


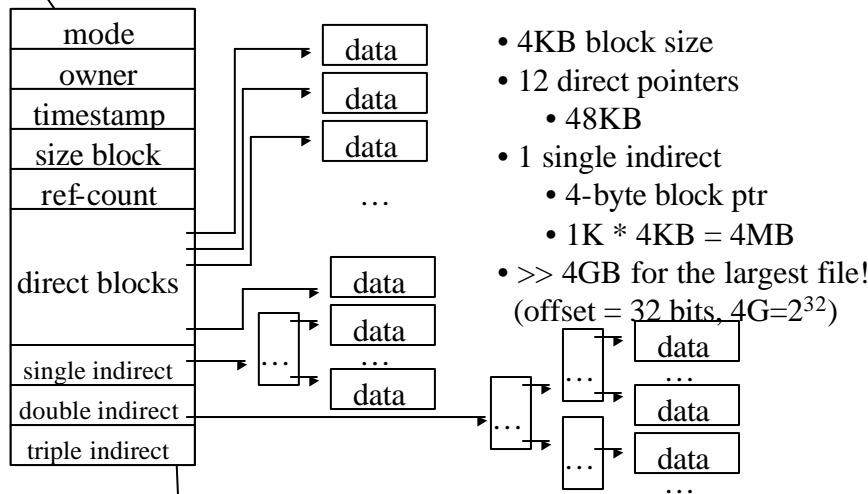
UNIX

- ✍ Introduction
- ✍ Programmer Interface
- ✍ User Interface
- ✍ Process Management
- ✍ Memory Management
-  ✍ File System
- ✍ I/O System
- ✍ Interprocess Communication

UNIX File System

- ✍ Main Objects
 - ✍ Files and Directories
 - ✍ Data Blocks
 - ✍ Physical Blocks
 - ✍ Sector – 512bytes
 - ✍ Logical Blocks
 - ✍ 4.1BSD – 1KB
 - ✍ 4.2BSD – block size, e.g., 4KB, and fragment size, e.g., 512B, initialized during file-system creation.

UNIX File System – i-node



* "Operating system concept", Silberschatz and Galvin, Addison Wesley, pp. 380.

58

* All rights reserved, Tei-Wei Kuo National Taiwan University, 2001.

UNIX File System – Directories

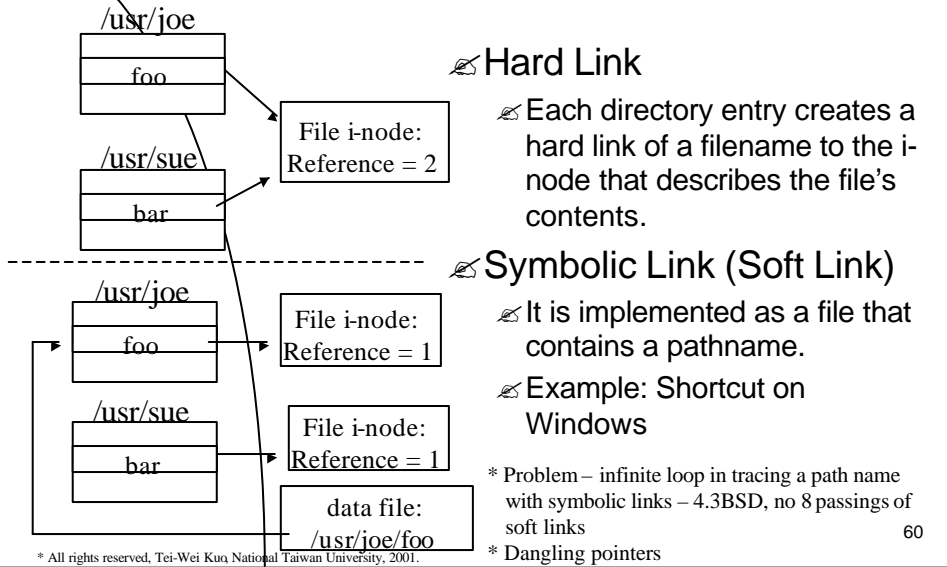
☞ Directory

- ☞ A special file distinguished by its i-node type.
- ☞ Since 4.2BSD, file names can be up to 255bytes – a variable length for each directory entry.
- ☞ Linear search of empty directory entry!
- ☞ Given a path name, each directory file is opened and searched for the next node in the path until the desired i-node is returned, illegal access is found, or error occurs.

59

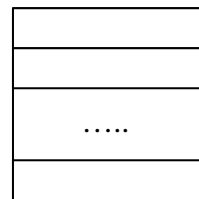
* All rights reserved, Tei-Wei Kuo National Taiwan University, 2001.

Sharing of Files - Revisiting



File Systems Revisiting

File: a sequence of bytes



a sequence of (logical) blocks

File Methods

Sequential Access

Basic Operations

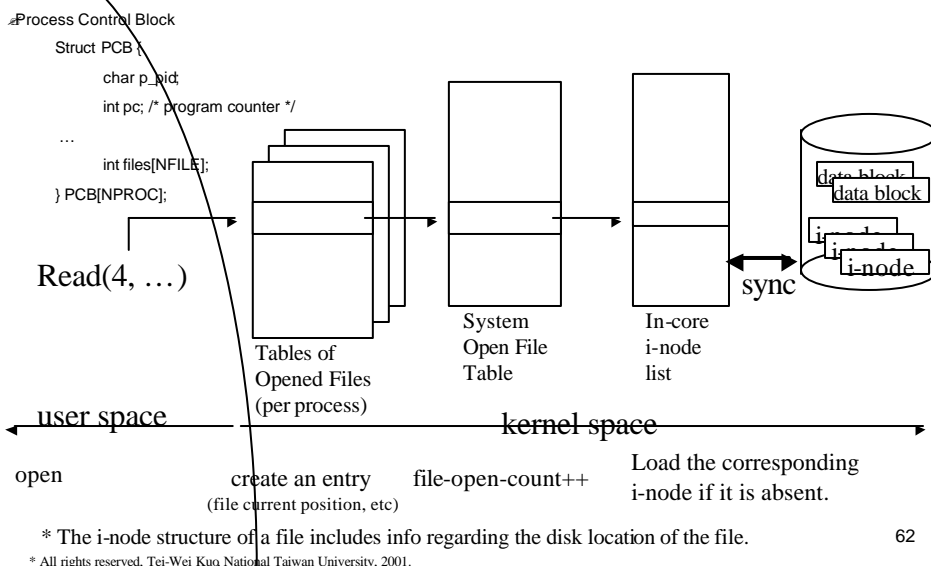
READ, WRITE + file pointers

Direct Access

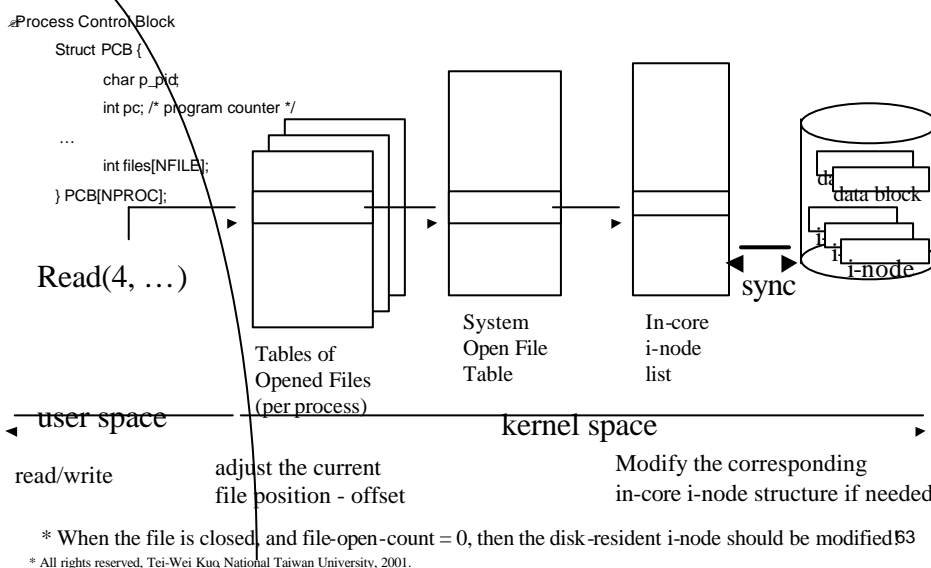
Basic Operations

READ N or Write N, where N is the relative block number.

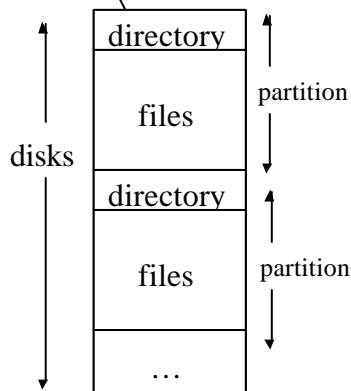
UNIX File System



UNIX File System



File System – Directory Structure



Partition (/Volume):

a low level structure in which files and directories reside.

Directory:

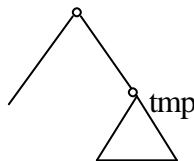
Records info for “all” files on a partition.

* “Operating system concept”, Silberschatz and Galvin, Addison Wesley, pp. 349,354-358.

* All rights reserved, Tei-Wei Kuo National Taiwan University, 2001.

UNIX File System - Mounting

(name of the device, mount point)



Use an appropriate device driver to read the device directory and verify the format => mount!

- Mount point: the location within the file structure at which to attach the file system.
- A bit in the i-node indicates that whether a file system is mounted on it! -> find the i-node of the root of the mounted file system.

UNIX: manual mounting

* All rights reserved, Tei-Wei Kuo National Taiwan University, 2001.

UNIX File System - Mounting

- ✍ When a mounting-point node in a path name is reached, the mounting table is searched.
 - ✍ (major number, minor number)
 - ✍ major number identifies the right driver.
 - ✍ minor number identifies the device
- ✍ **Boot block**
 - ✍ First sector of a file system – primary bootstrap program
 - ✍ Call a secondary bootstrap program residing in the next 7.5K.