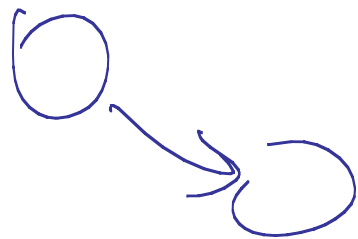
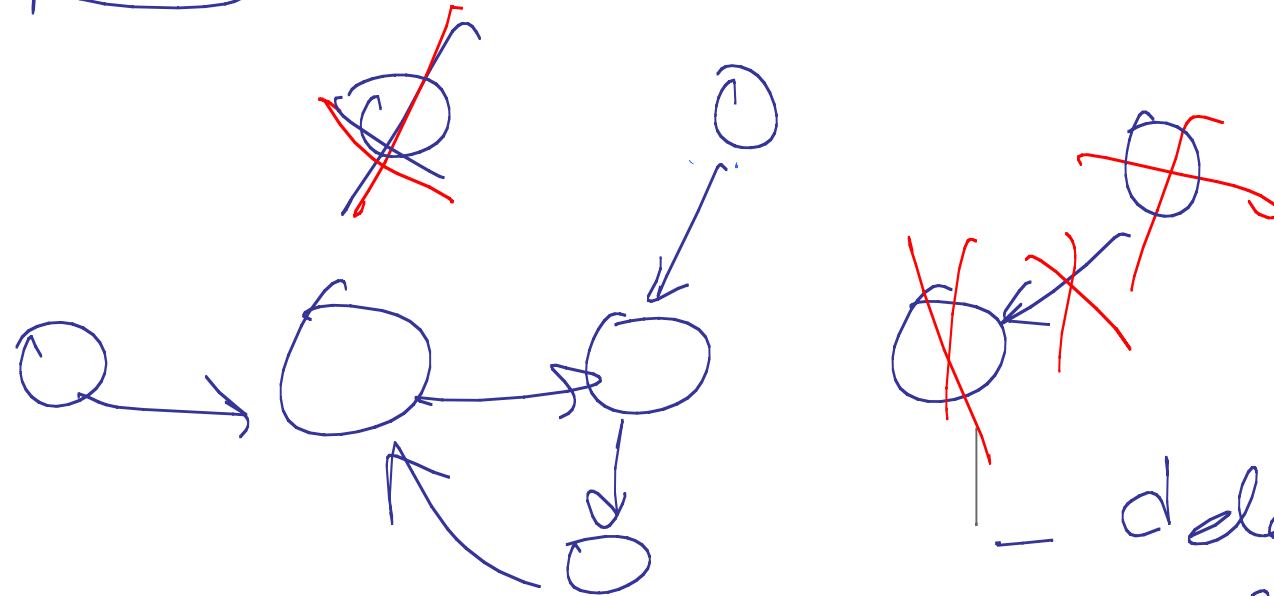


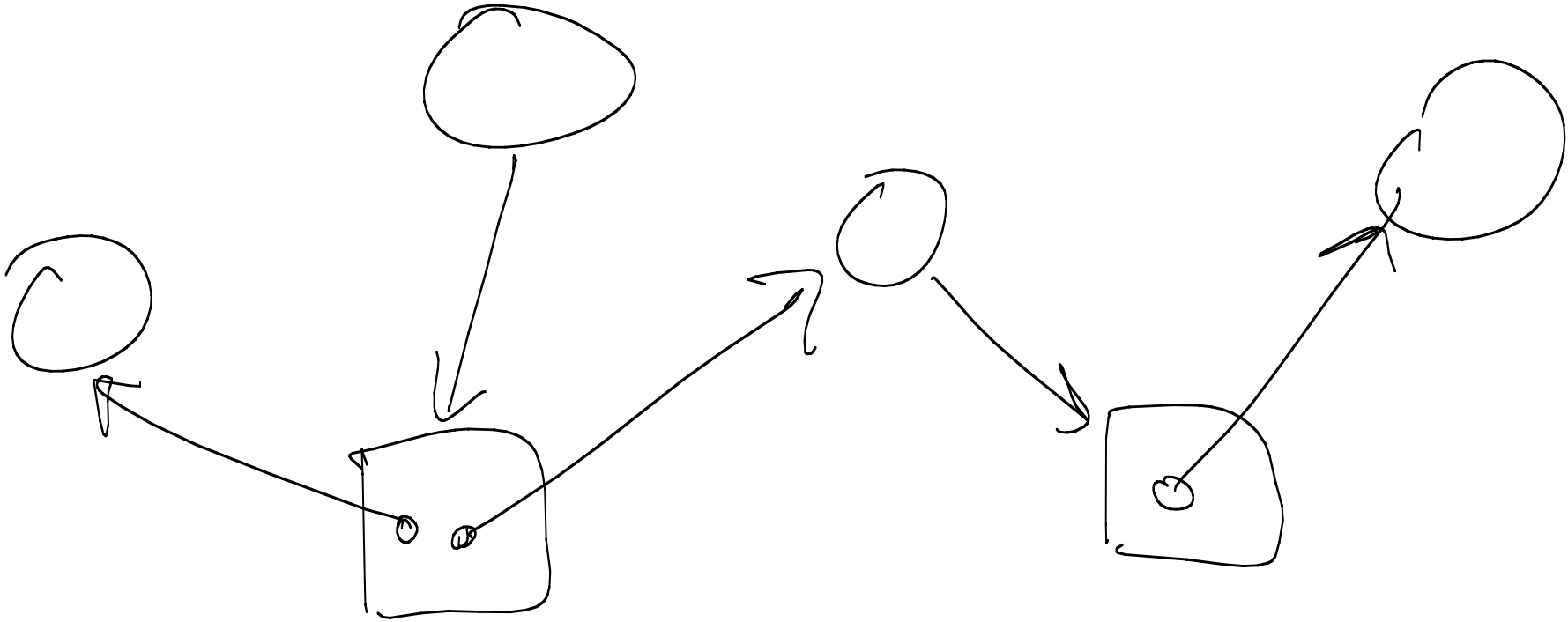
cycle  $\rightarrow$  deadlock  
 $\leftarrow$

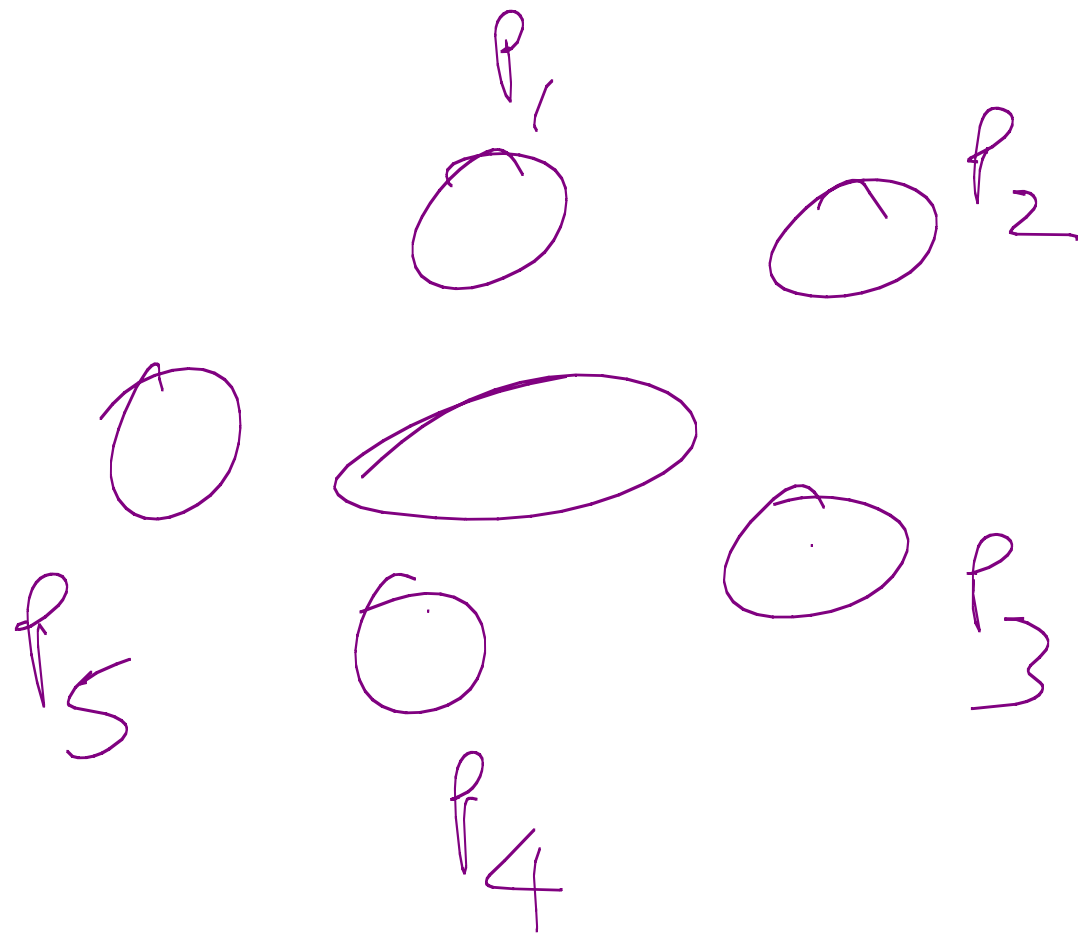


+ delete any incoming edges

- delete a node if it has no outgoing edges

# RAG





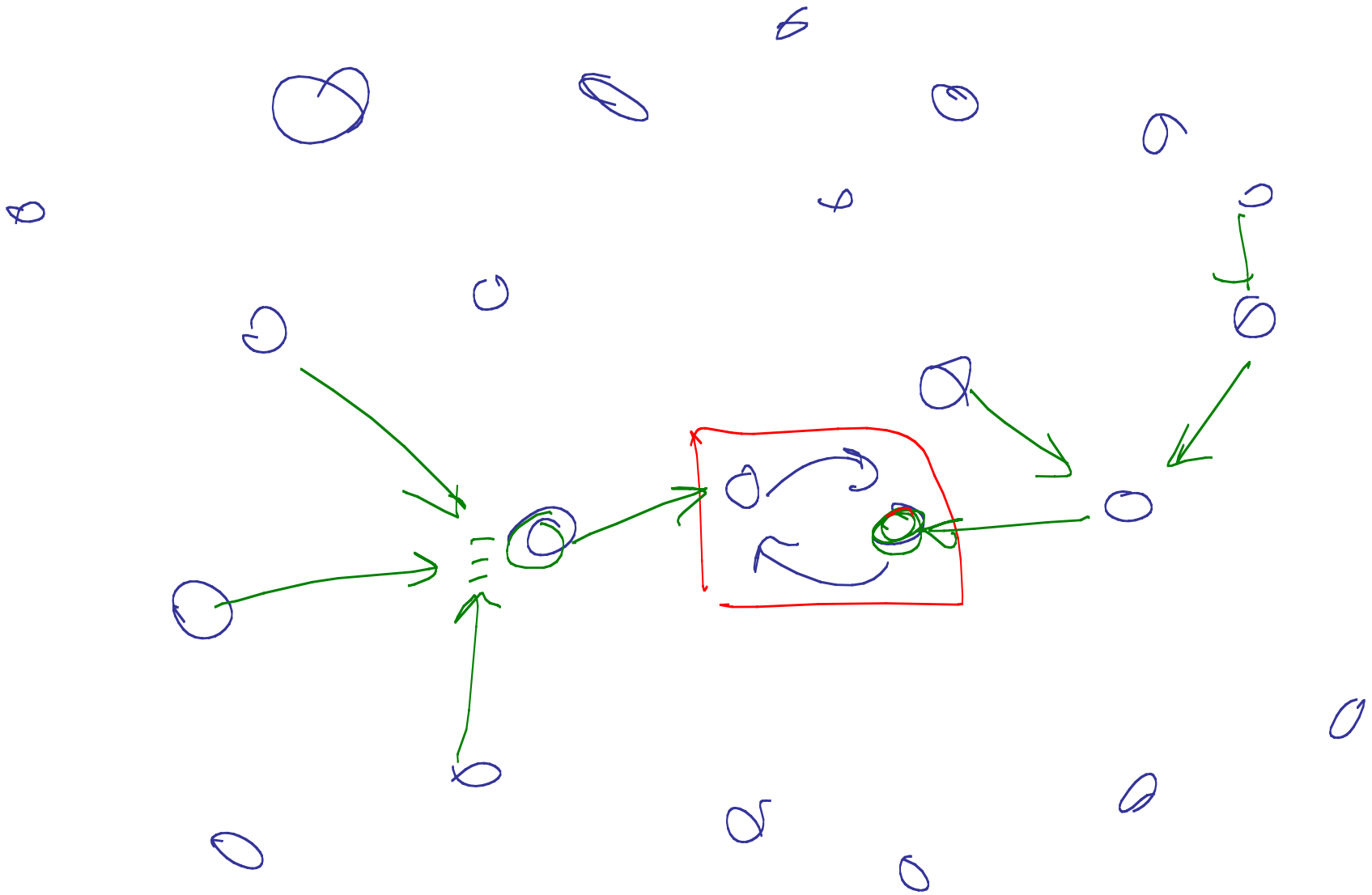
When to check?

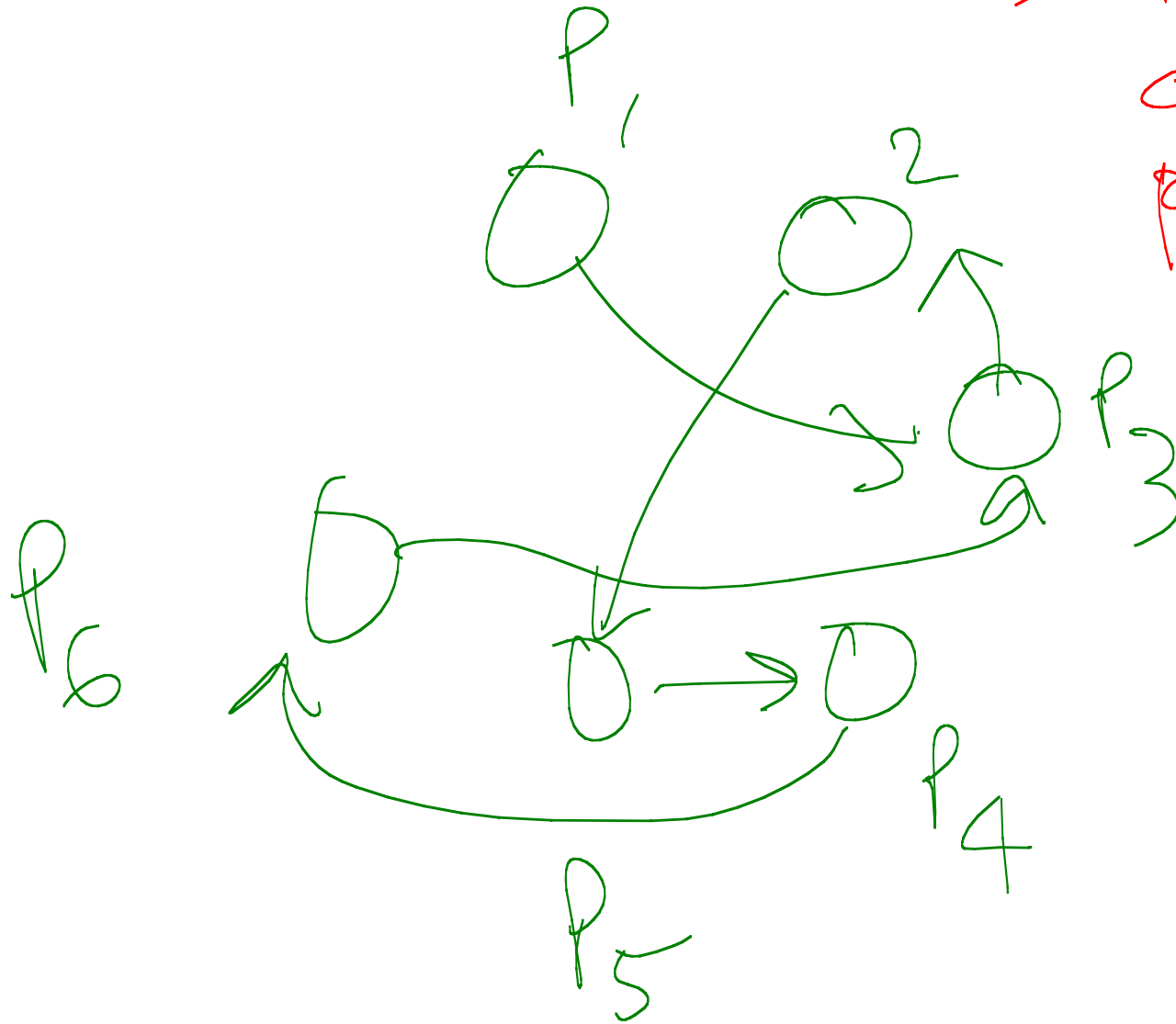
- eager

every resource alloc  
req that block  
→ check

- lazy

↳ after  $x$  secs or  
 $x$  blocks





→ terminate  
one  
process

↓  
which  
one?

Which one

① oldest

② youngest

③ one with the largest # of resources

④ " " " Smallest # of "

⑤ One that caused it.

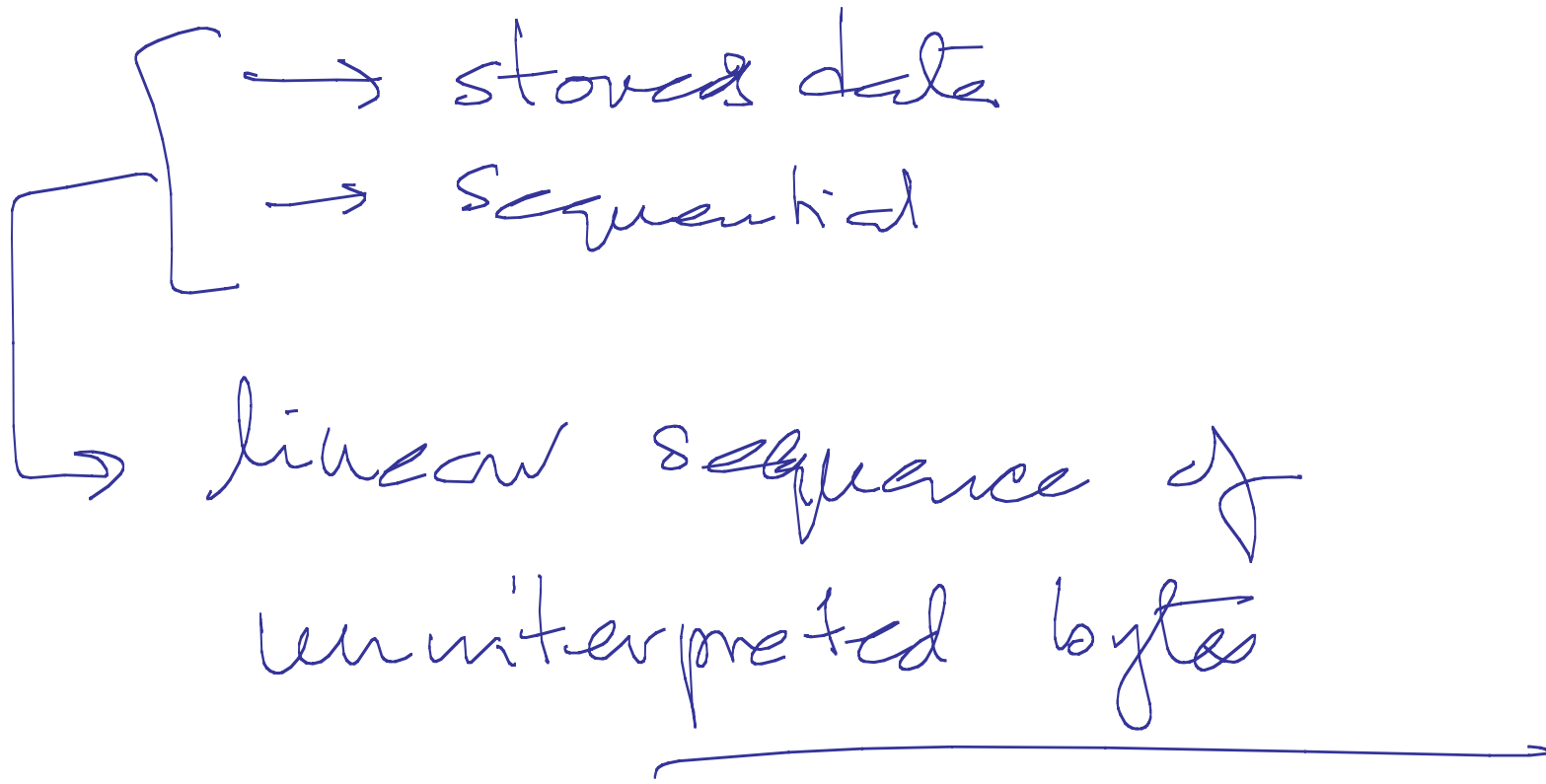


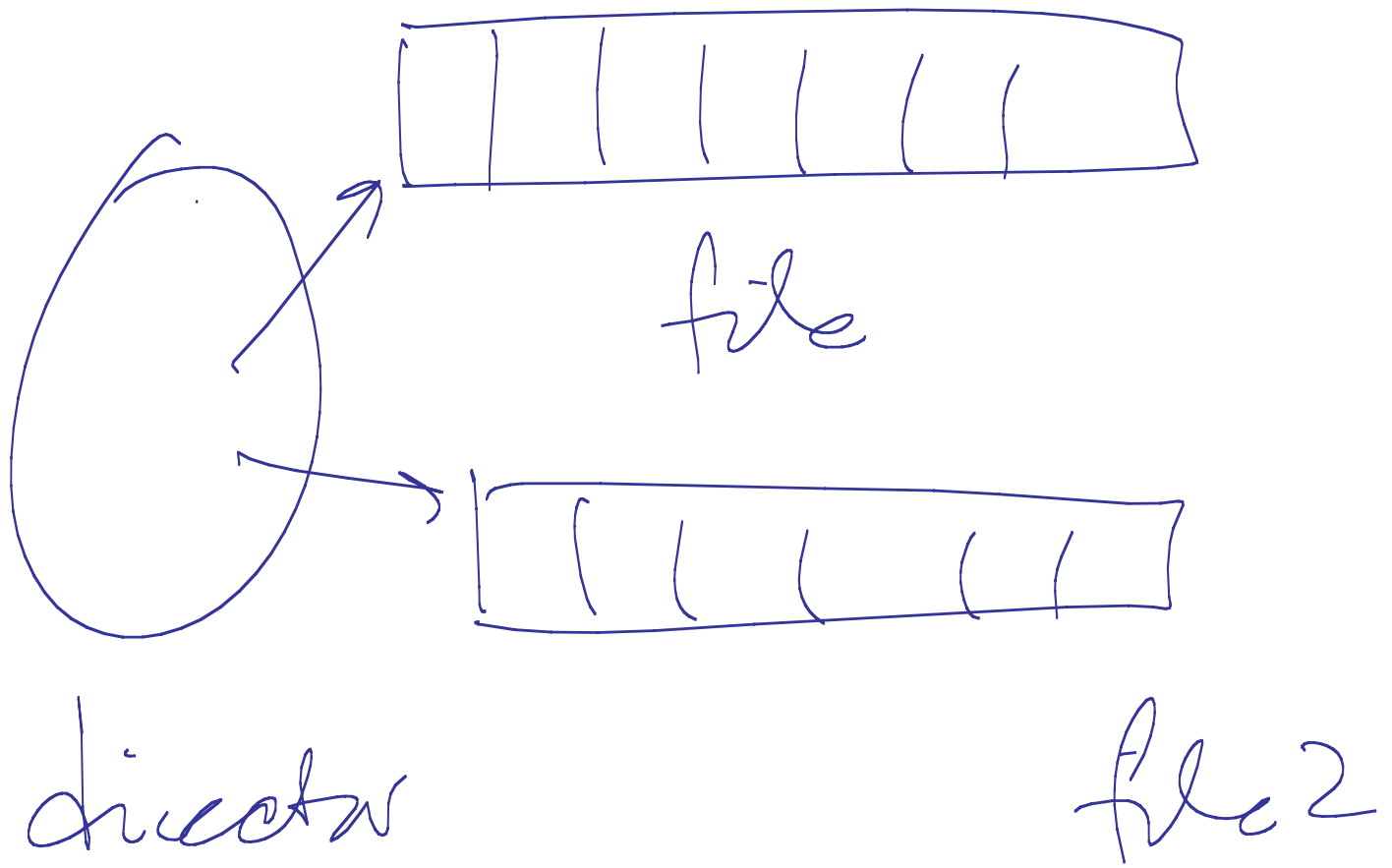
Can lead to starvation

↳ "aging"

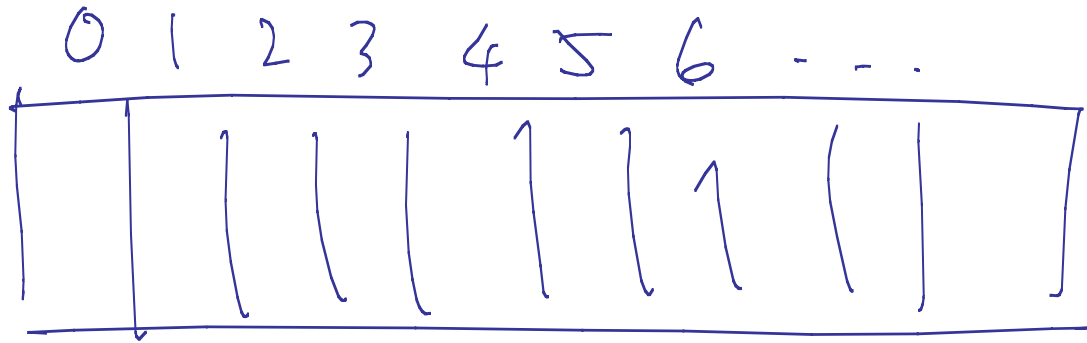
# File Systems

What is a file?



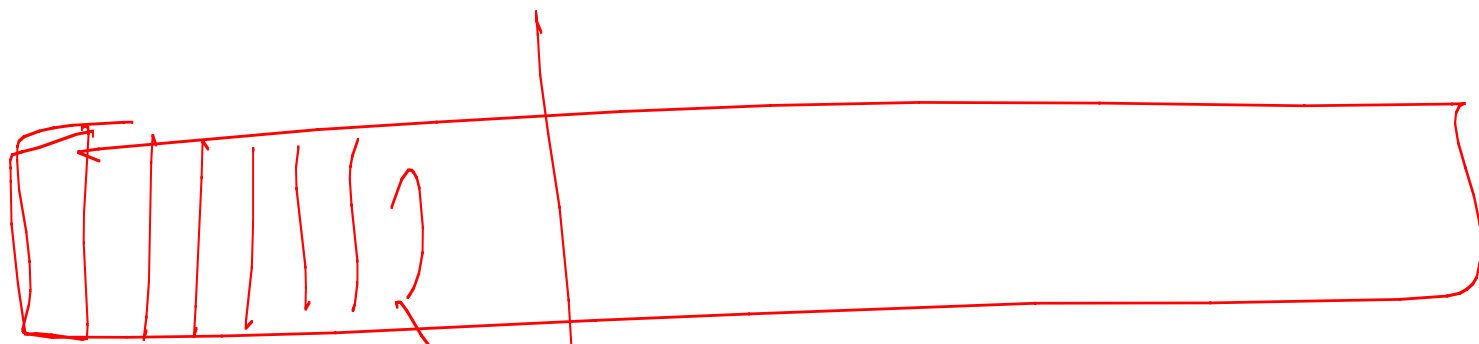


disk →

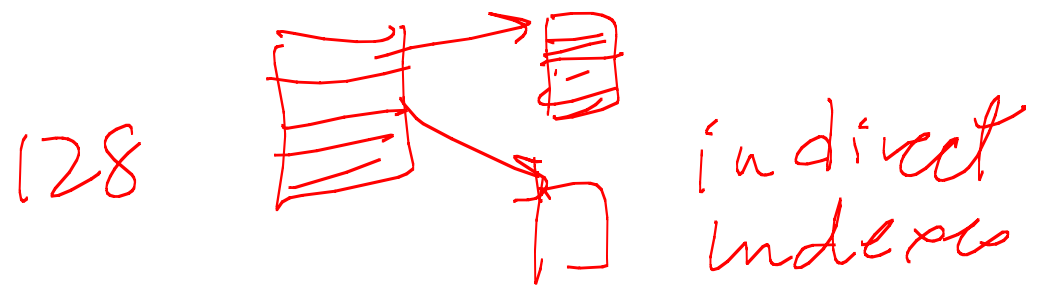
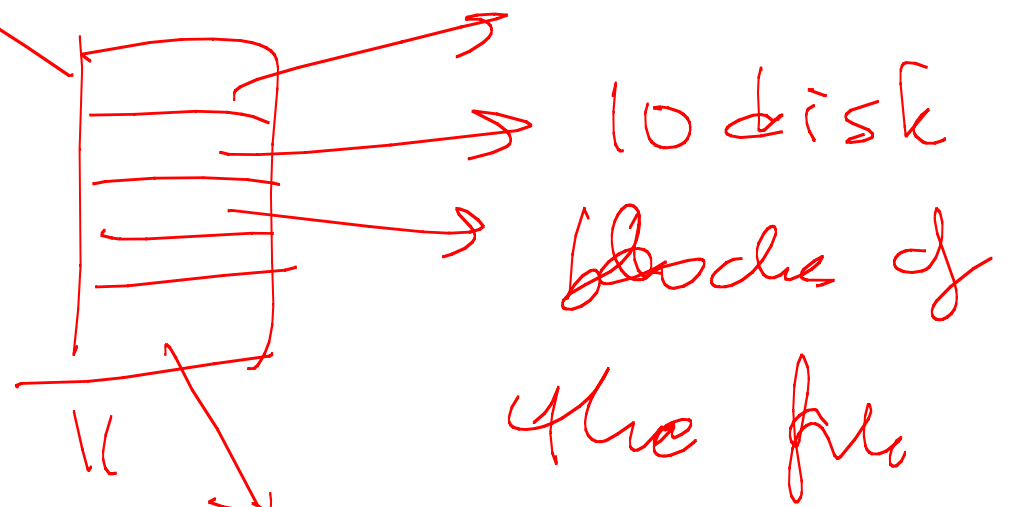


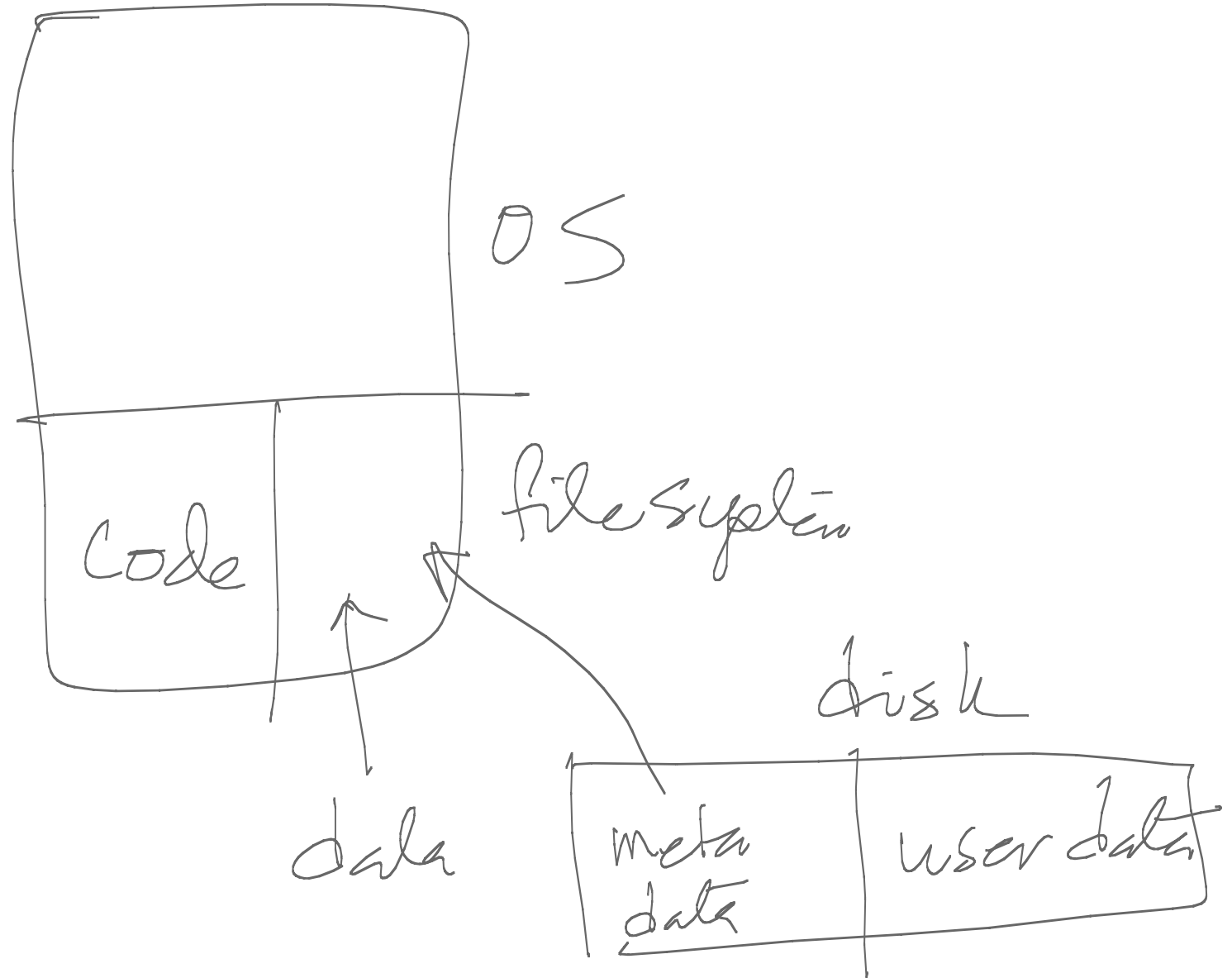
linear sequence of  
blocks.





0 1 2 3 4  
inode  
area





main ( )

```
{ printf ( )
```



- ✓ open
- ✓ read
- write
- ~~close~~

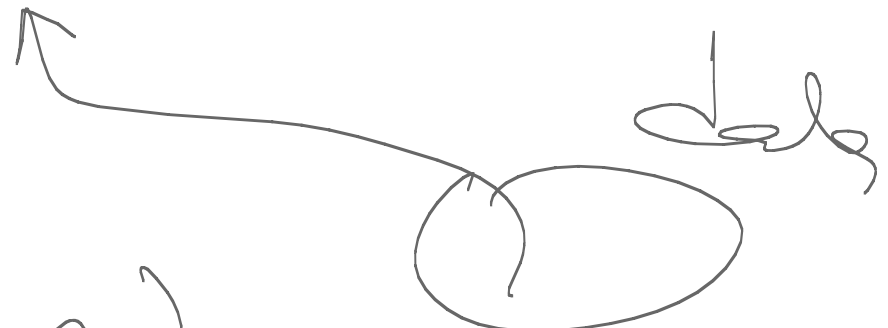
read(filename, buffer)

read(f, buffer, n)

"abd"

read("x/y/.../abcd", -

n



`f = open(".....")`

finds the file

stores the index pointer

into a file descriptor

+  
check  
permissions

`read(f, ...)`

