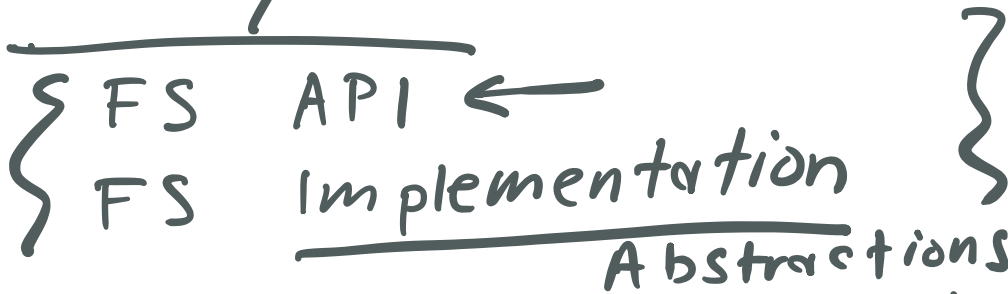


Today :



API:

File

byte array
has low-level
name
(number)

Directory

map human-readable
names →
low-level names

e.g. file "main.c"

low-level #: 1000

directory: "main.c" → 1000

Access

open
read
close

pread

Grow

open
write
close

pwrite

write to
arbitrary
point in the
file:

lseek

Delete

unlink (system calls)

FS: tracks info about each
file

"meta data"

what info is there per file?

Directory:

just a special type of file

meta data: inode

data: contents of directory
inode #

map

"main.c" → 1000

"main" → 1001

⋮

all directories also store:

"dot"
or

"dot dot"

"."

".."

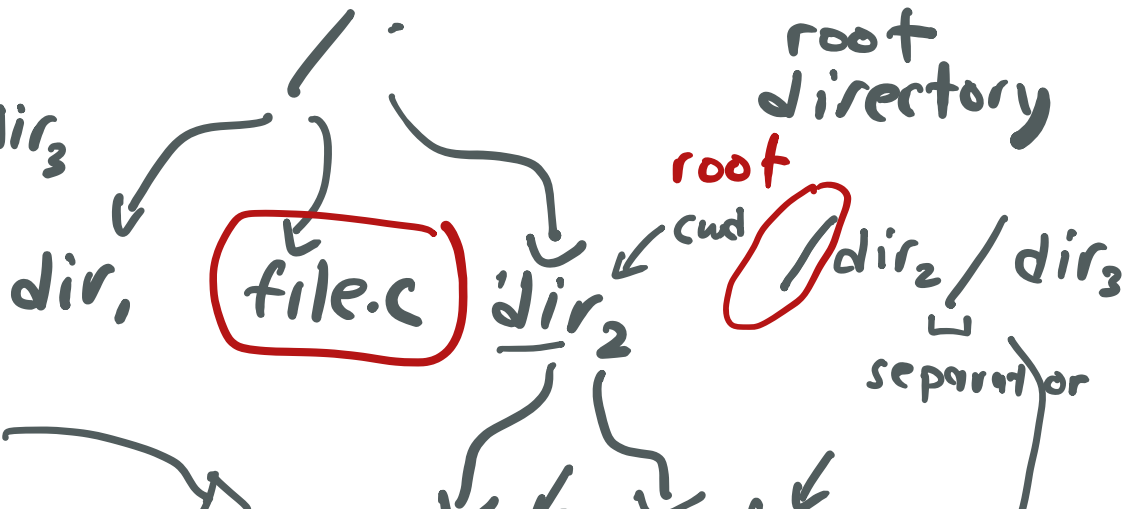
→ inode # of the dir

→ inode # of parent directory

File System Hierarchy

alternate:

~~root/dir₂/dir₃~~





Absolute path name:

starts at root, and includes the entire path to file or dir

Relative path name:

current working directory (CWD)

⇒ cd ⇒ moves shell to "location" in hierarchy

cd /dir₂ CWD: dir₂

"file2.c"

"./file2.c"

"../file.c"

"../dir₂/file2.c"

⇒ " ../dir₂ / .. /dir₂ /
../dir₂ / file2.c "

Path traversal:

open("/a/b/c/d/main.c")

O_RDONLY);

- read "root dir" /
- look for "a" → a's inode #
- read "a"
- look for "b" → b's inode #
- ⋮
- read "d"
- look for "main.c" ⇒ main.c's inode #

Link (Hard Link)

program: ln link (or linkat)

	directory :	inode #
rm → unlink	"foo"	8388622
	"foo2"	8388622
	"foo3"	8388622

"last" unlink: removes contents from disk, etc.

Soft/Symbolic Link

ln -s contents of data:
pathname to file

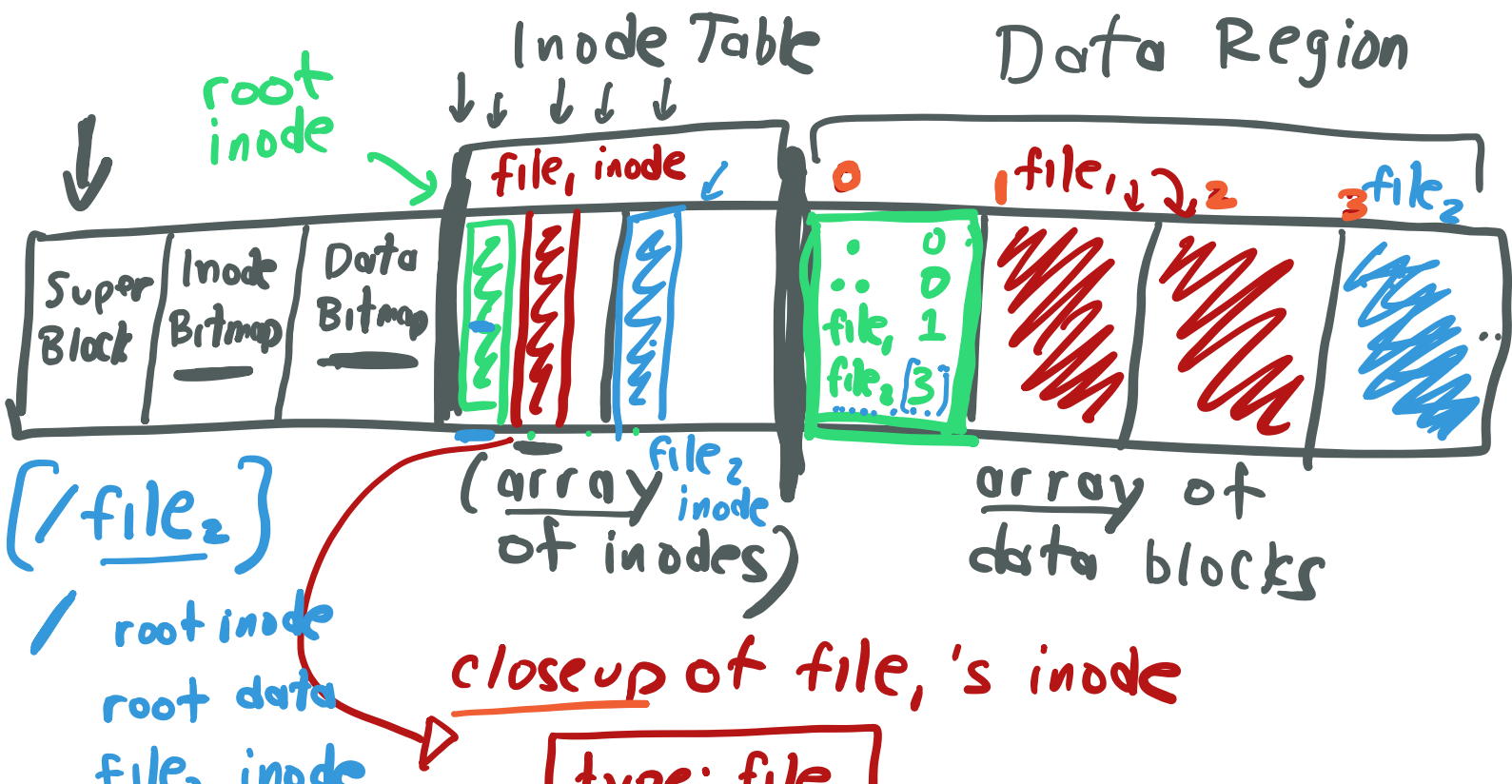
- no class next week
- P3b due: Monday ← goal
(break after)

→ Midterm 2:
 { Average → [23] / 32 }

File System Implementation

- ⇒ On-disk Structures } ← "static" in operation
- ⇒ Access Methods ←

Disk: [Blocks] ⇒ 4KB (most of disk)



file₂ meta
file₂ data

type: file
size: 8KB
owner,
permissions
block pointers:
1, 2

} block pointer
aka
block address
aka
disk address

Directory: just a file

root directory

→ file₁

→ file₂

Inode
Bitmap

tracks which
inodes free/
not

Data
Bitmap

tracks data blocks:
free/not

Super Block:

metadata: information about
entire file system

e.g. size, where data region
is, etc.

magic #, type