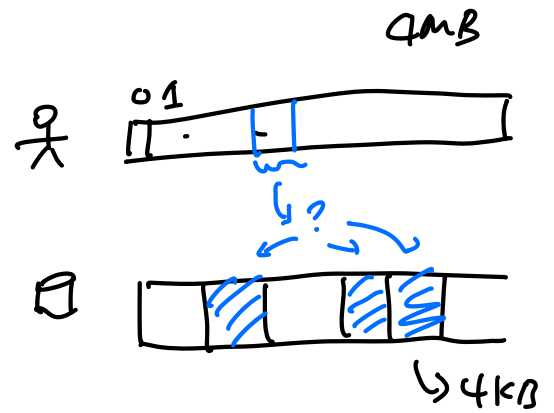


1. File mapping (cont'ed)
2. Directories
3. FS interfaces

 fs {

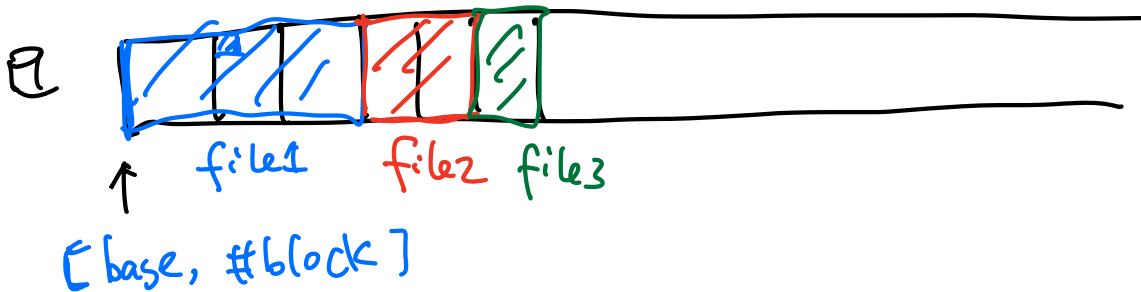
- persistency
- name data (files)*
- user-friendly names (dirs)



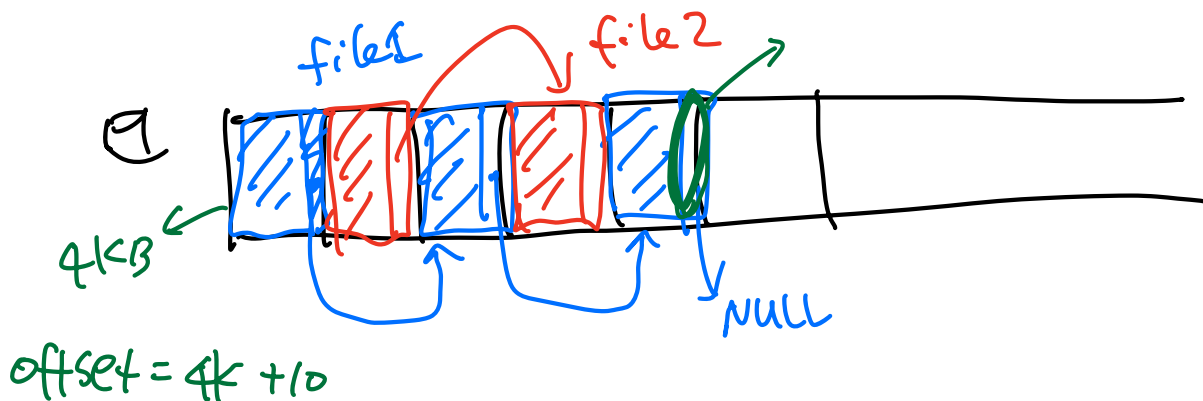
$\langle \text{file, offset} \rangle \xrightarrow{\text{inode}} \text{block\#}$
 \parallel
 $\underline{4096 + 10} \rightarrow ?$

Candidates (from last time) 4GB

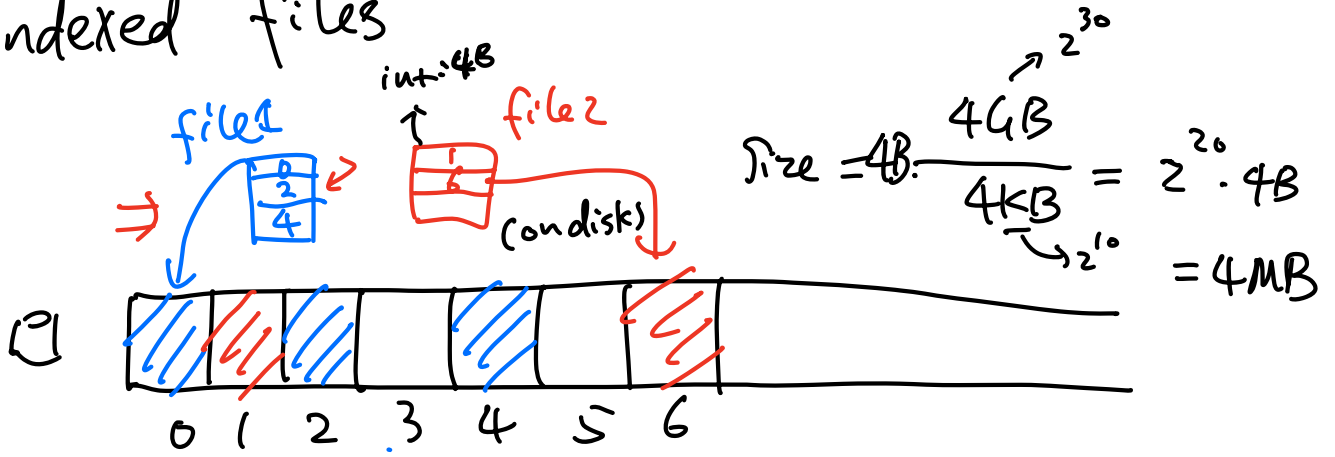
- extent-based files



- linked files



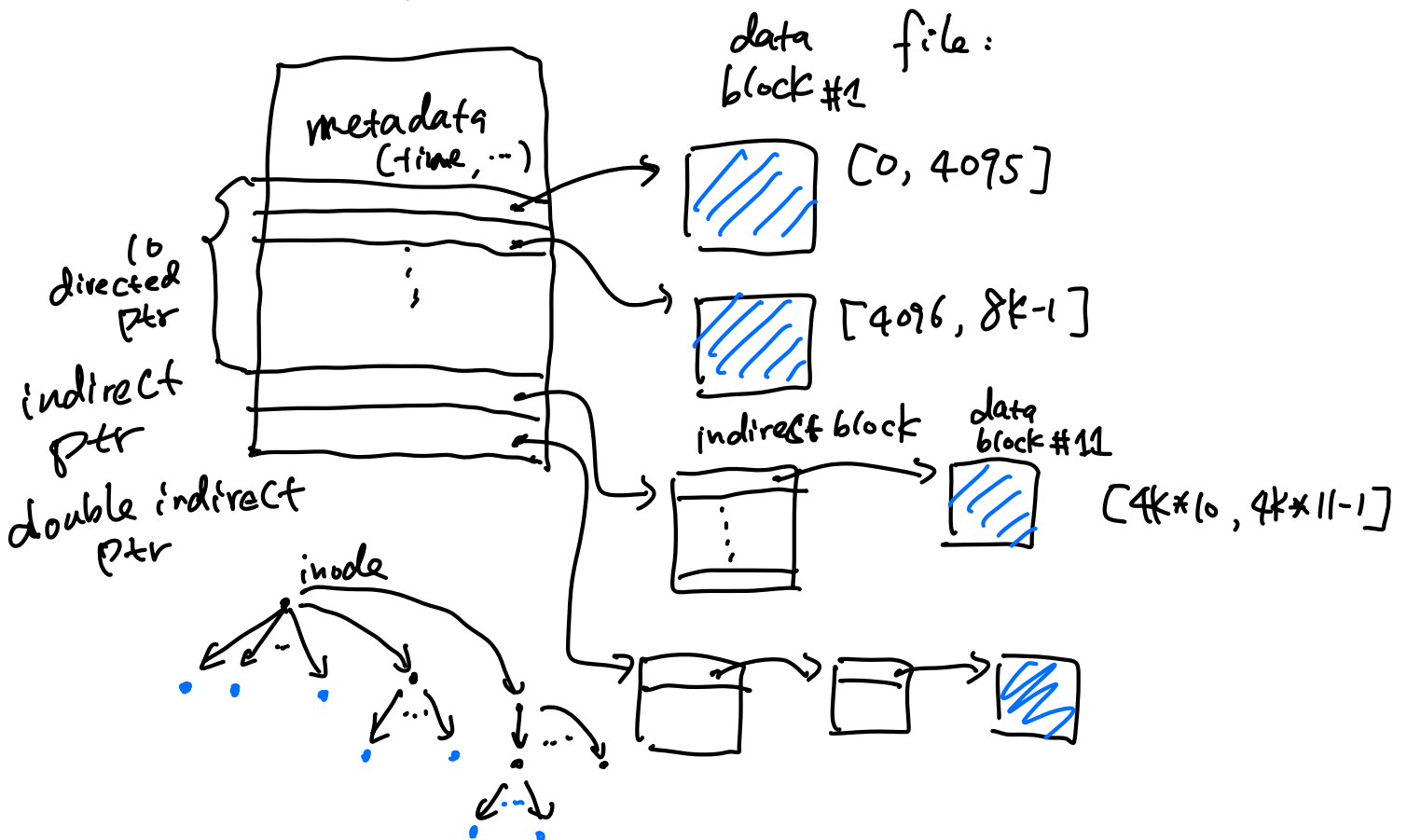
indexed files

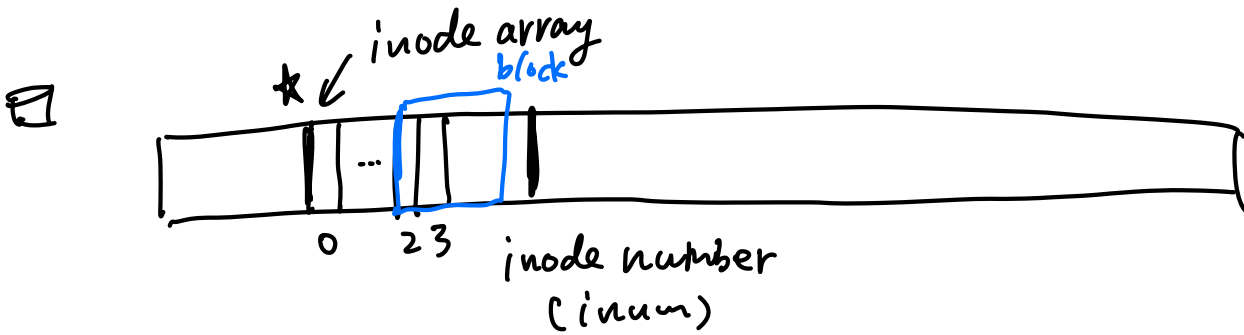


$$\frac{\text{offset} = 4k + 10}{\text{block size} = 4k} = 1$$
 file contents used blocks

	disk util	seq	random
extent-based files	☹	☺	☺
linked files	☺	☺	☹
indexed files	☹	☺	☺
unix inode	☺	☺	☺

Unix inode:





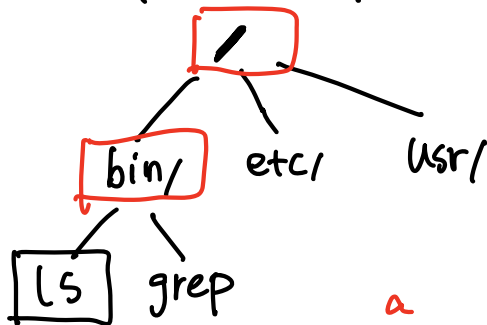
• Dirs.

• Problem?

name	inum
"a"	100
README.txt	101
...	...

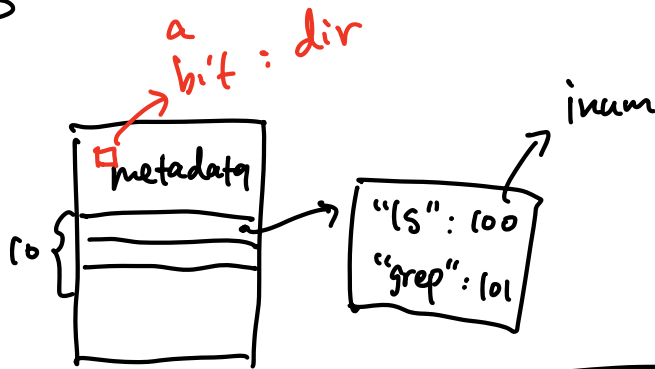
Users →

• hierarchical namespace



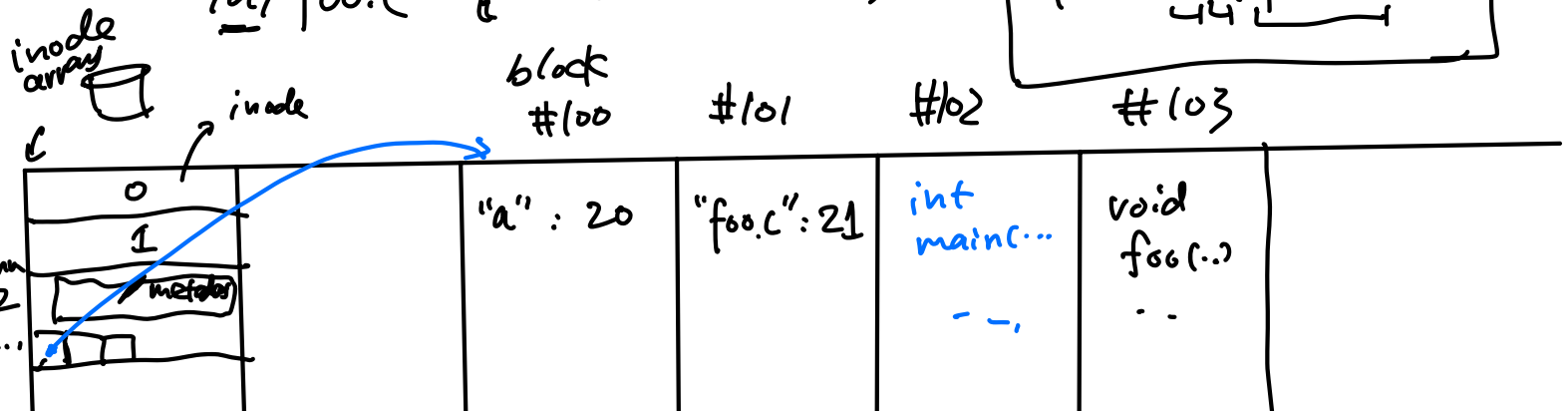
• dir?

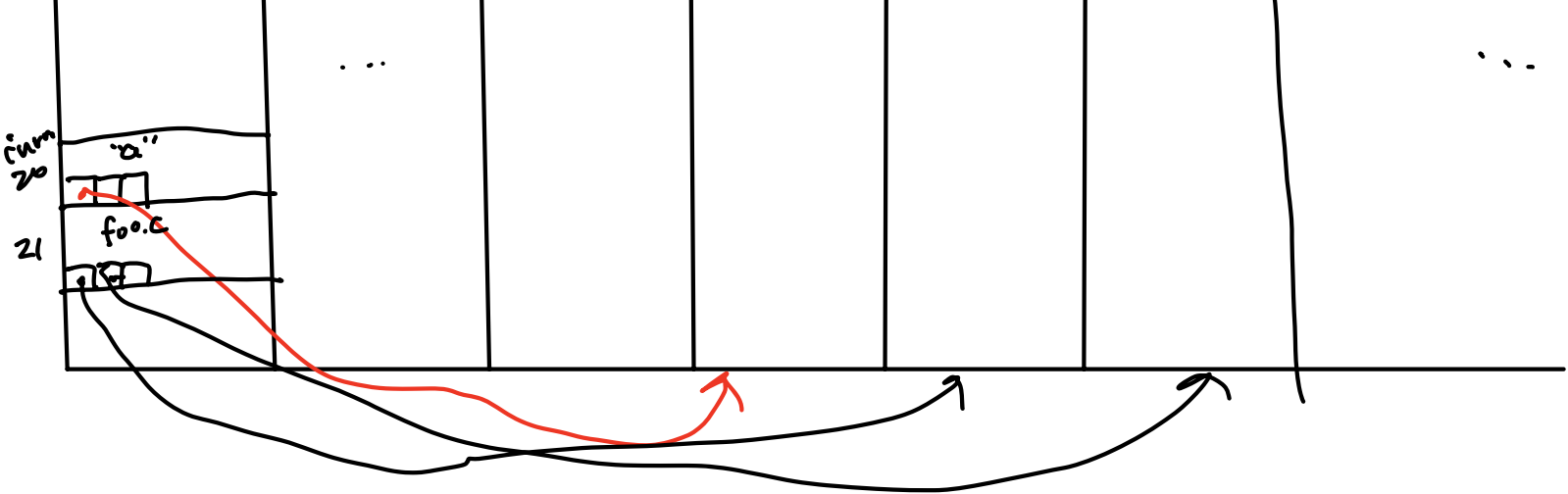
↳ inode



/a/foo.c ("int main(...)")

\$ Cat /a/foo.c

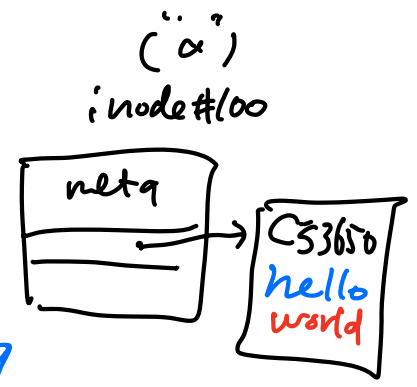
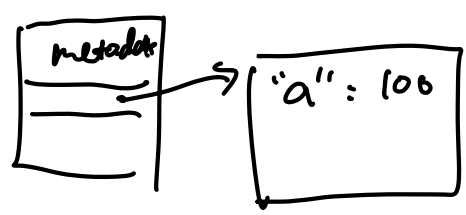




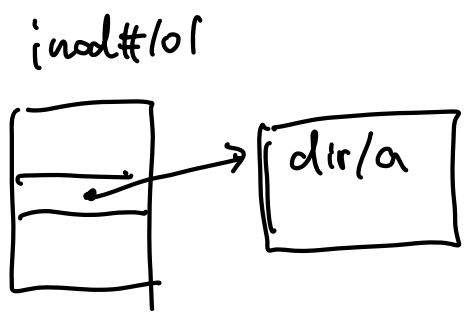
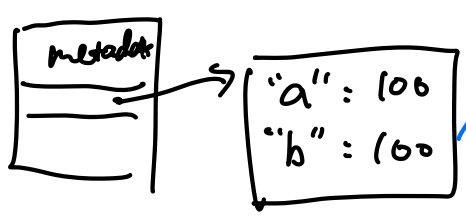
- links
 - hard link : $\$ (n \ \underline{a} \ \underline{b})$
 - soft link : $\$ (n \ -s \ a \ sb)$

dir/a
dir/b
dir/sb

a: "CS3650"



Run ①:



Run ②:

$\$ \text{rm } a$
 $\$ \text{cat } b$
 $\$ \text{cat } sb$