Introduction to Files and Directories

Introduction

We have understood that secondary storage devices are used for storing both data and programs persistently and we have known about two most common non-detachable secondary storage devices, Hard Disk Drive (HDD) and Solid State Drive (SSD). Moving ahead, in the lecture, we will focus our attention on Hard Disk Drive (HDD) only.

Now, the next question arises how does the operating system abstract usage of secondary storage devices for the applications. The operating system does so using **File System**. The File system provides the mechanism for:

1. Storage of data and programs on the disk
2. Access of data and programs on the disk

So, the file system defines the rules for storing and accessing data on disk. Now, OS uses two more abstractions:

- Files
- Directories

Files and Directories

The OS abstracts the physical properties of its storage devices to define a logical storage unit - the **file**. Hence, the physical locations of storage devices are mapped to files by the OS. The files are further organized into **directories** for ease of its use.

When we look from a **user's perspective**:

- A file is the smallest allotment of logical secondary storage.
- Data cannot be written to secondary storage unless they are within a file.

As we can clearly see that files are used to map to storage locations of different devices, therefore, files can store any type of data. The type of data that files represent:

- Can be both data and programs
- Can be both alphanumeric, numeric, alphabetic, binary
- May be free form such as text files, or may be formatted rigidly

Therefore, we can say that a file is a sequence of bits, bytes, lines or records, the meaning of which is defined by the file's creator and user. If the user creates a video recording, then the file will store data of that type and if the user writes a program in C programming language, then the file will store the corresponding data. Hence, it can be concluded that the information in a file is defined by its creator. Let us look at different examples of information that can be stored by file.

1. Source Programs
2. Object Programs
3. Executable Programs
4. Numeric Data
5. Text
6. Graphic Images
7. Sound Recordings
8. Video Recordings

Next Steps

In the next lecture video, let us understand deeply how OS creates and manages files and directories.