



OPERATING SYSTEMS COURSE

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Topic 5 Presentation Guide: Files and Directories.

This topic describes the concepts related to files and directories in the operating systems, presenting the basics from the point of view of the user, the services provided by the operating system and basics of file systems and files servers design.

All operating systems provide a logical storage unit, which hides the details of physical storage system, called file. A file is an unit of non-volatile storage logical grouping a set of related information together under one name. From the point of view of the user, the file is the only way to manage secondary storage. It is important in an operating system to define how files are named, what operations are available on the files, how users perceive files , etc. Internally, all operating systems spend part of their duties in the file system, managing files and directories. This operating system component defines how files are structured, how they are identified, how they are implemented, access, protect, etc.

From the standpoint of operating system, a file is characterized by a number of attributes. These attributes vary among operating systems, but typically include the following: name, unique identifier, file type , map file protection , file size , time information and control information file. The operating system must provide at least one generic file structure that supports all file types mentioned above, a name mechanism, facilities to protect files and a set of services that allow to exploit the secondary storage and I/O system easily and efficiently. This structure should include the desired attributes for each file, specifying which are visible and which are hidden from users .

A file system can be very large. To access files easily, all operating systems provide ways to organize files by directory names. A directory is an object that uniquely relates the user name with an internal file descriptor used by the operating system.

Directories serve to organize and provide information about the structure of the files in file systems. To avoid ambiguity the same name can never identify two different files, although several names may refer to the same file . Typically, a directory contains

many entries as files are accessible through it, the main function of the directories present a simple logical view to the user, hiding the implementation details directory system.

The topic includes three lessons:

- Files.
- Directories.
- File Systems.

The primary objective of the subject is to show the concepts related to files and directories in operating systems and their usage by the user, together with internal aspects of the operating system to provide these abstractions.

This overall objective is broken down into a series of specific objectives, which are listed below:

- To Understand the concepts of file and directory and its characteristics.
- To study the files, their attributes and operations, the logical and physical view of them and how they are represented from the point of view of users.
- To study directories, their alternative structures, and the solutions and services to interpret names for directory manipulation.
- To use file management services and directories offered by the operating system .
- To understand the structure of a file system.
- To understand the mechanisms to support a file system.

Associated Materials

The theoretical lessons are complemented with exercises for each of them, to be resolved after the classes, as specified in the schedule associated with the teaching guide.

Mandatory and recommended reading with more problems and solved exercises are included, so that students can complete their training.

The topic is complemented with a lab to use file and directories system calls.