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Implementing Directories:

Recall that the primary function of a directory is to map the file name (in ASCII, Unicode, or some other text-based encoding) to whatever is needed to retrieve the data of the file itself. There are several ways to do this depending on how files are stored.

For sequentially allocated files, the directory entry for a file contains the starting address on the disk and the file size. Since disks can only be accessed by sectors, we store the sector number. The system can choose to start all files on a block (rather than sector) boundary in which case the block number, which is smaller, is stored instead.

For linked allocation (pure linked or FAT-based) the directory entry again points to the first block of the file. For inode-based file systems, the directory entry points to the inode.

Another important function is to enable the retrieval of the various attributes (e.g., length, owner, size, permissions, etc.) associated with a given file.

One possibility is to store the attributes in the directory entry for the file. Windows does this. Another possibility for inode-based systems, is to store the attributes in the inode as we have suggested above. The inode-based file systems for Unix-like operating systems do this.

Notice that there are two meanings for the “/” character. When it appears at the front of a file or directory name, it refers to the root directory. When it appears inside a path, it’s just a separator. Directories store both special and ordinary files. For users familiar with Windows or Mac OS, UNIX directories are equivalent to folders. A directory file contains an entry for every file and subdirectory that it houses. If you have 10 files in a directory, there will be 10 entries in the directory. Each entry has two components.

(1) The Filename

(2) A unique identification number for the file or directory (called the inode number)

Branching points in the hierarchical tree.

Used to organize groups of files.

May contain ordinary files, special files or other directories.

Never contain “real” information which you would work with (such as text). Basically, just used for organizing files.

All files are descendants of the root directory, ( named / ) located at the top of the tree.

In long-format output of ls –l , this type of file is specified by the “d” symbol.