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### Week 8 Assignment

Using APA format, give short answers to the following:

1. What is the difference between the logical and physical structure of a file? What advantages are realized by not having an application program interact directly with physical file structure?

The logical structure of storage is how the user and applications view it, as a collection of files organized within directories and storage volumes. The physical view of storage is the physical storage locations on the hardware, organized as a linear address space. By having the application program work with the logical structure of storage, it is decoupled from the physical details of how data is stored on the device.

2. What is an allocation unit? What are the advantages of using small allocation units? What are the disadvantages?

An allocation unit is the smallest number of secondary storage bytes that can be allocated to a file and cannot be smaller than the unit of data transfer between the storage device and controller, which is called a block. The smaller the allocation units, the more efficient is the use of storage space; however, the larger the allocation unit, the smaller the storage allocation structures.

3. Describe the use of buffers in file I/O operations. When are buffers allocated? When are they released?

The File Management System uses buffers in primary storage to store data temporarily as it moves between programs and secondary storage devices. Buffers are allocated when the file is first accessed, and they are released when the FM copies them to the data area of the application program.

4. How is file deletion normally accomplished? What security problems might arise from this method?

File deletion normally does not immediately remove files from secondary storage, but rather marks the file's storage allocation units as free and its directory entry as unused. This makes content visible to intruders who bypass the storage allocation table and read the allocation units directly. This is a security problem for individuals who are trying to wipe their computer free of personal information before selling it (McDowell, 2008); at the same time, it also allows users to potentially recover data they delete and discover they need at a later time.

Mindi McDowell and Matt Lytle, *National Cyber Alert System, Effectively Erasing Files*, United States Computer Emergency Readiness Team, 2008. Retrieved from us-cert.gov on Mar 8, 2009 at: <http://www.us-cert.gov/cas/tips/ST05-011.html>

5. What is transaction logging, or journaling? Describe the performance penalty that it imposes on file update operations.

Transaction logging is a form of automated file backup. While journaling provides protection against data loss, the practice imposes a performance penalty because every file change requires two write operations, one to the file and another to the transaction log.