# Extra Reading – Week 6

## 1. Introduction

* Linux is a free, Unix-like operating system designed for IBM PC-compatible machines.
* It was created by Linus Torvalds at Helsinki University of Technology, Finland.
* The system was developed with contributions from volunteers worldwide, using the Internet as a collaborative platform.

Linux is particularly beneficial for:

* Professionals needing a Unix-based environment at home.
* Educational institutions looking for a cost-effective computing solution.
* Students and researchers who require a powerful and free OS.

## 2. Features of Linux

* Fully-fledged Operating System with capabilities equivalent to commercial Unix systems.
* Multitasking & Multi-user support: Allows multiple logins and parallel processing.
* Security: Supports password protection and file access control.
* Networking: Enables remote logins, shell access, and electronic mail.
* X Window System: The GUI system, XFree86, provides a graphical interface similar to Unix.
* Extensive software support:
* Compilers for C, C++, Pascal, Modula, Smalltalk, and Fortran.
* Text processing tools like TeX/LaTeX with previewing applications.
* Drawing tools like xfig and idraw.
* Network File System (NFS) support for file sharing.
* Free distribution: Licensed under the GNU General Public License (GPL), allowing free access to the source code.

## 3. Obtaining and Installing Linux

How to Obtain Linux

* Available through Internet FTP sites, Usenet newsgroups, and commercial distributions.
* Distribution formats:
* Floppy disk sets
* CD-ROMs (preferred due to larger storage capacity)
* FTP or Network File System (NFS) for online installation.

Key documents for new users:

* Installation HOWTO
* Hardware Compatibility HOWTO
* Network Administrator’s Guide
* Linux Journal (for keeping up with developments)

Hardware Requirements

* Minimum specs: 386 processor, 4 MB RAM, and 80 MB disk space.
* Recommended specs for X Windows: 8+ MB RAM and 100+ MB disk space.

Additional requirements:

* Numeric coprocessor (optional but beneficial).
* SVGA monitors and accelerator cards for better graphics.
* At least 4-5 MB of additional space for TeX/LaTeX font generation.

Installation Process

* Creating a Boot Disk
* A DOS utility (rawrite.exe) writes a Linux boot image to a floppy disk.
* The boot disk loads a minimal Linux system into RAM.

Hard Disk Partitioning

Example setup:

* 100 MB for DOS
* 16 MB swap partition for virtual memory
* 134 MB Linux partition

Partitioning tools:

* fdisk (Linux partitioning)
* fips (non-destructive resizing of DOS partitions)

Setting Up Linux

The setup utility installs selected components.

Available installation methods:

* Floppy disk sets
* CD-ROM
* From a DOS partition
* Over a network (NFS)
* The Linux Loader (LiLo) is installed to manage booting between multiple OS options.

## 4. Running and Managing Linux

Basic System Administration

* Root account: Used for administrative tasks but should be used cautiously.
* User accounts: Recommended for daily operations to prevent accidental system damage.
* Shutdown process: Unlike DOS, Linux must be properly shut down to prevent file corruption.

Networking Support

* Uses TCP/IP for communication between Unix/Linux systems.
* Can be integrated into existing networks.
* Supports Network File System (NFS) for remote file access.
* Setup includes: Configuring network addresses, hostnames, and Ethernet cards.

## 5. The X Window System

* XFree86 provides GUI capabilities similar to Unix workstations.
* Supports many graphics cards and monitors.
* Configuration challenges: Setting up XFree86 can be complex and requires caution.
* Virtual window managers can expand desktop space beyond screen size.

## 6. Applications and Use Cases

* Scientific & Engineering Applications
* Parallel Virtual Machine (PVM): Enables parallel computing on networked Linux machines.
* Ghostscript: Converts and prints PostScript files on non-PostScript printers.
* X-Protocol Multiplexor (XMX): Creates an electronic classroom where an instructor’s screen is mirrored to students.

## 7. Future of Linux

* Growing popularity in academic and research environments.
* Low-cost hardware ensures affordability for years to come.
* Expanding compatibility: Ports to new architectures like IBM PowerPC are in development.
* Potential to become a dominant Unix-like OS, completely free.

## 8. Conclusion

* Linux is a powerful, stable, and free operating system.
* Ideal for scientific, engineering, and academic communities.
* Represents a successful model of open-source collaboration.
* Has the potential to be a major Unix alternative in the future