Chapter 13

Multiple Choice Questions

1. File's _____ is a unique tag identifies the file within the file system.
A. type
B. location
C. identifier
D. name

Ans: C
Feedback: 13.1.1
Difficulty: Easy

2. What steps are necessary to create a file?
A. allocating a space in the file system
B. making an entry for the file in the directory
C. all of the above
D. none of the above

Ans: C
Feedback: 13.1.2
Difficulty: Easy

3. What pointer is used for writing a file?
A. memory pointer
B. seek pointer
C. shared--file pointer
D. current-file-position pointer

Ans: D
Feedback: 13.1.2
Difficulty: Easy

4. With _____ locking, once a process acquires an exclusive lock, the operating system will prevent any other process from accessing the locked file.
A. temporary
B. mandatory
C. shared
D. exclusive

Ans: B
Feedback: 13.1.2
Difficulty: Medium

5. Some binary files can include a magic number. This mechanism is used by _____.
A. MS Windows
B. UNIX
C. macOS
D. JavaVM

Ans: B
Feedback: 13.1.3
Difficulty: Medium

6. Because all file systems suffer from internal fragmentation, the following relation is true:
A. the larger block size, the greater the internal fragmentation
B. the smaller block size, the greater the internal fragmentation
C. the larger block size, the smaller internal fragmentation
D. there is no relation between block size and internal fragmentation

Ans: A
Feedback: 13.1.5
Difficulty: Medium

7. IBM's indexed sequential access method (ISAM)_____.
A. uses an index file for sequential access
B. uses a small master index (kept in memory) that points to disk blocks of a secondary index, while the secondary index blocks point to the actual file blocks
C. use the pointers (kept in memory) of the actual file blocks
D. uses the pointers (kept in memory) that points to disk blocks of a master index which points to disk blocks of a secondary index, while the secondary index blocks point to the actual file blocks

Ans: B
Feedback: 13.2.3
Difficulty: Hard

8. In the two-level directory, if a user refers to a particular file then_____
A. only his/her own UFD (user file directory) is searched
B. only MFD (master file directory) is searched
C. first UFD (user file directory) is searched, then MFD (master file directory)
D. first MFD (master file directory) is searched, then UFD (user file directory)

Ans: A
Feedback: 13.3.2
Difficulty: Medium

9. A two-level directory can be thought as a tree of height _____
A. 2 and its root is UFD
B. 1 and its root is MFD
C. 2 and its root is MFD
D. 1 and its root is UFD

Ans: C
Feedback: 13.3.2
Difficulty: Easy

10. The current directory is
A. always included in the search path
B. represented by the symbol ".."
C. may be included in the search path
D. none of the above

Ans: C
Feedback: 13.3.3
Difficulty: Easy

11. A relative path name defines a path from_____
A. the root directory
B. the current directory
C. from the UFD (user file directory)
D. from the MFD (master file directory)

Ans: B
Feedback: 13.3.3
Difficulty: Easy

12. Acyclic-graph directory structure_____
A. prohibits the sharing of files and directories
B. prohibits the sharing of files, but allows to share directories
C. allows to share files and directories
D. allows the sharing of files, but prohibits to share directories

Ans: C
Feedback: 13.3.4
Difficulty: Easy

13. In the case of UNIX, where sharing is implemented by symbolic link_____
A. the deletion of link does not affect the original file
B. the deletion of the original file does not remove the link, but it is dangling
C. both of the above
D. none of the above

Ans: C
Feedback: 13.3.4
Difficulty: Medium

14. The garbage collection is necessary _____
A. in each implementation of the directory structure
B. in tree-based directory structure only
C. in acyclic-graph directory structure only
D. in general graph directory structure only

Ans: D
Feedback: 13.3.5
Difficulty: Medium

15. ACL (access-control list) is associated with each file and directory. It
A. specifies user names and types of access allowed for each of them
B. includes user names only
C. includes types of access allowed for the file only
D. contains user names and their encrypted passwords

Ans: A
Feedback: 13.4.1
Difficulty: Easy

16. The following information is presented for the prog.c
-rwxr-xr--   1   Jim   staff   130   May 25 22:13   prog.c
Users Jim, Sara and Mike are the members of the group staff

A. Jim can invoke read and execute operation on prog.c
B. Mike can read and write to prog.c
C. Alan can read prog.c
D. Sara can modify prog.c

Ans: C
Feedback: 13.4.2
Difficulty: Medium

17. Manipulating files through memory rather than using the read() and write() system calls_____

A. simplifies, but retards file access and usage
B. simplifies and speeds up file access and usage
C. is not recommended for single-processor operating systems
D. complicates, but retards file access and usage

Ans: B
Feedback: 13.5.1
Difficulty: Medium

18. If a current directory is /home/user/jane and then the propose path to file /home/user/mike/prog.c is_____
A. ./mike/prog.c
B. ../../mike/prog.c
C. ../mike/prog.c
D. /mike/prog.c

Ans: C
Feedback: 13.3.3
Difficulty: Medium

19. close() operation _____ an open count associated with a given file.

A. decreases
B. increases
C. resets
D. does not change

Ans: A
Feedback: 13.1.2
Difficulty: Easy

20. UNIX systems employ _____

A. two-level tree directory
B. general graph directory
C. single-level directory
D. acyclic-graph directory

Ans: D
Feedback: 13.3.4
Difficulty: Easy

21. When the exclusive lock is applied to a file then _____
A. only one process can use this file
B. only one process can write to this file, but many processes can read it concurrently
C. many processes can read and write to this file concurrently
D. processes can write to this file only

Ans: A
Feedback: 13.1.2
Difficulty: Medium

22. When the shared lock is applied to a file then _____

A. several processes can acquire the lock concurrently
B. only one process can use this file
C. many processes can read and write to this file concurrently
D. many processes can write to this file concurrently

Ans: A
Feedback: 13.1.2
Difficulty: Medium

23. UNIX systems consider ach file to be a sequence of _____

A. bit words, which length is defined by the users
B. 16 bit words
C. 8-bit bytes
D. 32 bit words

Ans: A
Feedback: 13.1.4
Difficulty: Medium

24. The file protection can be provided by:

A. access-control list
B. password
C. knowledge of the existence and name of a file
D. all of the above

Ans: D
Feedback: 13. 4
Difficulty: Medium

Essay Questions

1. Why is open() call implemented?
Ans: Most of the file operations involve searching the directory for the entry associated with a given file. To avoid this constant searching, many systems require that open() system call be made before a file is first used. When a file operation is requested, the file is specified via an index into open-file table, so no searching is required.

Feedback: 13.1.1
Difficulty: Easy

2. What are the differences between per-process open-file table and a system-wide open-file table?
Ans: The operating system uses two levels of internal tables: a per-process table and a system-wide table. The per-process table tracks all files that a process has open. Stored in this table is information regarding the process's use of the file. Each entry in the per-process table in turn points to a system-wide open-file table. The system-wide table contains process-independent information, such as the location of the file on disk, access dates, and file size. Once a file has been opened by one process, the system-wide table includes an entry for the file.

Feedback: 13.1.2
Difficulty: Medium

3. Why information about the location of the file is kept in memory?
Ans: Most file operations require the system to modify data within the file, then to speed up this operation by avoiding reading this information from the directory structure for each operation – it is kept in memory.

Feedback: 13.1.2
Difficulty: Medium

4. What is the reason to design an operating system which recognizes the type of a file?
Ans: Because it can then operate on the file in reasonable ways, i.e., the system uses the type of the file and the type of operations that can be done on that file.

Feedback: 13.1.3
Difficulty: Easy

5. What is the main disadvantage of having the operating system support multiple file structures?
Ans: Supporting multiple file structures makes the operating system large and non-effective. If the operating system defines several different file structures, it needs to contain the code to support these file structures. Additionally, it may be necessary to define every file as one of the file types supported by the operating system. When new applications require information structured in ways not supported by the operating system, severe problems may result.

Feedback: 13.1.4
Difficulty: Medium

6. What does it mean internal fragmentation associated with the internal file structure?
Ans: Because disk space is always allocated in blocks, some portion of the last block of each file is generally wasted. The waste incurred to keep everything in units of blocks (instead of bytes) is internal fragmentation.

Feedback: 13.1.5
Difficulty: Medium

7. Is it possible that read_next() operation is used in direct access method?
Ans: Yes, it is. One of the approaches proposes to retain read_next() and to add an operation position file(n) where n is the block number. Then, to effect a read(n), we would position file(n) and then read_next().

Feedback: 13.2.2
Difficulty: Medium

8. Describe the main drawback of single-level directory structure
Ans: Even a single user on a single-level directory may find it difficult to remember the names of all the files as the number of files increases. It is not uncommon for a user to have hundreds of files on one computer system and an equal number of additional files on another system. Keeping track of so many files is a daunting task. This task is much more complicated in the case of many users on single-level directory, because they should make an agreement how to name their files to avoid conflicts and ensure unique names.

Feedback: 13.3.1
Difficulty: Easy

9. What is the internal representation of a directory in tree-structured directory?
Ans: A directory (or subdirectory) contains a set of files or subdirectories. A directory is simply another file, but it is treated in a special way. All directories have the same internal format. One bit in

each directory entry defines the entry as a file (0) or as a subdirectory (1). Special system calls are used to create and delete directories.

Feedback: 13.3.3
Difficulty: Easy

10. Describe the file protection method use by the UNIX system.
Ans. In the UNIX system, three fields (owner, group, universe) are associated with each file or directory. Each field consists of the three bits rwx, where r controls read access, w controls write access, and x controls execution.

Feedback: 13.4.2
Difficulty: Easy

11. What are the main disadvantages of associating a password with each file?
Ans: (1) the number of passwords that a user needs to remember may become very large, making the scheme impractical; (2) if only one password is used for all the files, then once it is discovered, all files are accessible; protection is on an all-or-none basis.

Feedback: 13.4.2
Difficulty: Easy

12. How does MS Windows API implement shared memory using memory-mapped files?
Ans: The general outline for creating a region of shared memory using memory-mapped files involves first creating a file mapping for the file to be mapped and then establishing a view of the mapped file in a process's virtual address space. A second process can then open and create a view of the mapped file in its virtual address space. The mapped file represents the shared-memory object that will enable communication to take place between the processes.

Feedback: 13.5.2
Difficulty: Medium

True/False Questions

1. Is the set of the file's attributes the same for each operating system?
Ans: F

Feedback: 13.1.1
Difficulty: Easy

2. Reading and writing a file operations use the same current-file-position pointer.

Ans: T
Feedback: 13.1.2
Difficulty: Easy

3. Truncating a file operation resets values of all its attributes and releases its file space.

Ans: F
Feedback: 13.1.2
Difficulty: Medium

4. create() system call uses open-file table.

Ans: F
Feedback: 13.1.2
Difficulty: Medium

5. Is an extension a part of a file name?

Ans: T
Feedback: 13.1.3
Difficulty: Easy

6. All operating systems have to support at least one file structure.

Ans: T
Feedback: 13.1.4
Difficulty: Easy

7. The length of a logical record is fixed for a given operating system.

Ans: F
Feedback: 13.1.5
Difficulty: Medium

8. All file systems suffer from internal fragmentation.
Ans: T
Feedback: 13.1.5
Difficulty: Medium

9. Sequential access to a file is based on a disk model of a file.
Ans: F
Feedback: 13.2.1
Difficulty: Easy

10. In two-level directory structure, the system's master file directory (MFD) is searched when a user logs in.
Ans: T
Feedback: 13.3.2
Difficulty: Easy

11. In tree-structured directory the search path always contains "the current directory"
Ans: F
Feedback: 13.3.3
Difficulty: Medium

12.UNIX rm command can delete non-empty directory

Ans: F
Feedback: 13.3.3
Difficulty: Medium

13.Systems that do not permit access to the files of another user do not need protection

Ans: T
Feedback: 13.4.1
Difficulty: Easy

14. Writes to the file mapped in memory are not necessarily immediate writes to the file on disk

Ans: T
Feedback: 13.5.1
Difficulty: Medium