Read Tanenbaum, Bos: Chapter 1

Exercises

1. What are the two main functions of an operating system?
2. (a) Give an example of a hardware resource that is shared by taking turns (time multiplexed).
   (b) Give an example of a hardware resource that is shared by dividing it (space multiplexed).
   (c) On a phone, is the microphone time or space multiplexed? What about the antenna?
3. To a programmer, a system call looks like any other call to a library procedure. Is it important that a programmer know which library procedures result in system calls? Under what circumstances, and why?
4. In UNIX, the call to create a new file is called `creat`. When asked what he would do differently if writing UNIX all over again, UNIX creator Ken Thompson reportedly said "I'd spell `creat` with an e". Why didn't the POSIX standard fix the spelling of `creat`? Why is it unlikely to ever be fixed?
5. What is a TRAP instruction? How is it used in operating systems?
6. Which of these operations should be allowed only in kernel mode?
   (a) Read the time-of-day clock
   (b) Set the time-of-day clock
   (c) Spin up the disk drive
   (d) Put the CPU into sleep (low power) mode.
   (e) Clear the carry bit of the status register
   (f) Set the supervisor (or system) bit of the status register
   (g) Alter the jump table for TRAP instructions
   (h) Disable all interrupts
7. What message does `perror("test");` print if there is no system error to report?
8. Can the code

   ```
   count = write(fd,buffer,nbytes);
   ```

   return any value in `count` other than `nbytes`? If so, why?
9. A file whose file descriptor is `fd` contains the text "Four score and seven years ago,..."
   The following system calls are made:

   ```
   lseek(fd,5,SEEK_SET);
   read(fd,&buffer,5)
   ```

   What does `buffer` contain after the read completes?