CSE 330: Operating Systems

Class: 24 **Date:** 11/15

Fall 2016

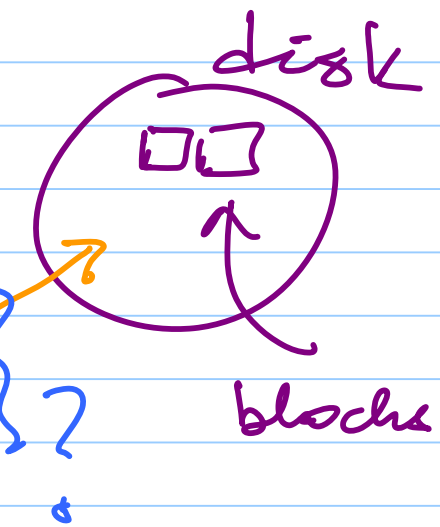
Note Title

DISK I/O

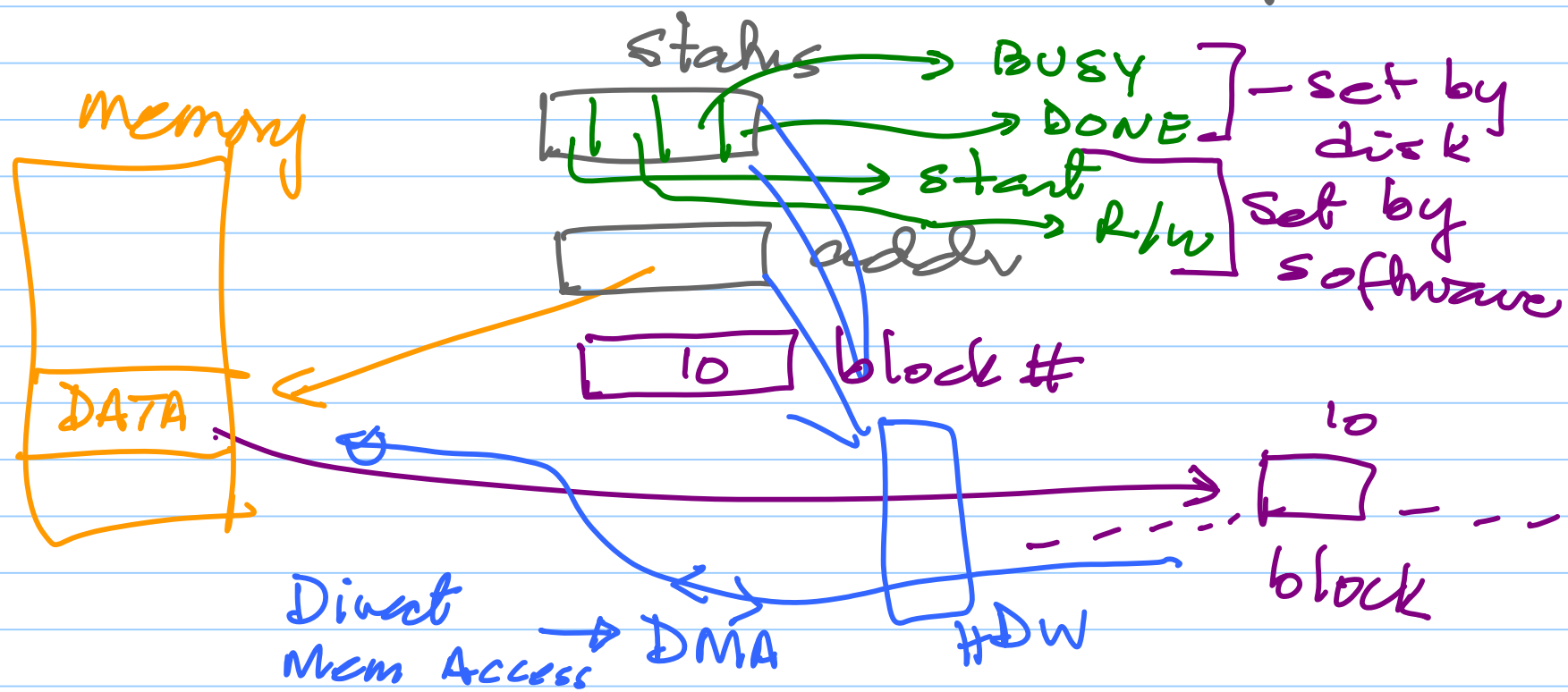
Application

:
program
read/write
from/to
files
write (fd, $\boxed{\text{data}}$, size)

OS
file write
{
:
$\boxed{\text{write block x of disk}}$



Disk interface → set of registers



// polled I/O

write a block to disk (b#, addr)

```
{ while (busy); // wait
  load b# → b# register
  load addr → addr reg
  set R/W bit to W
  set start bit
  while (not done); // wait for write to complete
}
```

ATOMIC

polling

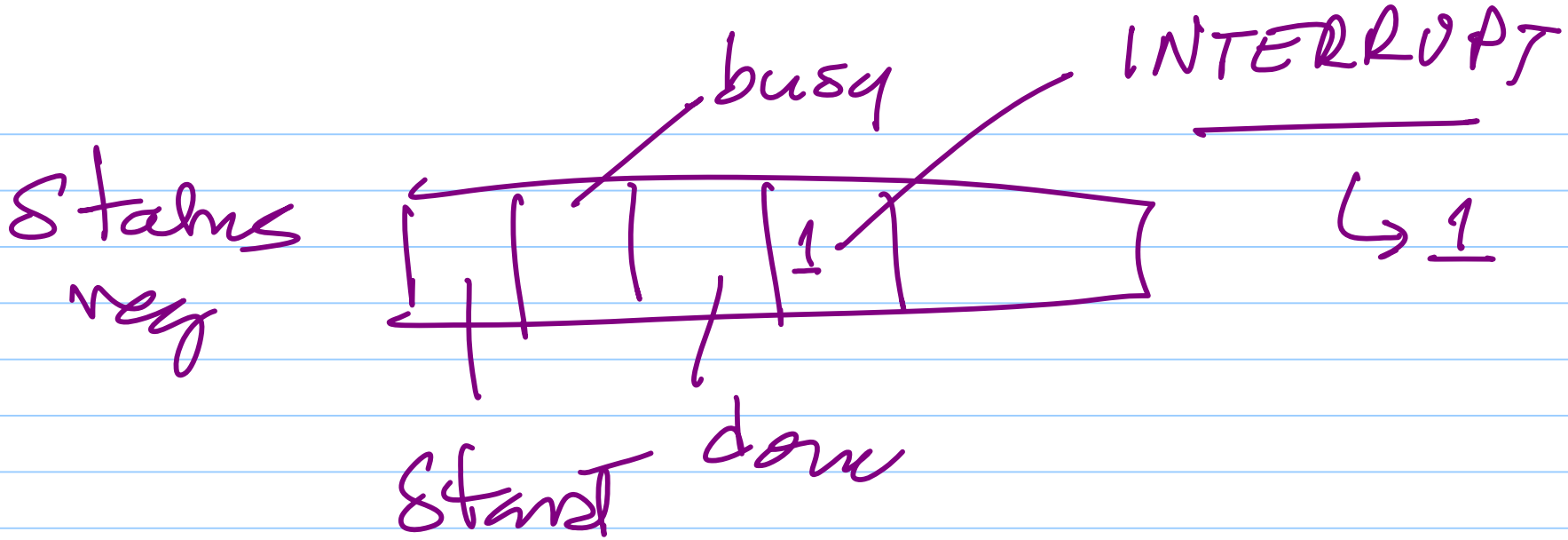
Interrupt driven I/O.

↳ driver starts things up

→ blocks

→ an $\boxed{\text{interrupt}}$ wakes it up

→ hardware signal generated at the end of an operation


status reg
busy
INTERRUPT
1
1
start
done

INT bit is 1

write ... (b#, addr)

{ P(disksem) → q of processes waiting

set to 1

set addr, b#, W bit, start for I/O

→ P(disk_int)

set to 0

V(disksem)

disk int handler()

{ V(disk_int) }

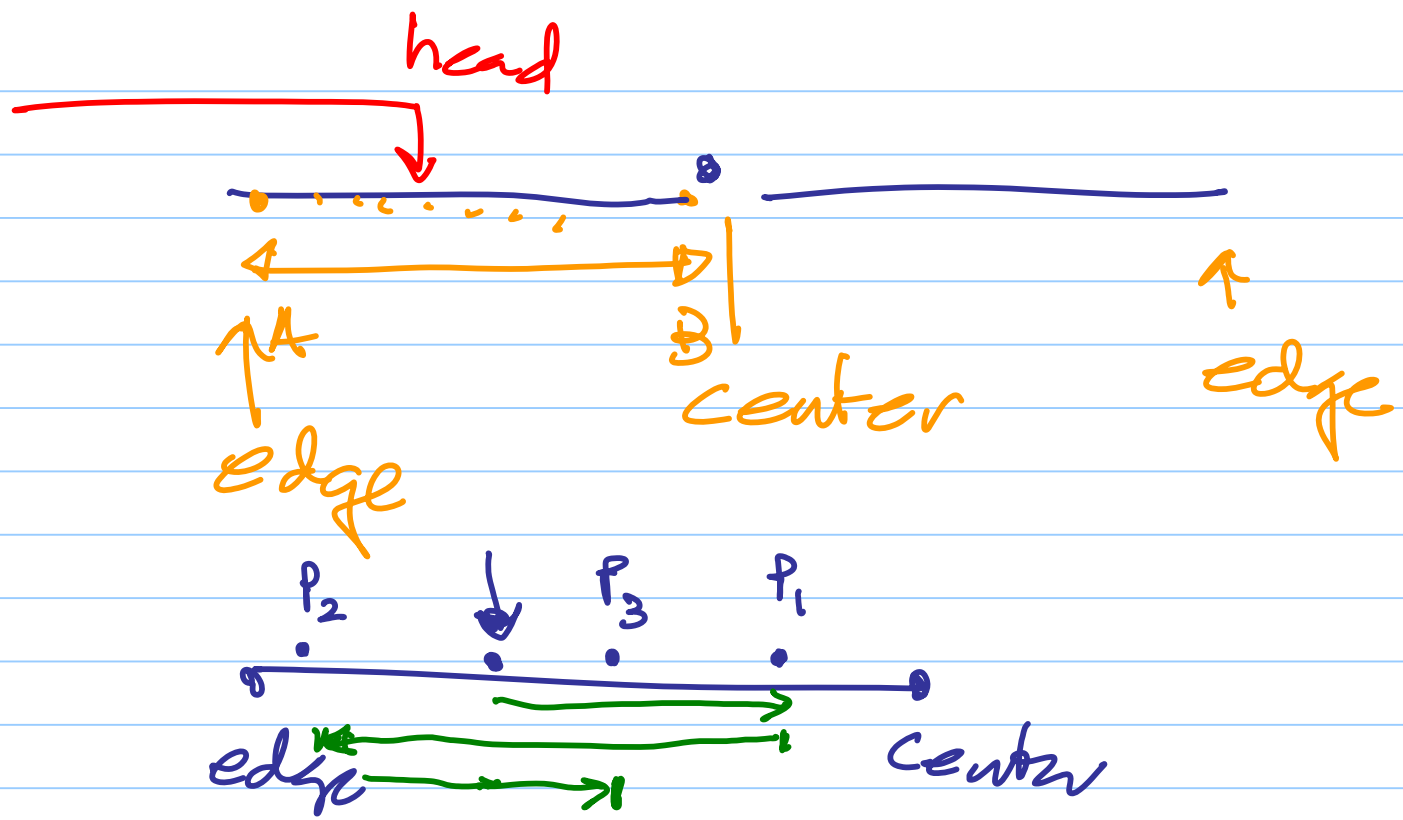
FCFS I/O scheduling

Disk scheduling

head

→ only for mechanical disks

→ what order should waiting I/O processes be using the disk


head
A
B
edge
center
edge
P_2
P_3
P_1
edge
center

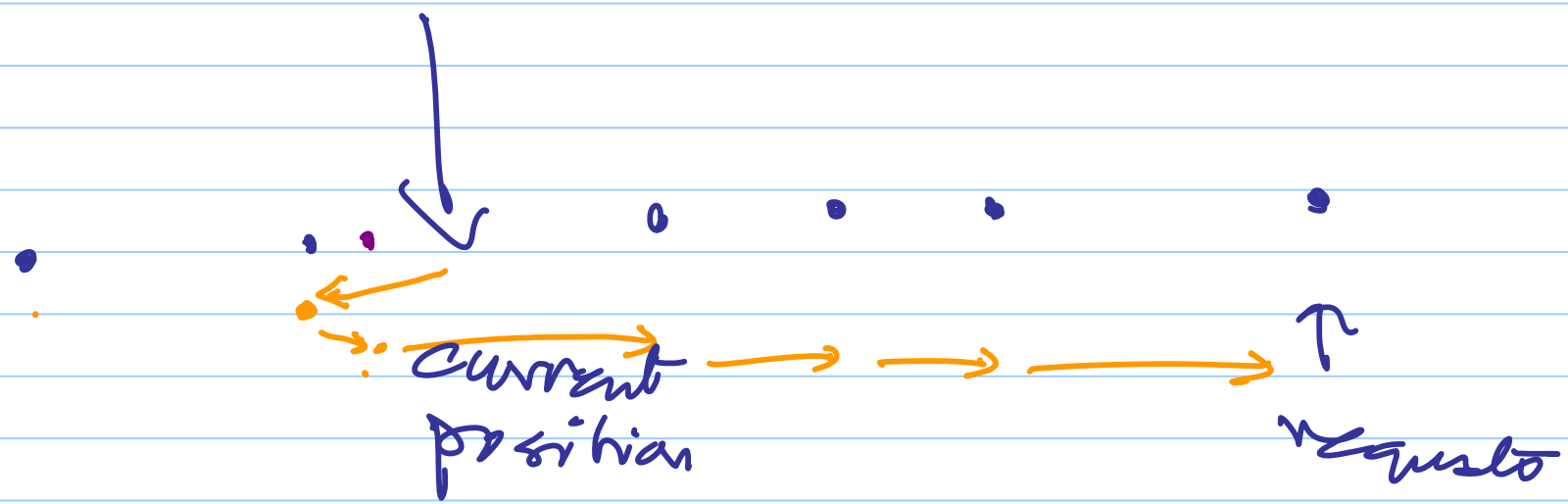
FCFS

based on requests

→ head moves "randomly" all over the disk

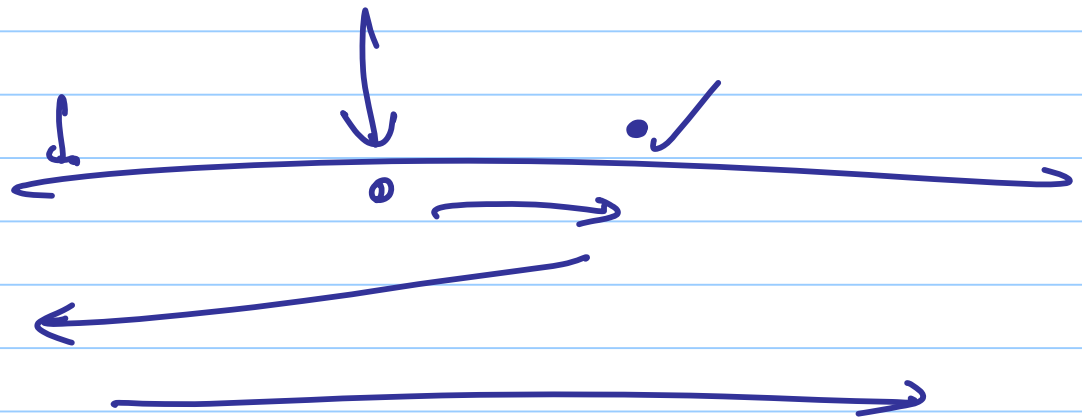
→ may have too much head movement

SSTF → shortest seek time first



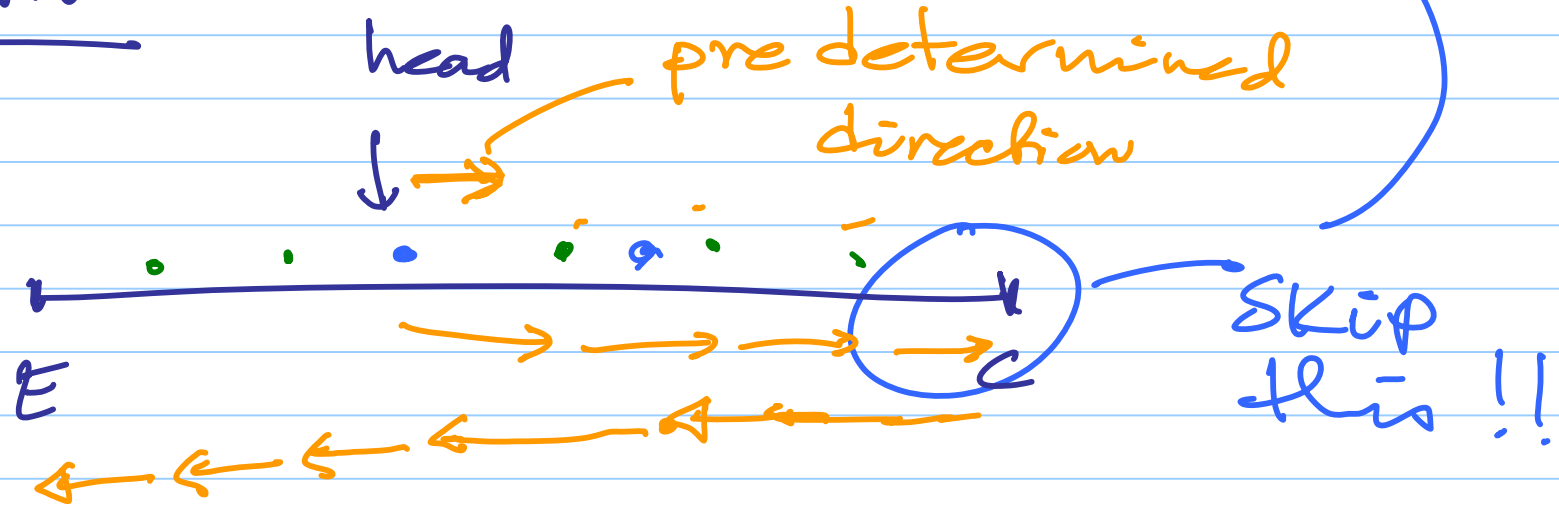
→ low head movent, but starvation

→ under low load — disk access is FCFS



SCAN

→ variant → Look



Travel Edge to center & then Center to edge

SCAN → LOOK

C-SCAN

C-LOOK

↳ circular scan

- edge to center
- retract
- edge to center

How to do non FCFS ?

P(disk sem)

P(disk-int)

V(disksem)

CS

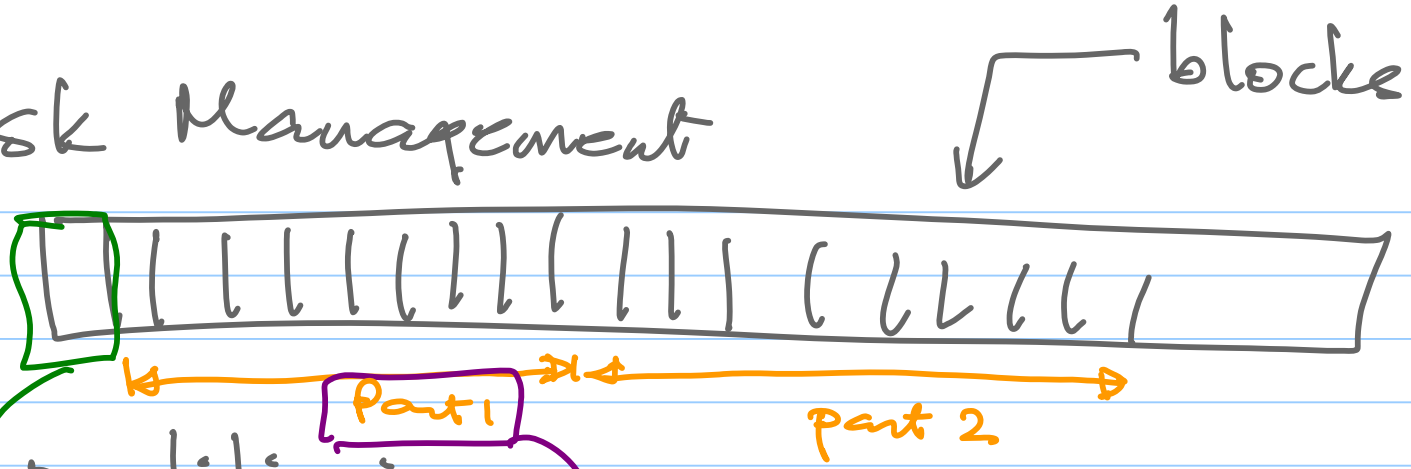
INT

V(disk_int)

Look into sem Q & pick the correct process....

FCFS due to sem_Q.

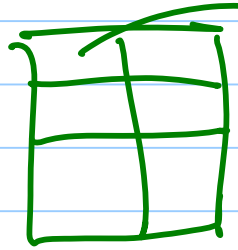
Disk Management



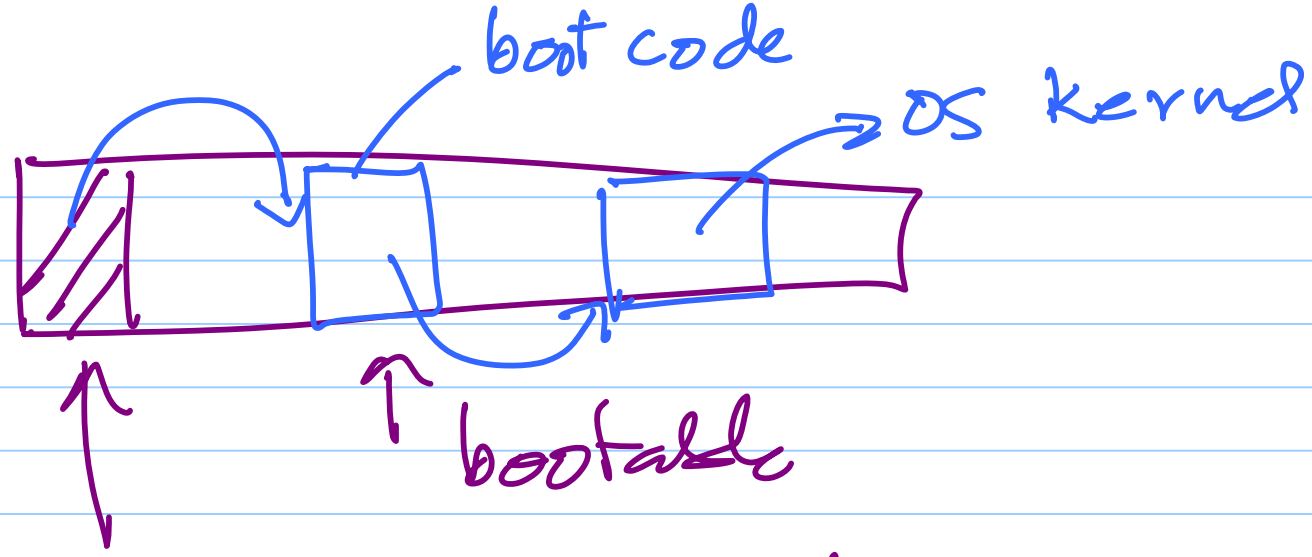
① partitioning

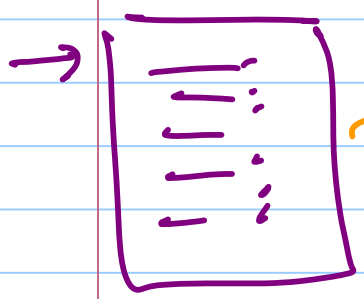
bootable partion

partition table



partion #, name, start block
end block (size) . . .





MBR → master boot record.

boot rom

find partition
find MBR
find boot_code

free disk blocks partition

MBR

"free list"

↳ bit vector

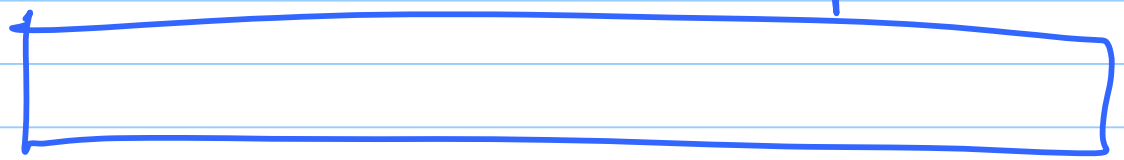
1000 blocks

0 1 2 1000 bits (contiguous)

↳ 0 = not free 1 = free

Swap space

Swap partition



- a swap file → a file (large)
- a " partition → full partition
- a " SPACE → contiguous area in a partition