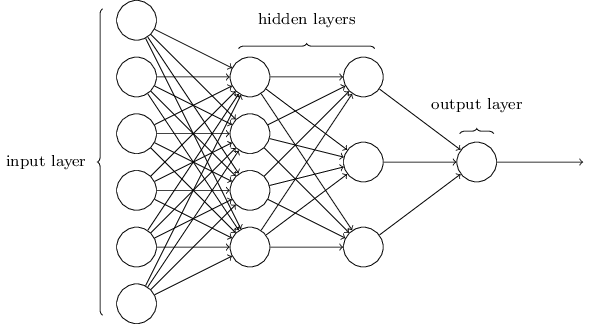
AI

In computer science, artificial intelligence (AI), sometimes called machine intelligence, is intelligence demonstrated by machines, in contrast to the natural intelligence displayed by humans. Leading AI textbooks define the field as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. Colloquially, the term "artificial intelligence" is often used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".

ANN

Artificial neural networks (ANN) or connectionist systems are computing systems that are inspired by, but not identical to, biological neural networks that constitute animal brains. Such systems "learn" to perform tasks by considering examples, generally without being programmed with task-specific rules. For example, in image recognition, they might learn to identify images that contain cats by analyzing example images that have been manually labeled as "cat" or "no cat" and using the results to identify cats in other images. They do this without any prior knowledge of cats, for example, that they have fur, tails, whiskers and cat-like faces. Instead, they automatically generate identifying characteristics from the examples that they process.

An ANN is based on a collection of connected units or nodes called artificial neurons, which loosely model the neurons in a biological brain. Each connection, like the synapses in a biological brain, can transmit a signal to other neurons. An artificial neuron that receives a signal then processes it and can signal neurons connected to it.



In ANN implementations, the "signal" at a connection is a real number, and the output of each neuron is computed by some non-linear function of the sum of its inputs. The connections are called edges. Neurons and edges typically have a weight that adjusts as learning proceeds. The weight increases or decreases the strength of the signal at a connection. Neurons may have a threshold such that a signal is sent only if the aggregate signal crosses that threshold. Typically, neurons are aggregated into layers. Different layers may perform different transformations on their inputs. Signals travel from the first layer (the input layer), to the last layer (the output layer), possibly after traversing the layers multiple times.

The original goal of the ANN approach was to solve problems in the same way that a human brain would. However, over time, attention moved to performing specific tasks, leading to deviations from biology. ANNs have been used on a variety of tasks, including computer vision, speech recognition, machine translation, social network filtering, playing board and video games, medical diagnosis and even in activities that have traditionally been considered as reserved to humans, like painting.

**Computer monitor**

A computer monitor is an output device that displays information in pictorial form. A monitor usually comprises the display device, circuitry, casing, and power supply. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT-LCD) with LED backlighting having replaced cold-cathode fluorescent lamp (CCFL) backlighting. Older monitors used a cathode ray tube (CRT). Monitors are connected to the computer via VGA, Digital Visual-Interface (DVI), HDMI, DisplayPort, Thunderbolt, low-voltage differential signaling (LVDS) or other proprietary connectors and signals.

Originally, computer monitors were used for data processing while television sets were used for entertainment. From the 1980s onwards, computers (and their monitors) have been used for both data processing and entertainment, while televisions have implemented some computer functionality. The common aspect ratio of televisions, and computer monitors, has changed from 4:3 to 16:10, to 16:9.

Modern computer monitors are easily interchangeable with conventional television sets. However, as computer monitors do not necessarily include integrated speakers, it may not be possible to use a computer monitor without external components.

# Computer speakers

Computer speakers, or multimedia speakers, are speakers sold for use with computers, although usually capable of other audio uses, e.g. for an MP3 player. Most such speakers have an internal amplifier and consequently require a power source, which may be by a mains power supply often via an AC adapter, batteries, or a USB port. The signal input connector is often a 3.5 mm jack plug (usually color-coded lime green per the PC 99 standard); RCA connectors are sometimes used, and a USB port may supply both signal and power (requiring additional circuitry, and only suitable for use with a computer). Battery-powered wireless Bluetooth speakers require no connections at all. Most computers have speakers of low power and quality built in; when external speakers are connected they disable the built-in speakers. Altec Lansing claims to have created the computer speaker market in 1990.

Computer speakers range widely in quality and in price. Computer speakers sometimes packaged with computer systems are small, plastic, and have mediocre sound quality. Some computer speakers have equalization features such as bass and treble controls. Bluetooth speakers can be connected with a computer by using an Aux jack and compatible adaptor.

More sophisticated computer speakers can have a subwoofer unit, to enhance bass output. The larger subwoofer enclosure usually contains the amplifiers for the subwoofer and the left and right speakers.

Some computer displays have rather basic speakers built-in. Laptop computers have built-in integrated speakers, usually small and of restricted sound quality to conserve space.

Instead of using a computer speaker for better sound, a computer can be connected to any external sound system, typically a high-power high-quality setup.

# Computer keyboard

A computer keyboard is a typewriter-style device which uses an arrangement of buttons or keys to act as mechanical levers or electronic switches. Following the decline of punch cards and paper tape, interaction via teleprinter-style keyboards became the main input method for computers.

Keyboard keys (buttons) typically have characters engraved or printed on them, [better source needed] and each press of a key typically corresponds to a single written symbol. However, producing some symbols may require pressing and holding several keys simultaneously or in sequence. While most keyboard keys produce letters, numbers or signs (characters), other keys or simultaneous key presses can produce actions or execute computer commands.

In normal usage, the keyboard is used as a text entry interface for typing text and numbers into a word processor, text editor or any other program. In a modern computer, the interpretation of key presses is generally left to the software. A computer keyboard distinguishes each physical key from every other key and reports all key presses to the controlling software. Keyboards are also used for computer gaming — either regular keyboards or keyboards with special gaming features, which can expedite frequently used keystroke combinations.

A keyboard is also used to give commands to the operating system of a computer, such as Windows' Control-Alt-Delete combination. Although on Pre-Windows 95 Microsoft operating systems this forced a re-boot, now it brings up a system security options screen.

**Computer mouse**

A **computer mouse** (plural **mice** or **mouses**) is a hand-held [pointing device](https://en.wikipedia.org/wiki/Pointing_device) that detects [two-dimensional](https://en.wikipedia.org/wiki/Two-dimensional_space) motion relative to a surface. This motion is typically translated into the motion of a [pointer](https://en.wikipedia.org/wiki/Pointer_(user_interface)) on a [display](https://en.wikipedia.org/wiki/Computer_monitor), which allows a smooth control of the [graphical user interface](https://en.wikipedia.org/wiki/Graphical_user_interface). The first public demonstration of a mouse controlling a computer system was in 1968. Originally wired to a computer, many modern mice are cordless, relying on short-range radio communication with the connected system.

Mice originally used a ball rolling on a surface to detect motion, but modern mice often have optical sensors that have no moving parts. In addition to moving a cursor, computer mice have one or more buttons to allow operations such as selection of a menu item on a display. Mice often also feature other elements, such as touch surfaces and "wheels", which enable additional control and dimensional input.

The earliest known publication of the term *mouse* as referring to a computer pointing device is in [Bill English's](https://en.wikipedia.org/wiki/Bill_English_(computer_engineer)) July 1965 publication, "Computer-Aided Display Control" likely originating from its resemblance to the shape and size of a [mouse](https://en.wikipedia.org/wiki/Mouse), a [rodent](https://en.wikipedia.org/wiki/Rodent), with the cord resembling its [tail](https://en.wikipedia.org/wiki/Tail).

The plural for the small rodent is always "mice" in modern usage. The plural of a computer mouse is either "mouses" or "mice" according to most dictionaries, with "mice" being more common.