



How Computers Store and Organize Files on Disk

KS4 COMPUTER SCIENCE

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What is a File System?

When you save a document, photo, or video on your computer, it doesn't just float around randomly in the hard drive. Instead, your computer uses something called a **file system** to organize everything neatly. A file system is like a set of rules that decides where files go, how they're named, and how your computer finds them again when you need them.

Think of it like a library. Books aren't scattered everywhere—they're organized by sections, shelves, and catalogue numbers so you can find exactly what you want.

Folders and Directories

Your computer organizes files into **folders** (also called **directories** **file hierarchy**—a tree-like organization system).

Think of it like Russian nesting dolls. The biggest doll contains smaller dolls inside, and those contain even smaller ones. Each folder is like one of these dolls.

How Computers Find Files

When you click on a file, your computer needs to locate it on the disk. It uses something called a **file path** to do this. The file path is like a set of directions: it starts from the main drive (like "C:" on Windows) and follows each folder name until it reaches the exact file you want. For example:

C:\Users\MyName\Documents\School\Maths\Homework.docx

Storage Space and Filing

Your hard drive or **SSD** (Solid State Drive) is divided into tiny sections called **sectors**. When you save a file, the file system finds empty sectors and stores your data there. It then creates a **file table**—like an index card—that remembers exactly which sectors

contain your file. If a file is very large, it might be split across multiple sectors, and the file table keeps track of all the pieces.

Think of it like a mailbox system. Each mailbox is labeled with an address, and a postal worker's list shows which mailbox contains which mail.

Why Organization Matters

Without a file system, finding anything would be impossibly slow. The organization system means your computer can find a file in seconds, even if you have thousands stored. Different computers use different file systems—**Windows** uses NTFS, **Mac** uses APFS, and **Linux** uses ext4—but they all work on the same basic principle: organize, label, and record where everything is stored.