CS 219 Lecture 13

~ memory virtualization.

& the address space abstraction.

design 0 ~ temporal sharing

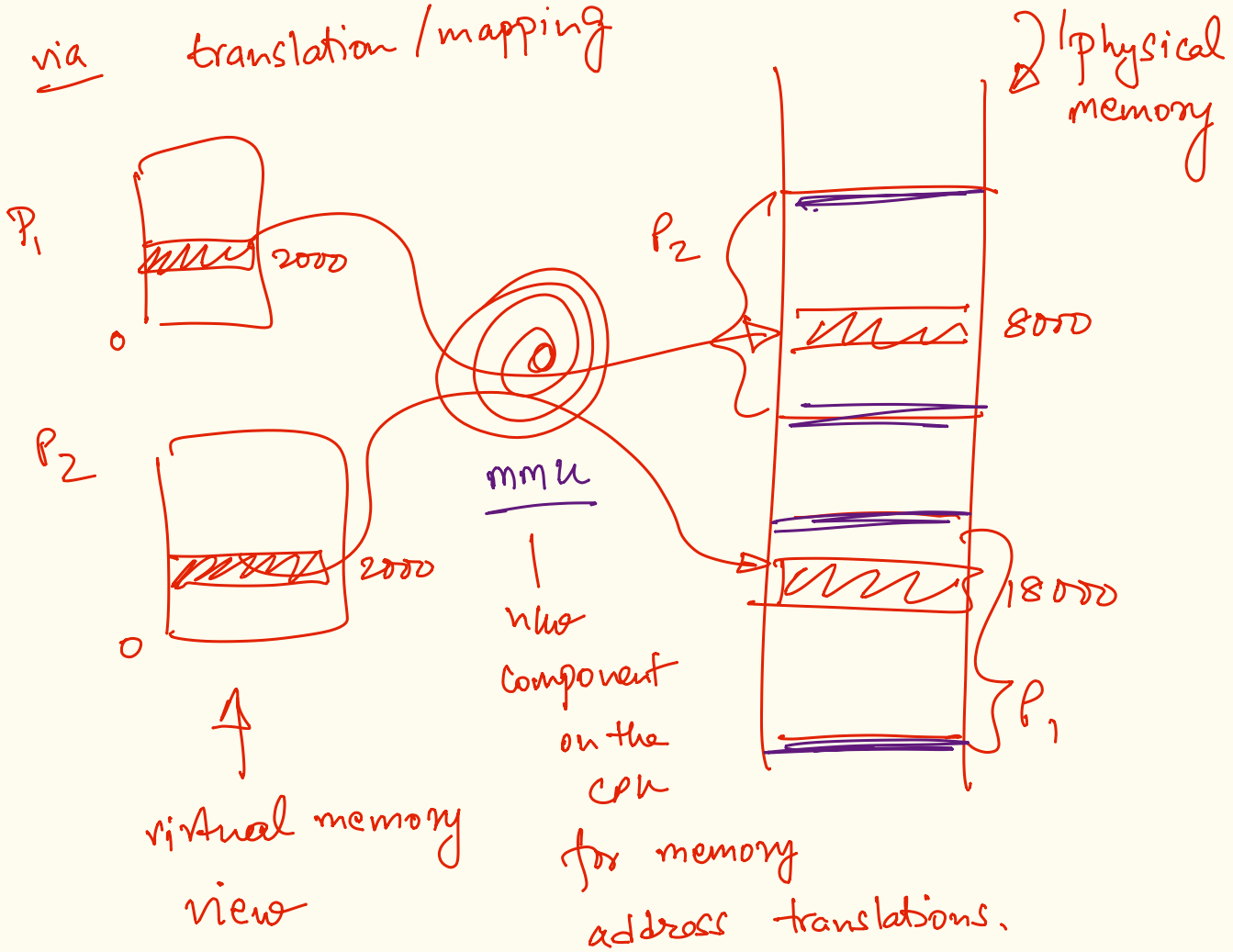
design 1 ~ spatial sharing

reqs:
- zero starting address
- full address range

design 2: segmentation

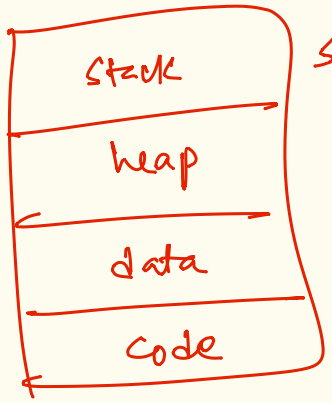
~ decouple addressing from allocation

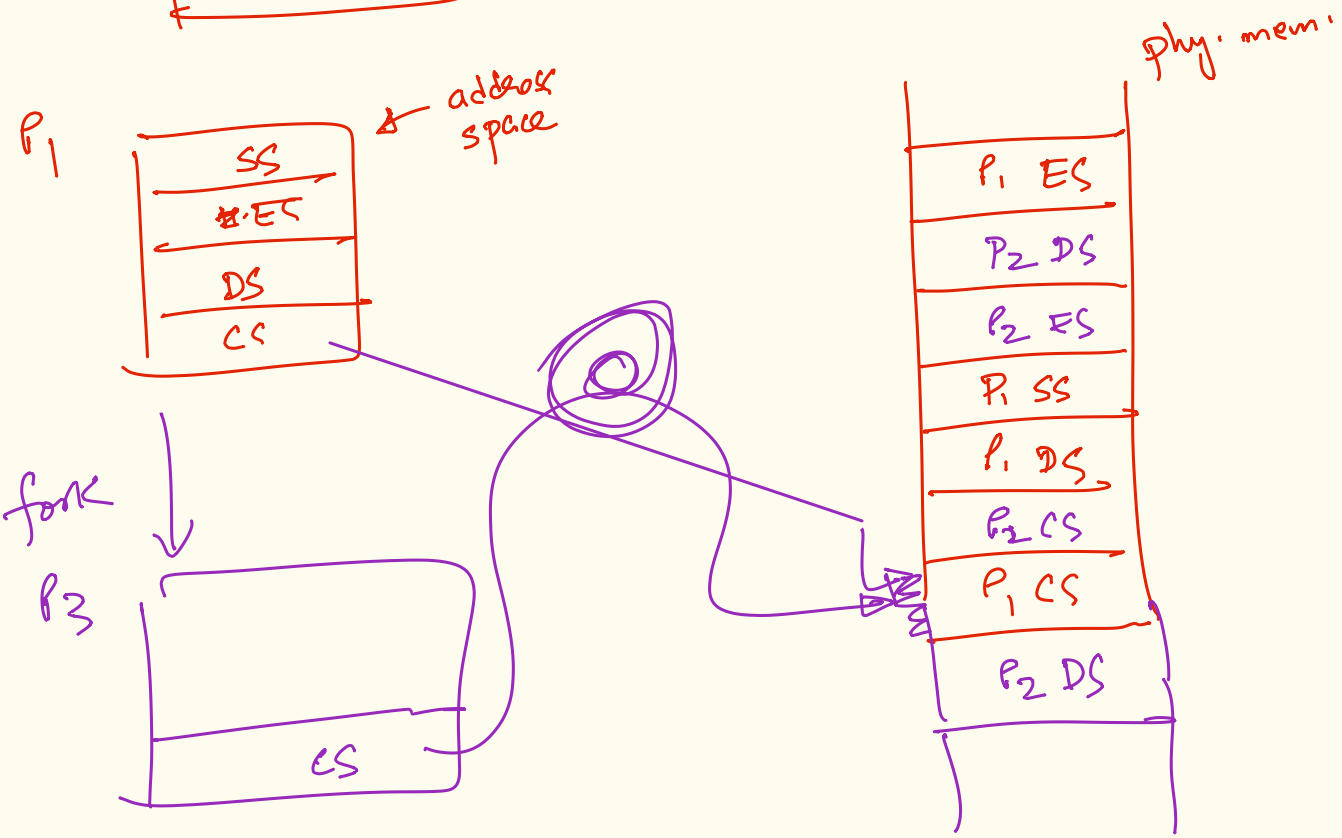
via translation / mapping



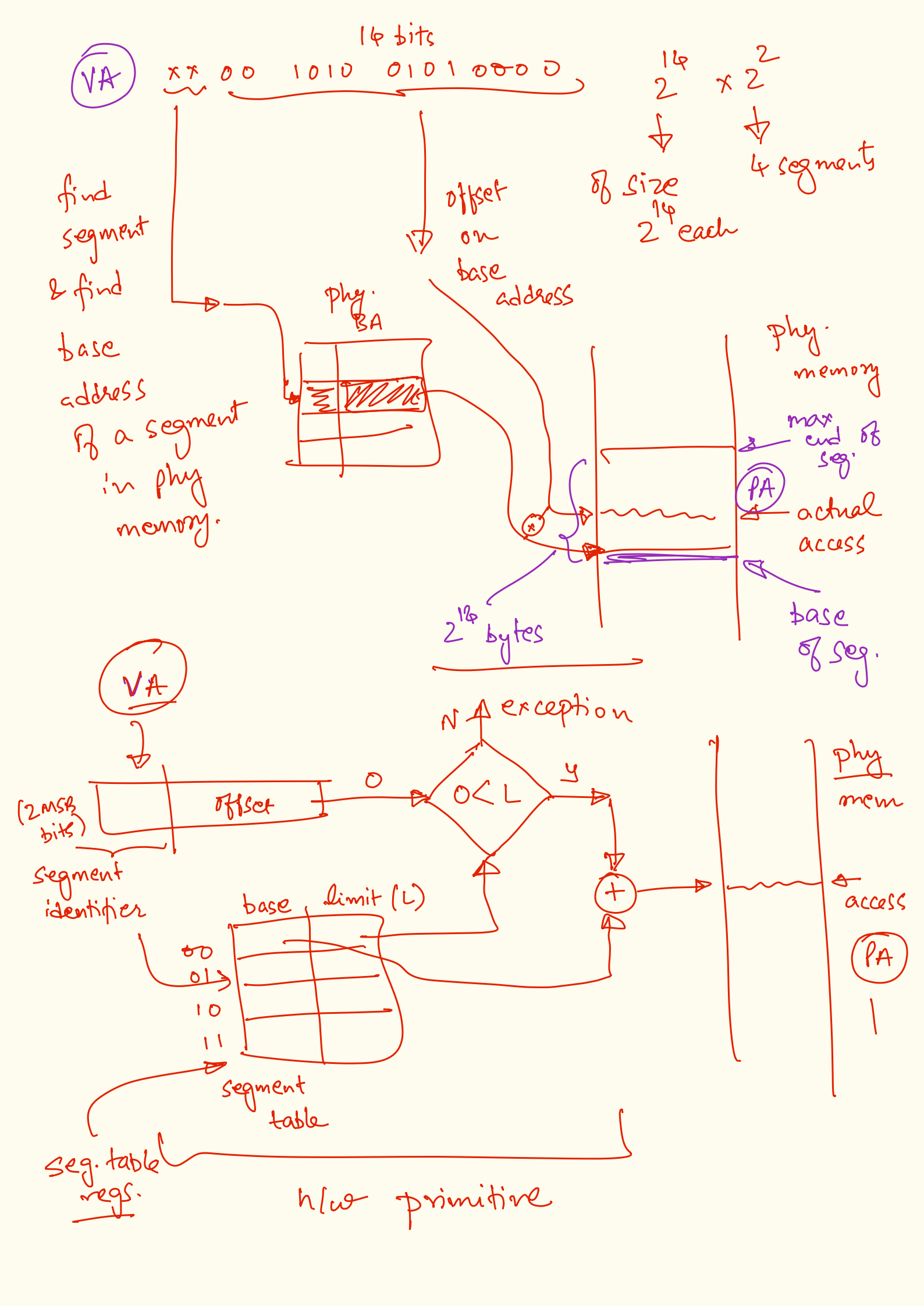
segmentation

- divides the address space into segments.
  - segment a logical memory region.





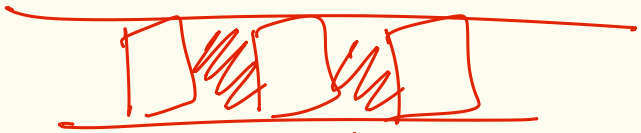
16-bit address range. ← process


16 bits
VA
xx 00 1010 0101 0000
$2^{14} \times 2^2$
2^{14} size each
4 segments
find segment & find base address of a segment in phy memory.
offset on base address
phy. BA
phy. memory
max end of seg.
PA
actual access
2^{16} bytes
base of seg.
VA
(2 MSB bits)
offset
segment identifier
O
O < L
N
exception
Y
base
limit (L)
00
01
10
11
segment table
seg. table regs.
h/w primitive
phy mem
access
PA
1

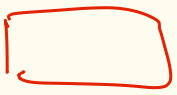
-ves: fragmentation ~ reserved space memory unused!

external

internal



free free



need for allocation

bigger than individual free regions.

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design 3: paging. ~ paged memory

↳ changing granularity of all allocations to a page ~ fixed "small" sized memory region

eg: 4 KB.