ANSWERS TO EVEN-NUMBERED EXERCISES

2. What is the Free Software Foundation/GNU? BSD? Mach? Which parts of the Mac OS X operating system did each provide?

The Free Software Foundation (www.fsf.org) is the principal organizational sponsor of the GNU Project. GNU developed many of the tools, including the C compiler, that are part of Mac OS X.

BSD stands for Berkeley Software Distribution; it describes the code released by the University of California at Berkeley.

Mach is an operating system kernel developed at CMU.

Mac OS X uses some GNU tools, such as the GNU C compiler, and the bash shell, a lot of BSD tools and utilities, and the Mach kernel.

4. How can you use utility programs and a shell to create your own applications?

You can write a *shell script,* also called a *shell program,* or a *batch file* under DOS. A shell script is one or more command lines contained in a file. Make the file executable and give the name of the file as a command: The shell then executes the commands in the file as though you had typed each command individually. (You may need to give the command as **./command**.)

6. What is the difference between a multiprocessor and a multiprocessing system?

Multiprocessor (having more than one processor) refers to a system with two or more processors or CPUs.

Multiprocessing (supporting multiple processes) refers to a system that can process one or more tasks at a time.

8. What is a utility program?

A utility (program), sometimes referred to as a command, performs a task that is frequently related to the operating system. A utility is simpler than an application program, although no clear line separates the two. Mac OS X includes many utilities. You can download other utilities from the Internet.

Examples of utilities are cp (copies a file), ls (lists information about files), ssh (securely connects to a remote computer), and df (lists information about free space on system devices such as hard disks).