Chapter 1 Notes

I. Four main parts make up a Linux system:
   A. The Linux kernel
   B. The GNU utilities
   C. A graphical desktop environment
   D. Application software

II. The core of the Linux system is the kernel
   A. The kernel controls all the hardware and software on the computer system, allocating hardware when necessary and executing software when required
   B. Primarily responsible for four main functions:
      1. System memory management
         a) The kernel swaps the contents of virtual memory locations back and forth from the swap space to the actual physical memory (RAM)
            (1) Allows the system to think there is more memory available than what physically exists
         b) Memory locations are grouped into blocks called pages
         c) The kernel keeps track of which memory pages are in use and automatically copies memory pages that have not been accessed for a period of time to the swap space area (called swapping out)
            (1) This process takes time and can slow down a running process
            (2) The process of swapping out memory pages for running applications continues for as long as the Linux system is running
      2. Software program management
         a) The Linux operating system calls a running program a process
         b) The kernel creates the first process, called the init process, to start all other processes on the system
      3. Hardware management
         a) Driver code allows the kernel to pass data back and forth to the device, acting as a middle man between applications and the hardware

b) Two methods are used for inserting device driver code in the Linux kernel:
    (1) Drivers compiled in the kernel
    (2) Driver modules added to the kernel
c) The Linux system identifies hardware devices as special files, called device files:
    (1) Character (one character at a time)
    (2) Block (large blocks at a time)
    (3) Network (use packets to send and receive data)
d) Linux creates special files, called nodes, for each device on the system

4. Filesystem management

III. Linus Torvalds

A. Created the first Linux kernel software

1. Intended it to be a copy of the Unix system

IV. The GNU organization (GNU stands for GNU's Not Unix) developed a complete set of Unix utilities, but had no kernel system to run them on.

A. These utilities were developed under a software philosophy called open source software (OSS)

1. Anyone can use the software, modify it, or incorporate it into his or her own system without having to pay a license fee

V. The core bundle of utilities supplied for Linux systems is called the coreutils package

A. Utilities for handling files
B. Utilities for manipulating text
C. Utilities for managing processes

VI. Any command that you can execute from the command line can be placed in a shell script and run as a group of commands

VII. The default shell used in all Linux distributions is the bash shell

VIII. The X Window software is the core element in presenting graphics

IX. No display environment to allow users to manipulate files or launch programs. To do that, you need a desktop environment on top of the X Window system software:

A. K Desktop Environment (KDE)

1. Similar to the Microsoft Windows environment.

B. The GNU Network Object Model Environment (GNOME)

C. The Unity Desktop

X. A complete Linux system package is called a distribution.

A. Three Types:

1. Full core Linux distributions
    a) Contains a kernel, one or more graphical desktop environments, and just about every Linux application that is available, precompiled for the kernel
    b) Examples:
        (1) Slackware
        (2) Red Hat
        (3) Fedora
        (4) Gentoo
        (5) openSUSE
        (6) Debian
2. Specialized distributions
    a) Typically based on one of the main distributions but contain only a subset of applications that would make sense for a specific area of use
    b) Examples:
        (1) CentOS
        (2) Ubuntu
        (3) PCLinuxOS
        (4) Mint
        (5) dyne:bolic
        (6) Puppy Linux
3. LiveCD test distributions
    a) Boot your PC from the CD and run a Linux distribution without having to install anything on your hard drive
    b) Because you access every-thing from the CD, applications run more slowly
    c) Examples:
        (1) Knoppix
        (2) PCLinuxOS
        (3) Ubuntu

(4) Slax

(5) Puppy Linux