Assignment No. 5

~~Q. 3]~~

Q. 1] What is file? explain file attributes & operations.

A] File :-

→ (1) A file is named collection of related information that is recorded on secondary storage.

(2) File represent programs and data.

i) Data files may be numeric, alphabetic, alphanumeric or binary.

(3) ~~ii)~~ File is sequence of bits, bytes, lines or records, the meaning of which is defined by file's creator and user.

(4) A tex file is sequence of character organized into lines.

(5) A source file is sequence of function each of which is further organized as declarations followed by executable statments.

(6) An executable file is series of code section.

B] File attributes :-

(1) Name :- Symbolic file name is only information kept in human-readable form.

(2) Identifier :- unique tag identifies file within file system. It's a non-human-readable name for file.

(3) Type :- needed for systems that support different types.

(4) location :- pointer to device & file location on that device

(5) Size :- current file size & possibly MAX allowed size.

(6) protection :- Access-control information determines who can do reading, writing, execution & so on.

(7) Time, date & user identification :- data for protection, security and usage monitoring.

c] File operations :-

(1) A file is abstract data type. To define a file properly, we need to consider the operations that can be performed on files.

(2) The OS can provide system calls to create, write, read, reposition, delete & truncate files.

1] Create :- Two steps are necessary to create a file. First, space in file system must be found for the file. Second, an entry for new file must made in directory.

2] Write :- To write a file, we make system call specifying both the name of file & info. to be written to file.

3] Read :- To (write) file & where the next block of file should be put.

4] Truncate :- The user may want to erase the content of file but keep its attributes. Rather than delete file and the recreate file it, this function allows all attributes to remain unchanged.

(3) The OS keeps a table, called open-file table, containing info. about all open file.

(4) When a file operation is requested, the file is specified via an index into this table, so no searching is required.

Q.2] How to lock open files? explain two file access methods.

→ A] locking open files :-

(1) file locks allow one process to lock a file and prevent other processes from gaining access to it.

(2) A shared lock is like to reader lock in that several processes can acquire the lock concurrently.

(3) An exclusive lock behaves like writer lock; only one process at a time can acquire such a lock.

B] Access methods :-

(1) The information in the file can be accessed in several ways :-

A] Sequential Access :-

The simplest access method is sequential access. Information in the file is processed in order, one record after the other.

B) Direct Access :-

A file is made up of fixed-length logical records that allows programs to read & write records rapidly in no particular order. The direct-access method is based on disk model of file, since disk allow random access to any file lock.

Q.3]

Q.3] What is directory? explain adv & disadv. of single level directory & tree-structured directory.

→ (1) A directory is container that is used to contain folders & file. It Organizes files and folders into hierarchical manner.

(2) Advantages of single level directory :-

i] its implementation is very easy.

ii] If files are smaller in size, searching will faster.

iii] The operation like file creation, searching, deletion, updating are very ~~fast~~ easy.

Disadv. :-

i] There may chance of name collision because two files can not have same name.

ii] searching will become time taking if directory will large.

iii] In this can not group same types of file together.

(3) Advantages of tree-structured directory :-

i] very generlize, since full path name can be given.

ii] very scalable, the probability of name collision is less.

iii] searching becomes very easy, we can use both absolute path as well as relative.

Disadv. :-

i] every file does not fit into hierarchical model, files may be saved into multiple directories.

ii] we can not share files.

Q.4] Explain the process of file system mounting.

→ (1) Mounting is a process by which the operating system makes files and directories on storage device available for users to access via computer's file system.
(2) The mount procedure is straightforward. The operating system is given the name of device and mount point - the location within the file structure where the file system is to attached.
(3) Typically, a mount point is an empty directory. For instance, on a UNIX system, a file system containing a user's home directories might be mounted as /home; then to access the directory structure within that file system, we could precede the directory names with /home, ~~as in /home~~.
(4) Mounting that file system under /users would result in the path name /users, which we could use to reach same directory.
(5) Files can be accessed only when file system is mounted.

Q.5] Illustrate different file sharing mechanism.

→ (A) Remote file systems :-

1) Uses networking to allow file systems access betⁿ systems.
   - Manually via programs like FTP
   - Automatically, seamlessly using distributed file systems
   - Semi automatically via world wide web

2) client-server model allows clients to mount remote file systems from servers
   - servers can serve multiple clients
   - NFS is standard UNIX client-server file sharing protocol.
   - CIFS is standard windows protocol

3) Distributed Information systems - such as LDAP, DNS, NIS, active directory implement unified access to information needed for remote computing

4) Open file request to remote server first checked for client-to-server permission, then user-id checked for access permission, then file handle returened.

(B) Failure Mode :-

(1) Remote file systems add new failure modes, due to network failure, server failure
   - Data or metadata loss or corruption

(2) Recovery from failure can involve state information about status of each remote request

(3) Stateless protocols such as NFS include all info. in each request allowing easy recovery but less security.

- But stateless protocols can lack features, so NFS V4 and CIFS are both state-ful

(c) consistency semantics :-

(1) It specify how multiple users are to access a shared file simm.

(2) Andrew file system (AFS) implemented complex remote file sharing semantics

(3) Unix file system implement -
- sharing file pointer to allow multiple users to read & write concurrently

(D) client-server model -

(1) client-server model allows clients to mount remote file systems from servers.

(2) server can serve multiple clients.

(3) NFS is standard UNIX client-server file sharing protocol.

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