

2) Infinite amount of mem

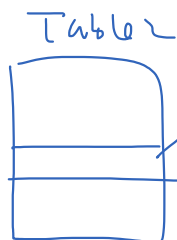
(V.sability)



- no concerns on the availability
- exact location.

3) Sharing

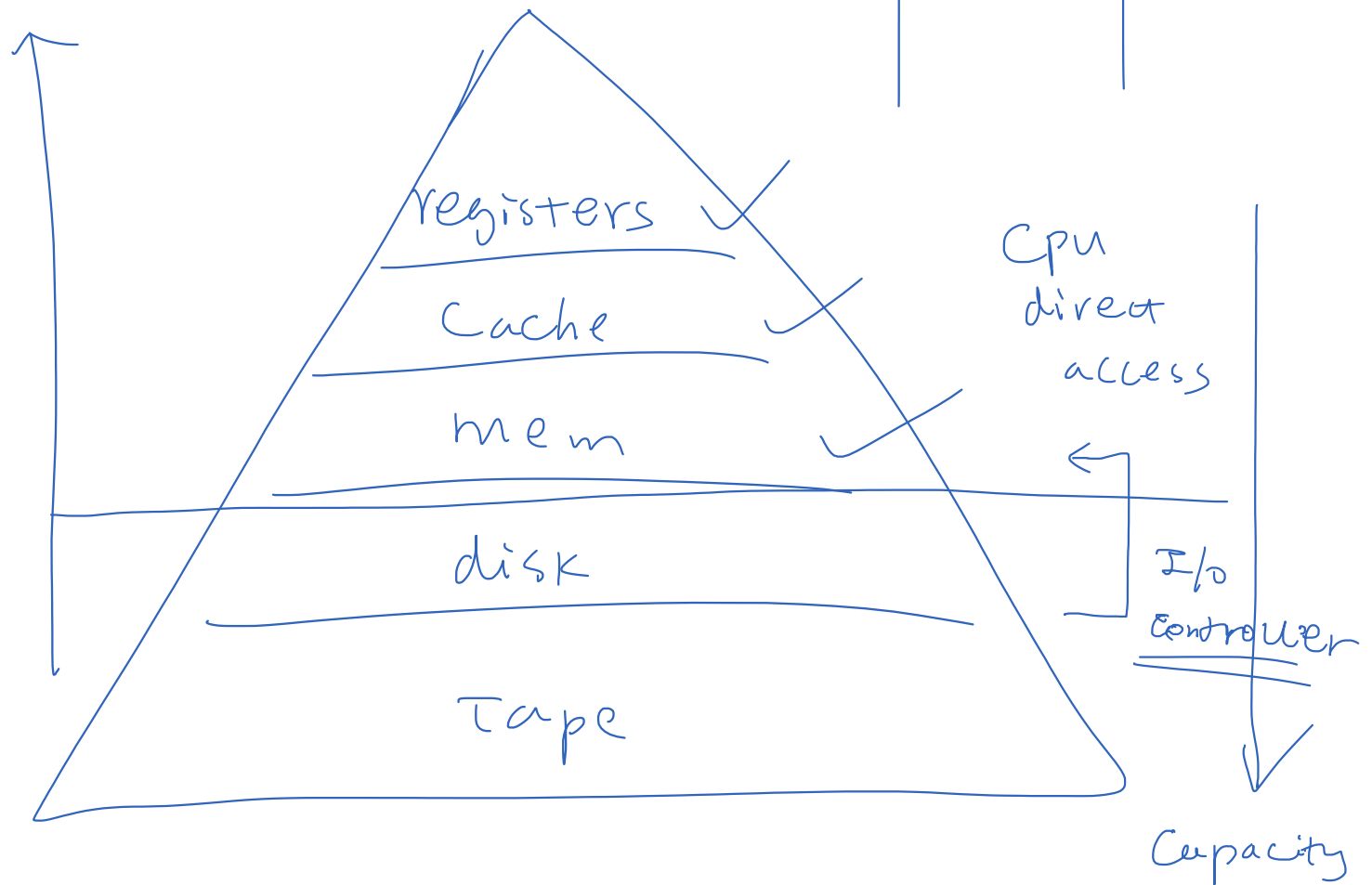
logical address space



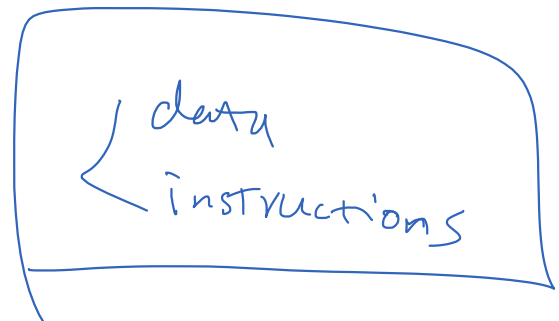
physical mem.

access speed

access speed



Cpu access



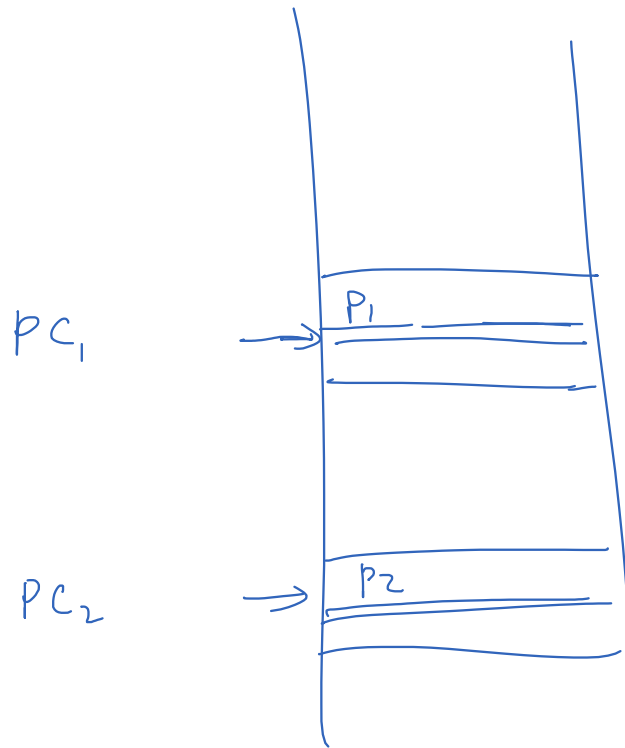
- 1) stored initially on "disk" in the form of "files"

2)

process

Instructions & data  
loaded in mem

Address space



ISA

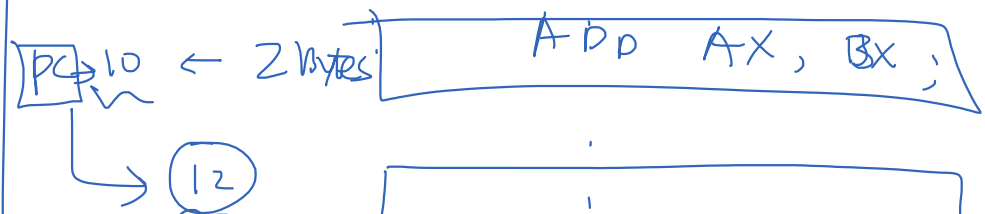
$P_1$

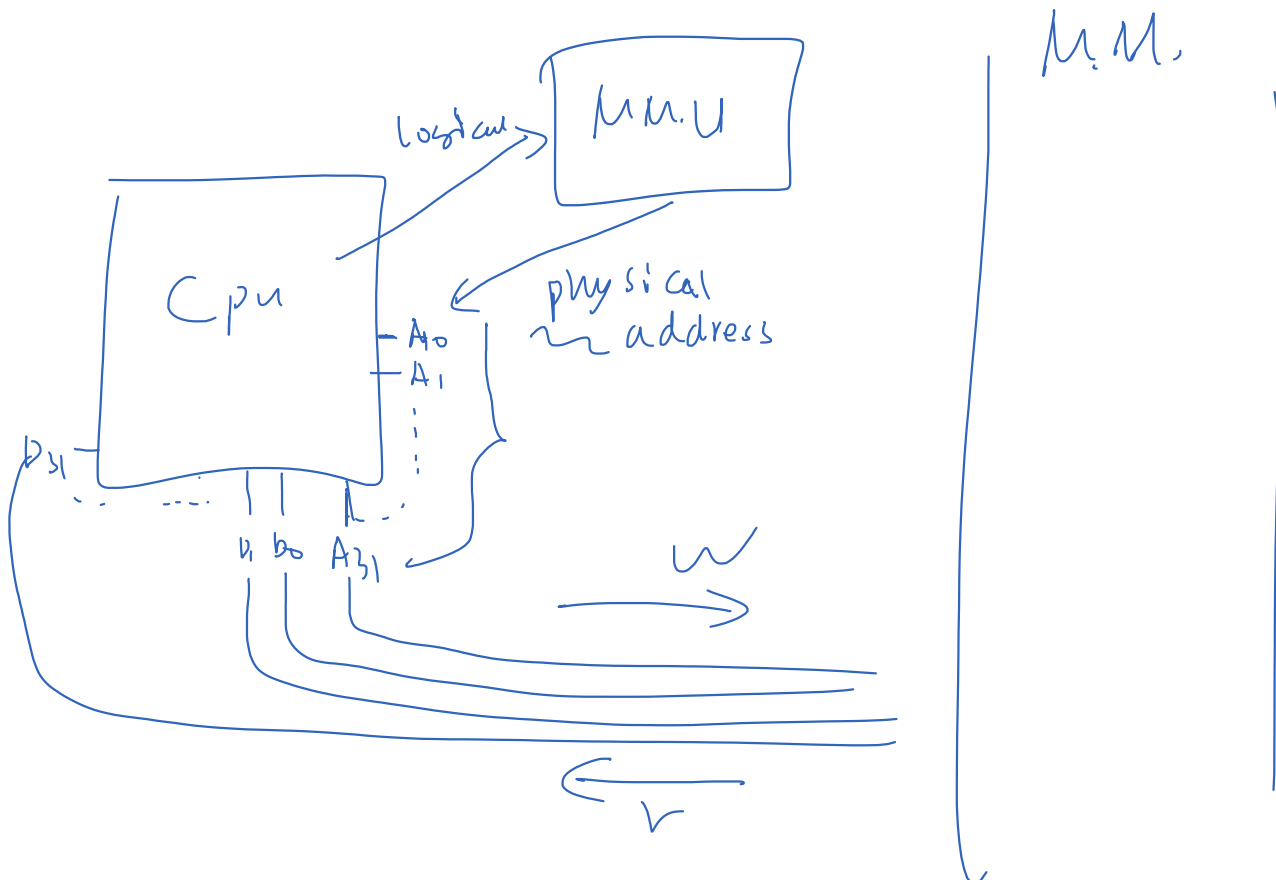
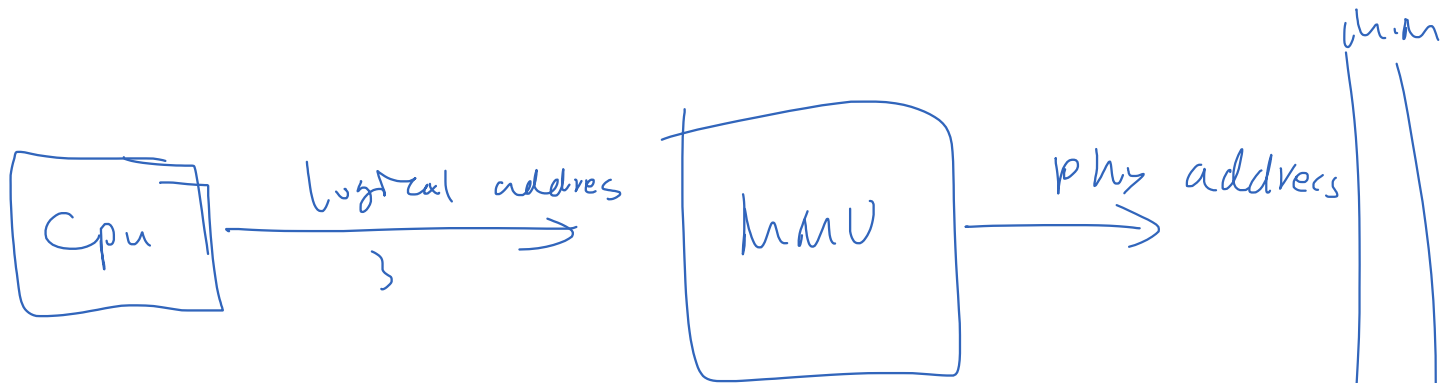
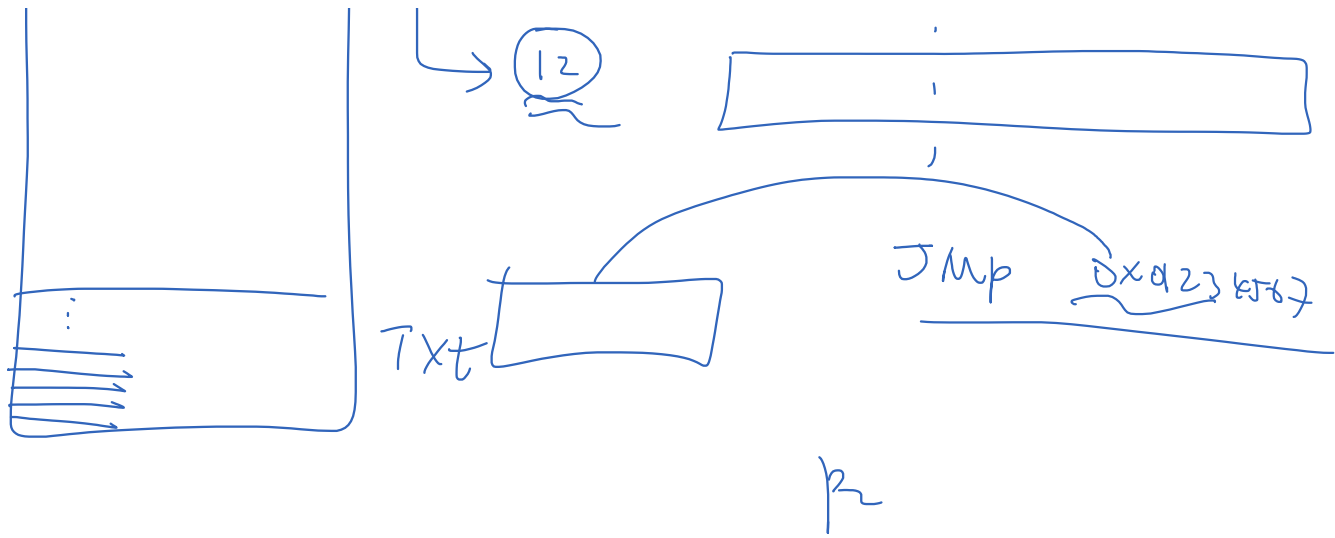
0 PUSH Esp

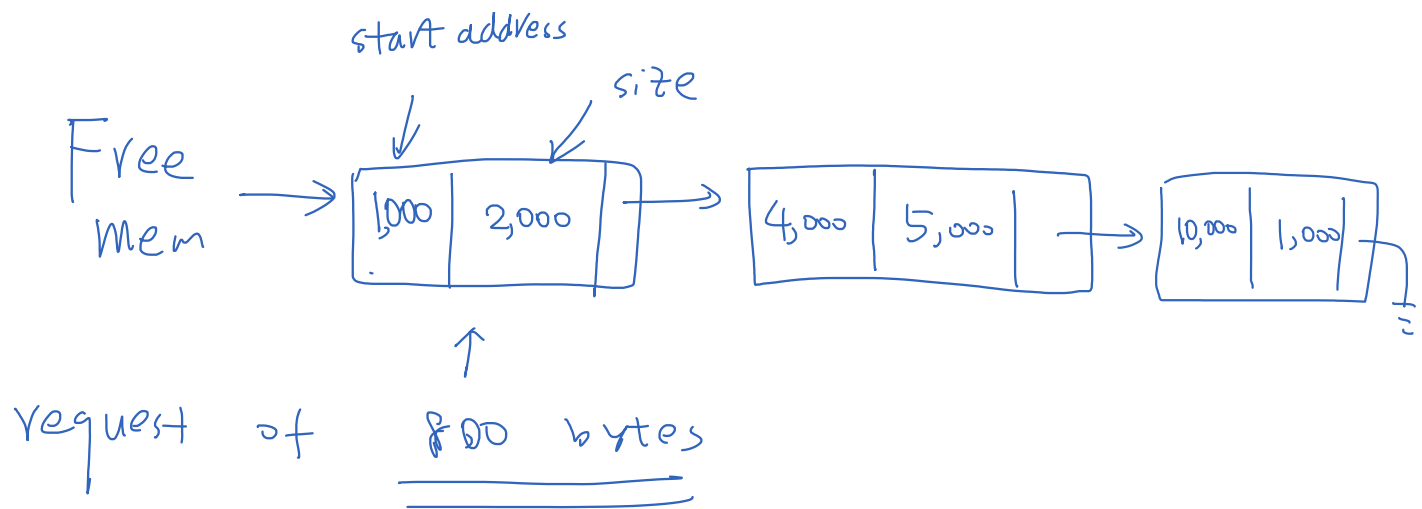
1  

⋮

⋮





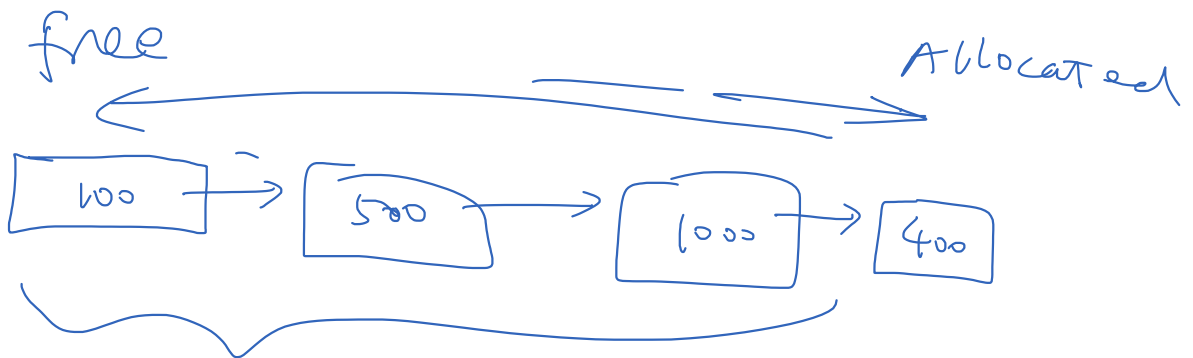


First fit:

Free list:  $(1,000, 2,000) \rightarrow (4,000, 5,000) \rightarrow (10,000, 1,000)$

Best:  $(1,000, 2,000) \rightarrow (4,000, 5,000) \rightarrow (10,000, 200)$

Worst:  $(1,000, 2,000) \rightarrow (4,800, 4,200) \rightarrow (10,000, 1,000)$



Total: 2,000 bytes

request  $r$ : if

$r = 1,500$  } 1,000  
500  
 $1,000 < r < 2,000$

$$\underline{\underline{1000 < r < 2000}}$$

fragmentation

↑  
Compaction

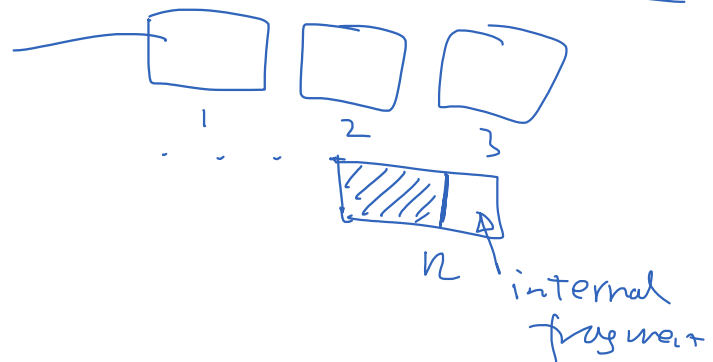
Contiguous allocation  
various sizes

1) remove the constraints

2) make sizes "equal"

$$S \neq n \cdot p$$

$$\left\lceil \frac{S}{p} \right\rceil = n$$



$$\underline{\underline{p = 4KB}}$$

~~program~~

process 1

process 2

20KB

32KB

n = 5

n = 8

process 2 terminates

process 1 arrives,

P<sub>1</sub> can use

the mem what P<sub>2</sub> just used

page size 4KB in logical address space  
↓

frame w/ equal size (4KB) in phy mem.

physical mem 1GB

$$\begin{aligned}\frac{1GB}{4KB} &= \frac{1K \cdot 1MB}{4KB} = 256K \\ &= \frac{1K \cdot 1K \cdot \cancel{1KB}}{4KB} \\ &= \frac{1K \cdot 256 \cdot \cancel{4} \cdot \cancel{1KB}}{\cancel{4KB}}\end{aligned}$$

4KB page size

physical mem 4MB

in total there are

1K frames.

a process size of 512KB



then it has  $\frac{512KB}{4KB} = 128$   
pages.

Contiguous Allocation  
OS maintains

- 1) Where in the phy mem, & how large is allocated to which process?
- 2) list of free partitions  
    ↑  
    (start, size)

Paging

OS will use

- 1) page table
- 2) bit map to represent the free mem

1. 2. 3.



1 bit w/ 0, or 1

4GB phy mem w/ page size  
of 4KB

So we need 256K bits



32K Bytes

17 page