

CSE451, Winter 2005
Homework #4

Out: Friday February 25th, 2005
Due: Wednesday March 9th, 2005

1. Which of the following two choices would most increase the maximum file size in the UNIX file system, and why? Assume the original system has 1024 byte disk blocks (i.e., 1024 byte data blocks, indirect blocks, doubly indirect blocks, etc.), and that a block pointer is 4 bytes. Thus, an indirect block holds 256 data block pointers

- i. Add a quadruply indirect block pointer to the file header.
- ii. Increase the block size to 4096 bytes.

2. Describe the sequence of steps that take place when a UNIX user, typing into the “vi” text editor, saves a file called “bar” in the current working directory. Make sure to include all I/O requests, interrupts, context switches, system calls, disk head movements, and so on. Assume that the file system cache is empty. [The fact that the user is in the “vi” editor as opposed to “emacs” or some other editor doesn’t really matter for this question – in other words, ignore editor-specific behavior.]

To get you started:

0. vi issues a read system call to wait for keyboard input.
 1. The user types “:w bar” to vi
 2. For each typed character, an interrupt is delivered to the OS kernel
 3. The OS kernel uses the interrupt to figure out the sequence of characters that were typed, and delivers the typed characters to the “vi” process
 4. “vi” parses the characters, and decides to write out the contents of the edit buffer to a file called “bar”
 5. “vi” calls the “open” system call, passing the flag “O_WRONLY | O_CREAT | O_TRUNC” as an argument
 6. ...

Problems from the textbook:

10.2, 10.9, 11.3, 11.4, 12.1, 12.7