



**DEPARTMENT OF AIML**  
**23CST202- OPERATING SYSTEMS**  
**II YEAR IV SEM AIML-B**  
**UNIT 3-MEMORY MANAGEMENT**  
**TOPIC –FILE CONCEPT**

## **FILE CONCEPT**

A computer file is defined as a medium used for saving and managing data in the computer system. The data stored in the computer system is completely in digital format, although there can be various types of files that help us to store the data.

File systems are a crucial part of any operating system, providing a structured way to store, organize, and manage data on storage devices such as hard drives, SSDs, and USB drives. Essentially, a file system acts as a bridge between the operating system and the physical storage hardware, allowing users and applications to create, read, update, and delete files in an organized and efficient manner.

### **What is a File System?**

A file system is a method an operating system uses to store, organize, and manage files and directories on a storage device. Some common types of file systems include:

- **FAT (File Allocation Table):** An older file system used by older versions of Windows and other operating systems.
- **NTFS (New Technology File System):** A modern file system used by Windows. It supports features such as file and folder permissions, compression, and encryption.
- **ext (Extended File System):** A file system commonly used on Linux and Unix-based operating systems.
- **HFS (Hierarchical File System):** A file system used by macOS.
- **APFS (Apple File System):** A new file system introduced by Apple for their Macs and iOS devices.

A file is a collection of related information that is recorded on secondary storage. Or file is a collection of logically related entities. From the user's perspective, a file is the smallest allotment of logical secondary storage.

**The name of the file is divided into two parts as shown below:**

- Name
- Extension, separated by a period.

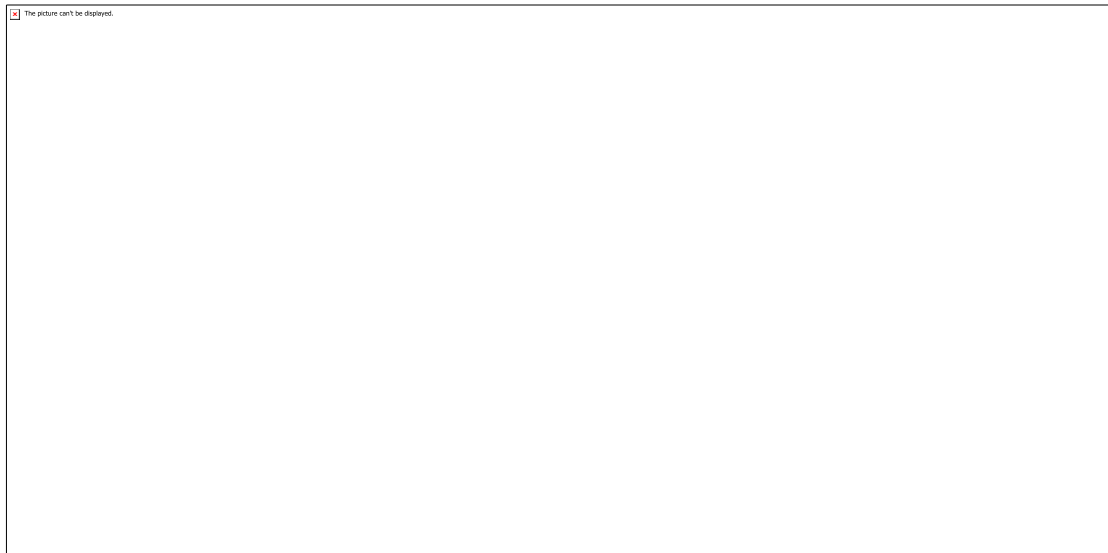


## Issues Handled By File System

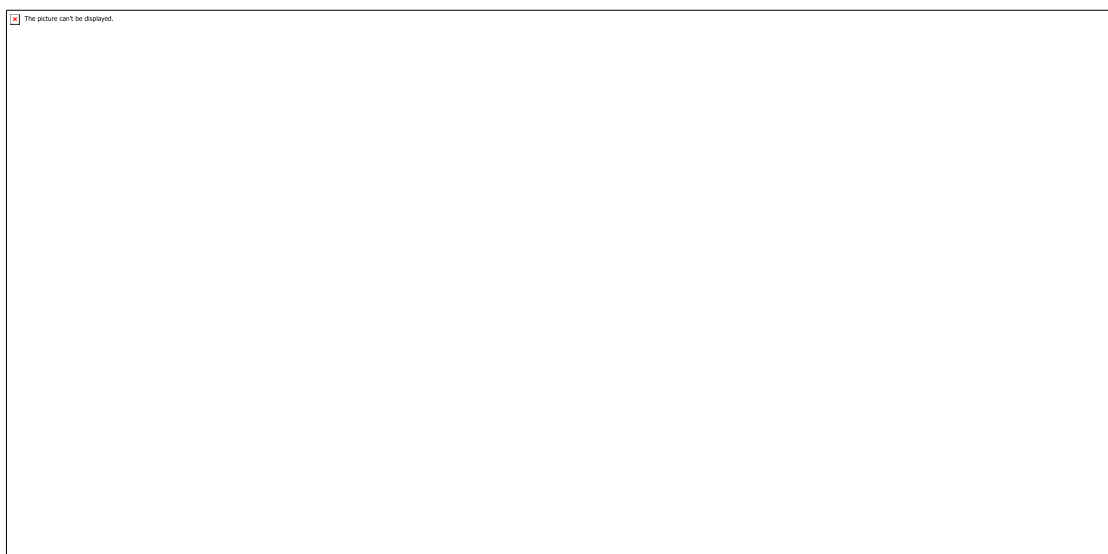
We've seen a variety of data structures where the file could be kept. The file system's job is to keep the files organized in the best way possible.

A free space is created on the hard drive whenever a file is deleted from it. To reallocate them to other files, many of these spaces may need to be recovered. Choosing where to store the files on the hard disc is the main issue with files one block may or may not be used to store a file. It may be kept in the disk's non-contiguous blocks. We must keep track of all the blocks where the files are partially located.

## Files Attributes And Their Operations



## File Types and Their Content





## File Directories

The collection of files is a file directory. The directory contains information about the files, including attributes, location, and ownership. Much of this information, especially that is concerned with storage, is managed by the operating system. The directory is itself a file, accessible by various file management routines.

Below are information contained in a device directory.

- Name
- Type
- Address
- Current length
- Maximum length
- Date last accessed
- Date last updated
- Owner id
- Protection information

**The operation performed on the directory are:**

- Search for a file
- Create a file
- Delete a file
- List a directory
- Rename a file
- Traverse the file system

## Advantages of Maintaining Directories

- **Efficiency:** A file can be located more quickly.
- **Naming:** It becomes convenient for users as two users can have same name for different files or may have different name for same file.
- **Grouping:** Logical grouping of files can be done by properties e.g. all java programs, all games etc.