Primary Memory

Primary memory is computer [memory](https://techterms.com/definition/memory) that is accessed directly by the [CPU](https://techterms.com/definition/cpu). This includes several types of memory, such as the processor [cache](https://techterms.com/definition/cache) and system [ROM](https://techterms.com/definition/rom). However, in most cases, primary memory refers to system [RAM](https://techterms.com/definition/ram).

RAM, or random access memory, consists of one or more [memory modules](https://techterms.com/definition/memorymodule) that temporarily store data while a computer is running. RAM is volatile memory, meaning it is erased when the power is turned off. Therefore, each time you start up your computer, the [operating system](https://techterms.com/definition/operating_system) must be loaded from [secondary memory](https://techterms.com/definition/secondary_memory) (such as a [hard drive](https://techterms.com/definition/harddrive)) into the primary memory, or RAM. Similarly, whenever you launch an [application](https://techterms.com/definition/application) on your computer, it is loaded into RAM.

The operating system and applications are loaded into primary memory, since RAM can be accessed much faster than [storage devices](https://techterms.com/definition/storagedevice). In fact, the data can be transferred between CPU and RAM more than a hundred times faster than between the CPU and the hard drive. By loading data into RAM, programs can run significantly faster and are much more responsive than if than constantly accessed data from secondary memory.

**NOTE:** Primary memory may be called "primary storage" as well. However, this term is somewhat more ambiguous since, depending on the context, primary storage may also refer to internal storage devices, such as internal hard drives.

# Secondary Memory

Secondary memory refers to [storage devices](https://techterms.com/definition/storagedevice), such as [hard drives](https://techterms.com/definition/harddrive) and [solid state drives](https://techterms.com/definition/ssd). It may also refer to removable storage media, such as USB [flash drives](https://techterms.com/definition/flashdrive), [CDs](https://techterms.com/definition/cd), and [DVDs](https://techterms.com/definition/dvd).

Unlike [primary memory](https://techterms.com/definition/primary_memory), secondary memory is not accessed directly by the [CPU](https://techterms.com/definition/cpu). Instead, [data](https://techterms.com/definition/data) accessed from secondary memory is first loaded into [RAM](https://techterms.com/definition/ram) and is then sent to the [processor](https://techterms.com/definition/processor). The RAM plays an important intermediate role, since it provides much faster data access speeds than secondary memory. By loading software [programs](https://techterms.com/definition/program) and [files](https://techterms.com/definition/file) into primary memory, computers can process data much more quickly.

While secondary memory is much slower than primary memory, it typically offers far greater storage capacity. For example, a computer may have a one [terabyte](https://techterms.com/definition/terabyte) hard drive, but only 16 [gigabytes](https://techterms.com/definition/gigabyte) of RAM. That means the computer has roughly 64 times more secondary memory than primary memory. Additionally, secondary memory is non-volatile, meaning it retains its data with or without electrical power. RAM, on the other hand, is erased when a computer is shut down or restarted. Therefore, secondary memory is used to store "permanent data," such as the [operating system](https://techterms.com/definition/operating_system), [applications](https://techterms.com/definition/application), and user files.

**NOTE:** Secondary memory may also be called "secondary storage." However, this term is a bit more ambiguous, since internal storage devices are sometimes called "primary storage devices" as well.