**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.

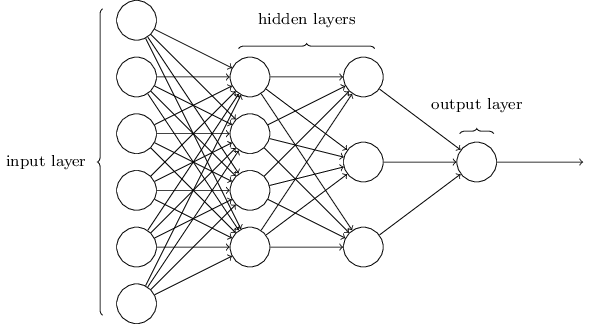
ML

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.