CS4320 (Principles of Operating Systems): Homework 4

Assigned: November 30, 2000.

Due: December 6, 5pm. Accepted until 5pm December 8 without penalty; not accepted after 5pm December 8.

Credit: 10 points.

Reading

Be sure you have read chapters 10, 11, and 12.

Problems

Turn in hardcopy answers (either handwritten or generated by your favorite word-processing or text-formatting program) to the following problems.

1. (2 points)

   Some systems provide support for many different ways of structuring files' data (for example, text files and binary executable files). Others support a single very simple structure, a stream of bytes. Briefly describe one advantage of each approach.

2. (3 points)

   Which of the two main access methods described in section 10.2 (sequential access and direct access) would be most appropriate for the following applications?

   - Printing the contents of a program source file (stored as ASCII text).
   - Given a file in which each record is a name (of fixed length) and records are in order by name, searching the file for a particular name. (*Hint:* Could the application use binary search?)
   - Creating a duplicate copy of a file.

3. (3 points)

   Consider a system that supports all three of the strategies mentioned in class for allocating disk space for files — contiguous, linked, and indexed. Which strategy would be most efficient for the following types of files?

   - A file whose size can vary a lot and which is usually accessed sequentially.
   - A relatively small file whose size does not change often and which is sometimes accessed sequentially and sometimes randomly.
   - A large file whose size can vary and which is sometimes accessed sequentially and sometimes randomly.

4. (2 points)

   What effect does DMA (direct memory access) have on total system concurrency (the number of things that can be going on "at the same time"), if any?