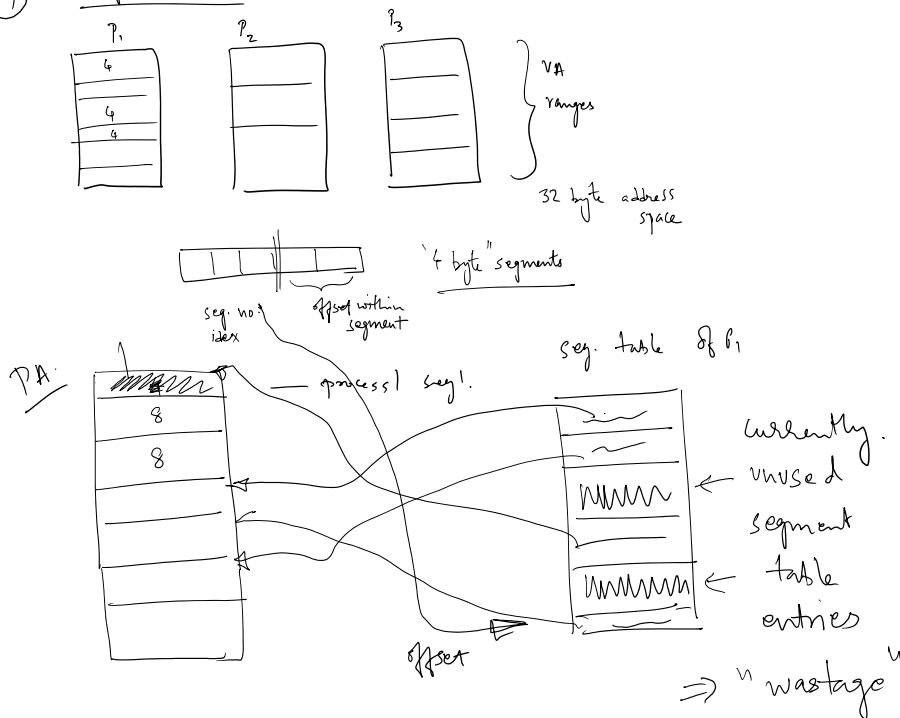


Paging

- ~ # memory translation reqs. ($VA \rightarrow PA$)
1. fast translation
 2. OS state for translation (mem. overheads) should be minimal. $\rightarrow 0$
 3. isolation & protection. sharing
 4. utilization of memory should be high.

1) # segmentation



① \Rightarrow increase in overheads.

$\frac{4GB}{1KB} \sim$
w/ 4 byte table entries

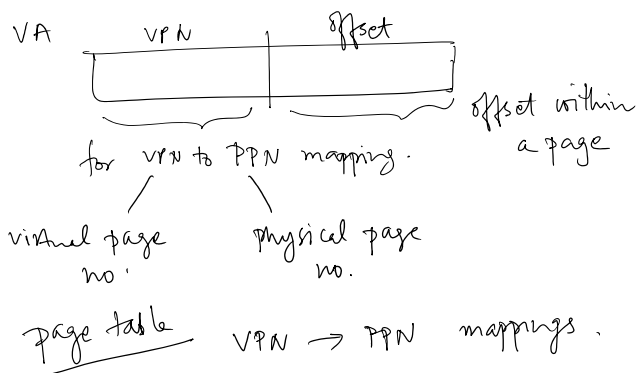
② contiguous mem. for the segment table.

③ external fragmentation.

④ finer \longleftrightarrow coarser segments
 - large tables \longleftrightarrow smaller tables
 - good control on allocations \longleftrightarrow low mem. utility

2) paging

~ all allocation is in terms of fixed sized pages $\begin{cases} 1KB \\ 4KB \end{cases}$



2.2

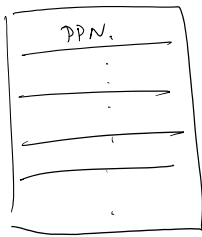
single-level paging

+ve

- overcomes external fragmentation

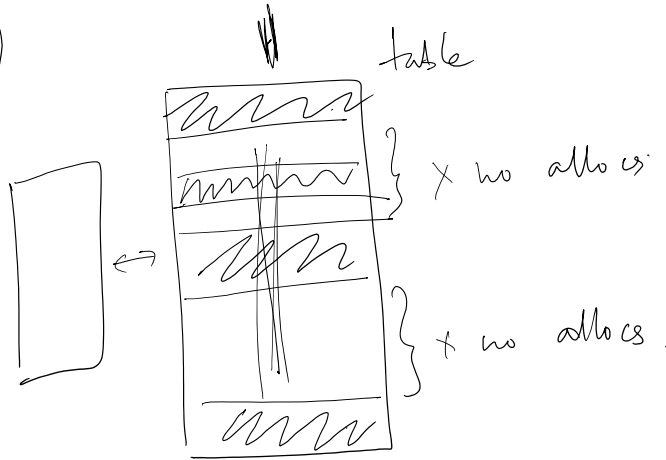
PPN.

- fragmentation



- fragmentation
- contiguous alloc for tables
- large tables

2.b



multi-level
hierarchical
paging.

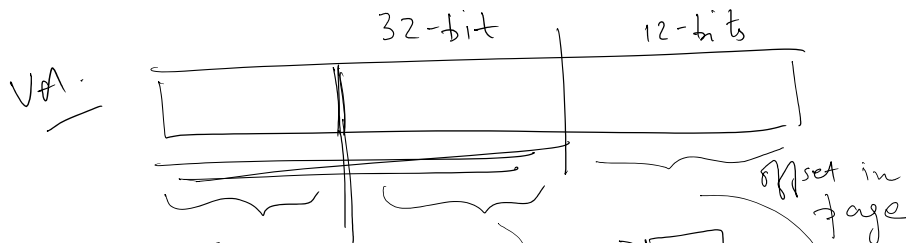
- directory — stores info. about
page table pages

- page table pages 2 page table entries
(Storing mapped PPNs)

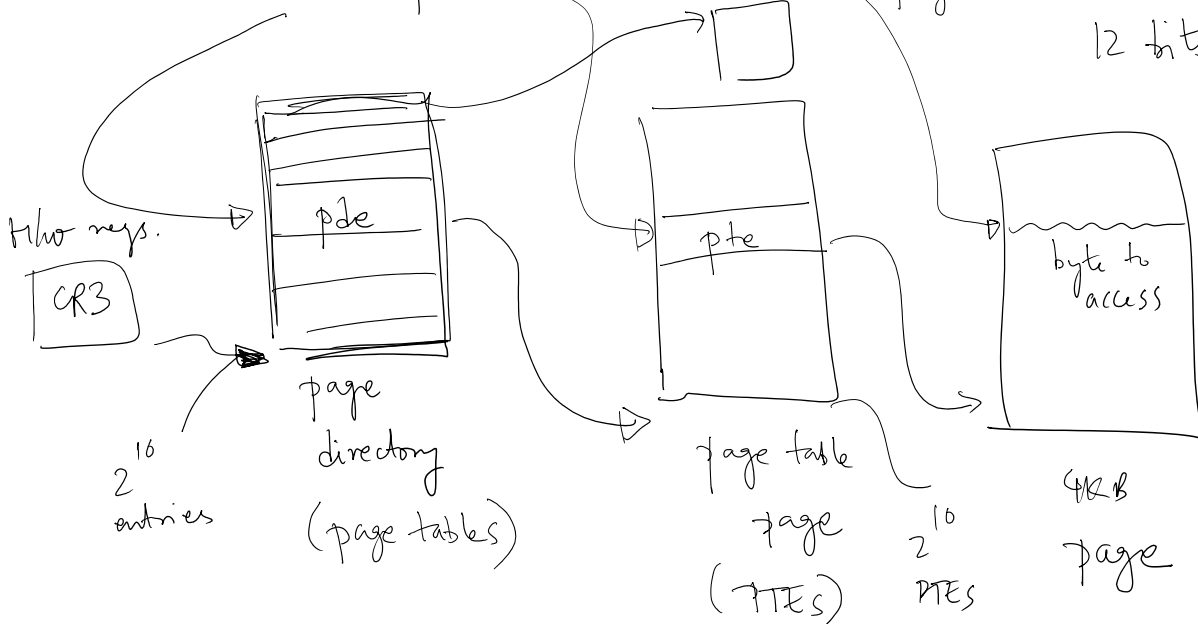
~~4KB~~
~~4KB~~

2^{32}

⇒ PTEs.



4KB pages
4096 bytes
↓
12 bits



(PTEs) 1Ks

32 bit VA, 4KB ~ 4096 bytes page.

PDE/PTE ~ 4 bytes

$$\frac{2^{12}}{2^2} \text{ --- } \frac{2^{10} \times 2^{10} \times 2^{12}}{2^2} \sim 2^{32} \text{ bytes}$$

