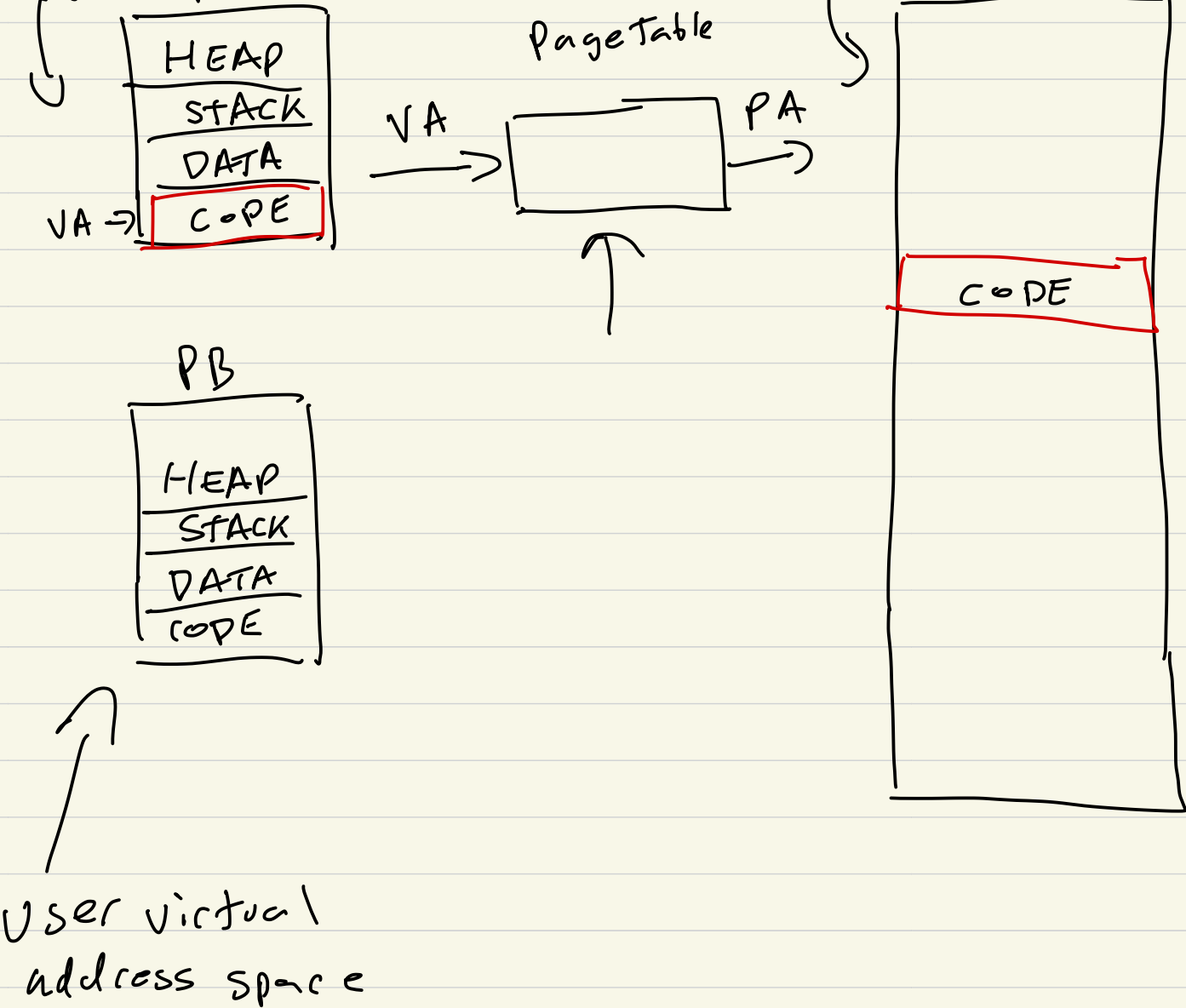
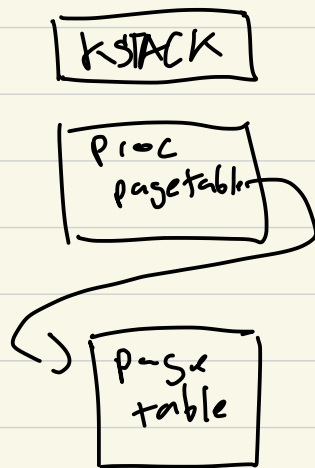
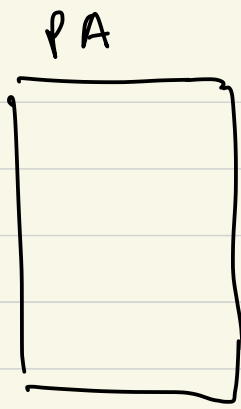


CS 326-01 PageTables

VA virtual addr
PA

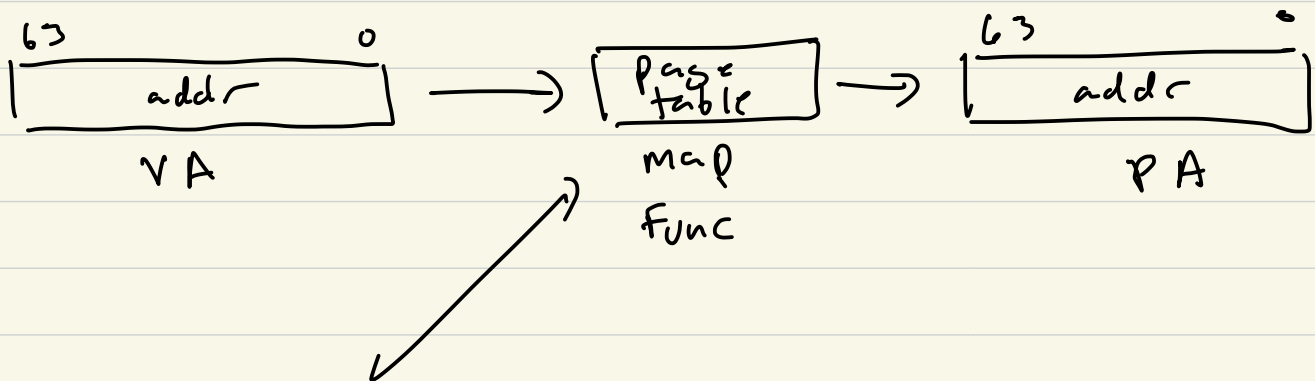
physical
addr
RAM





Translations

an address is 64 bits

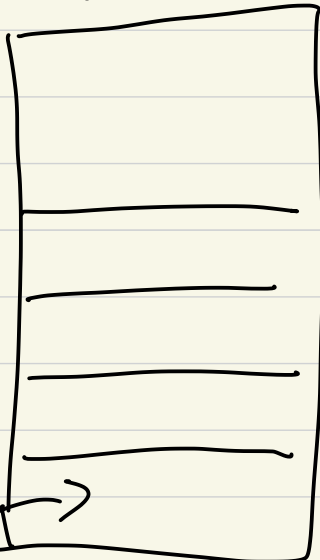


(VA₀, PA₀)

(VA₁, PA₁)

264

Virtual
addr space



pages 4KBS

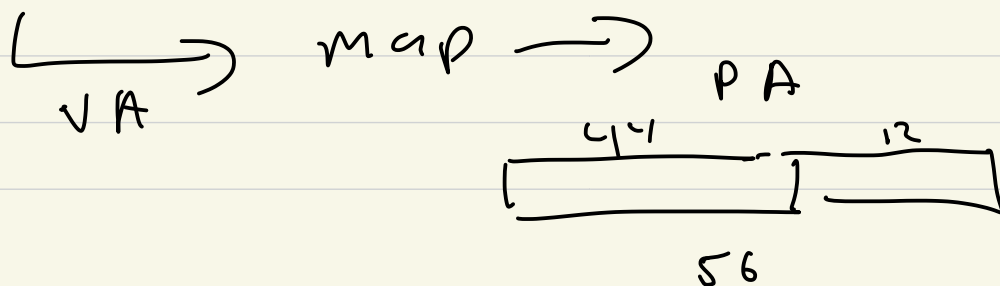
$$2^{10} = 1024$$

$$2^{11} = 2048$$

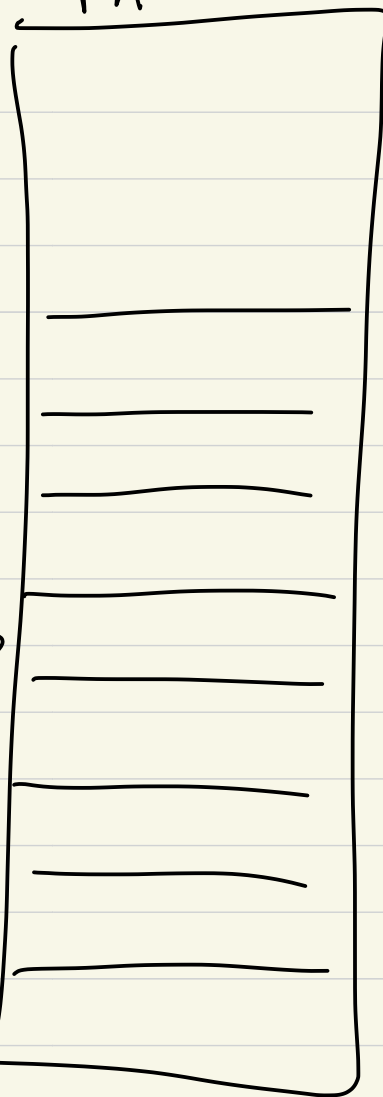
$$2^{12} = 4096$$

Now we are
mapping

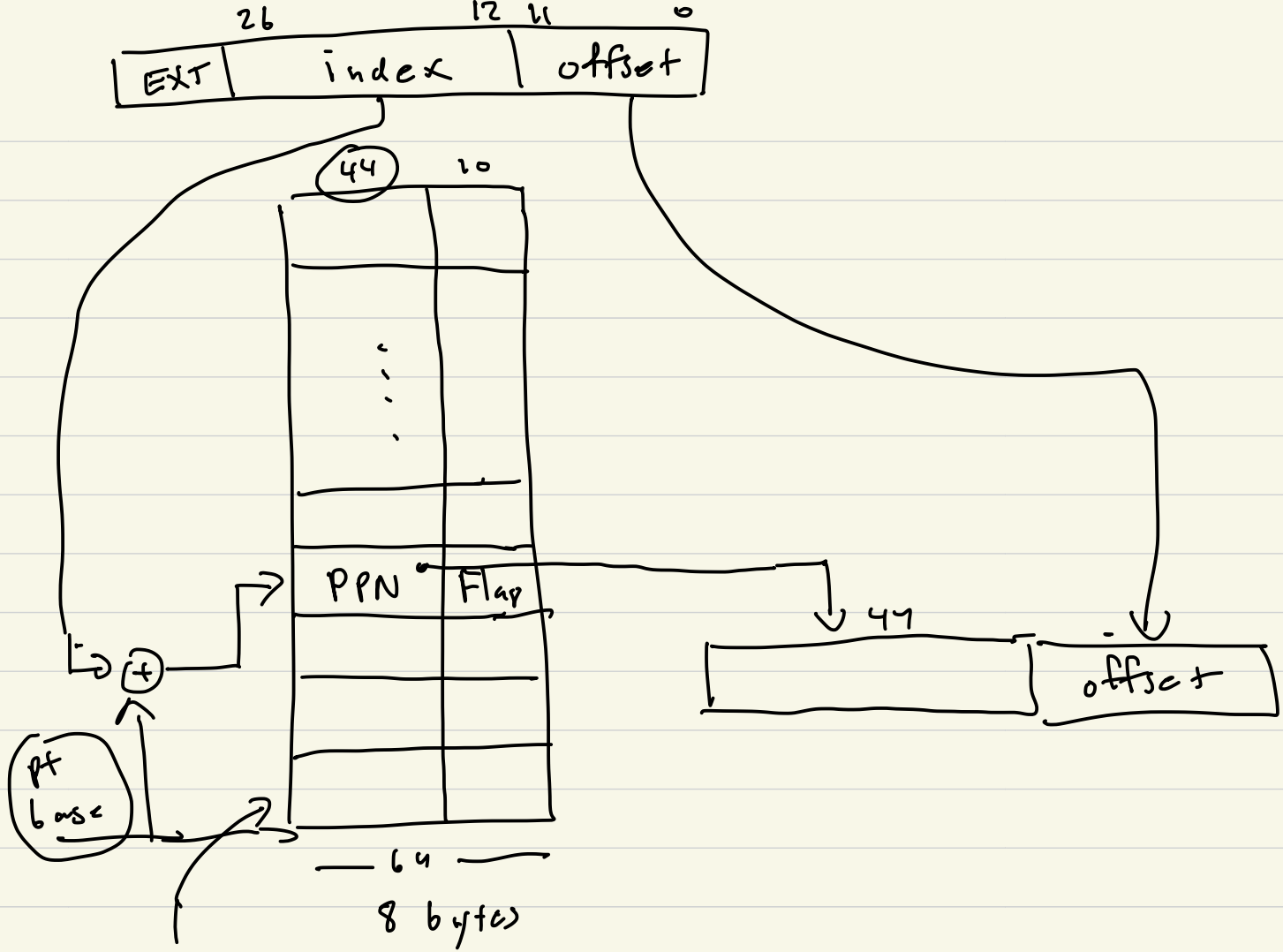
virtual pages into physical page frames



RAM



page
frame
4KBS



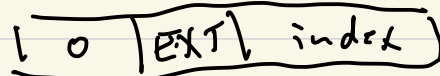
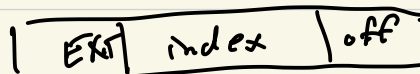
PTE page table entry

VA int *p;

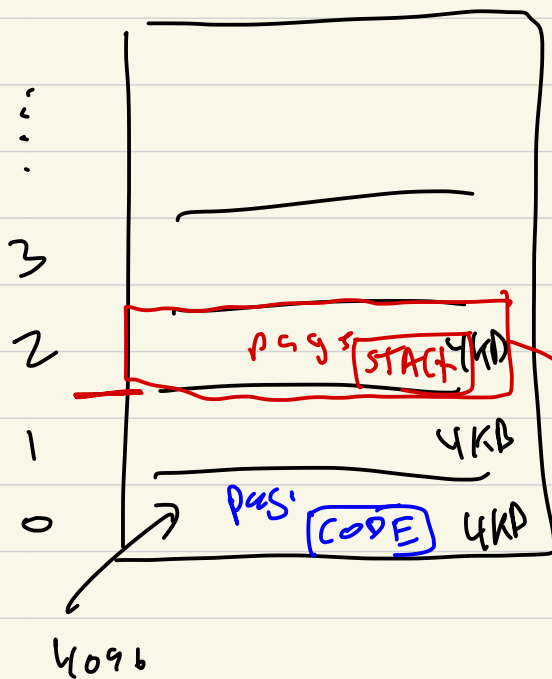
$$\text{index} = p / 4096$$

=

$$\text{index} = p \gg 12$$

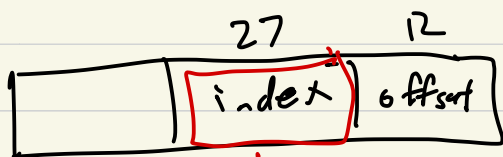
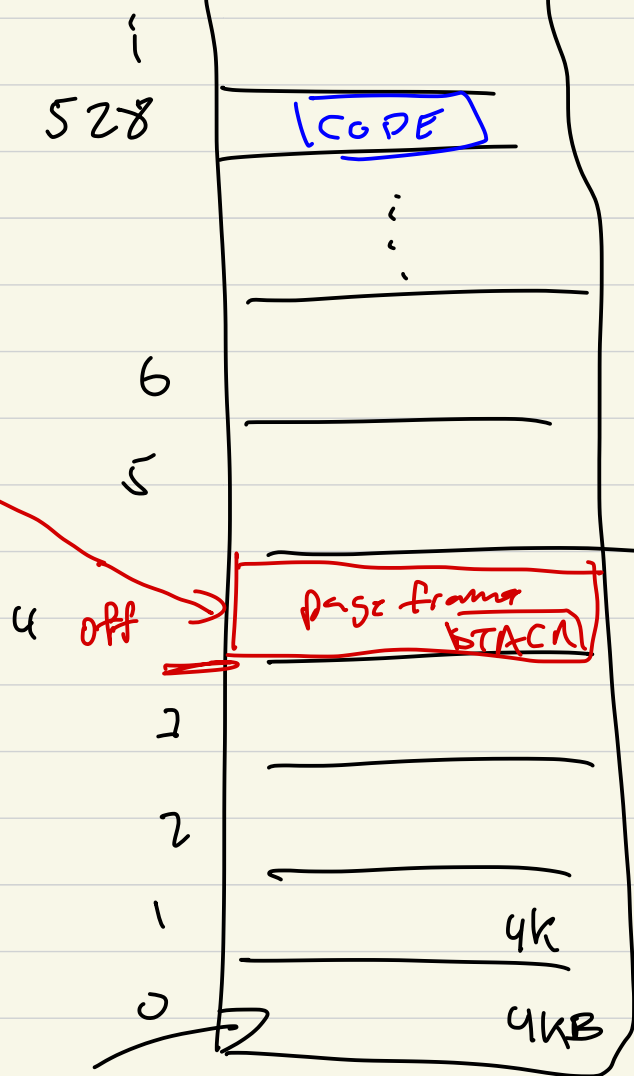


index

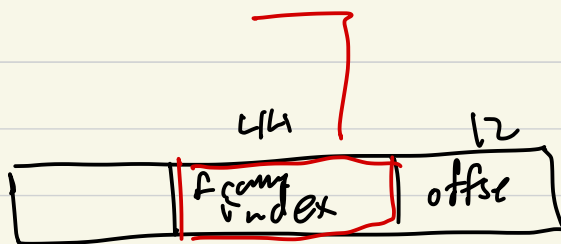


Frame index

RAM



PT → Frame index 4096



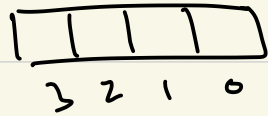
(page #, frame #)

(2, 4)
↑

index bits = 27

How many entries in the page table?

4 bits

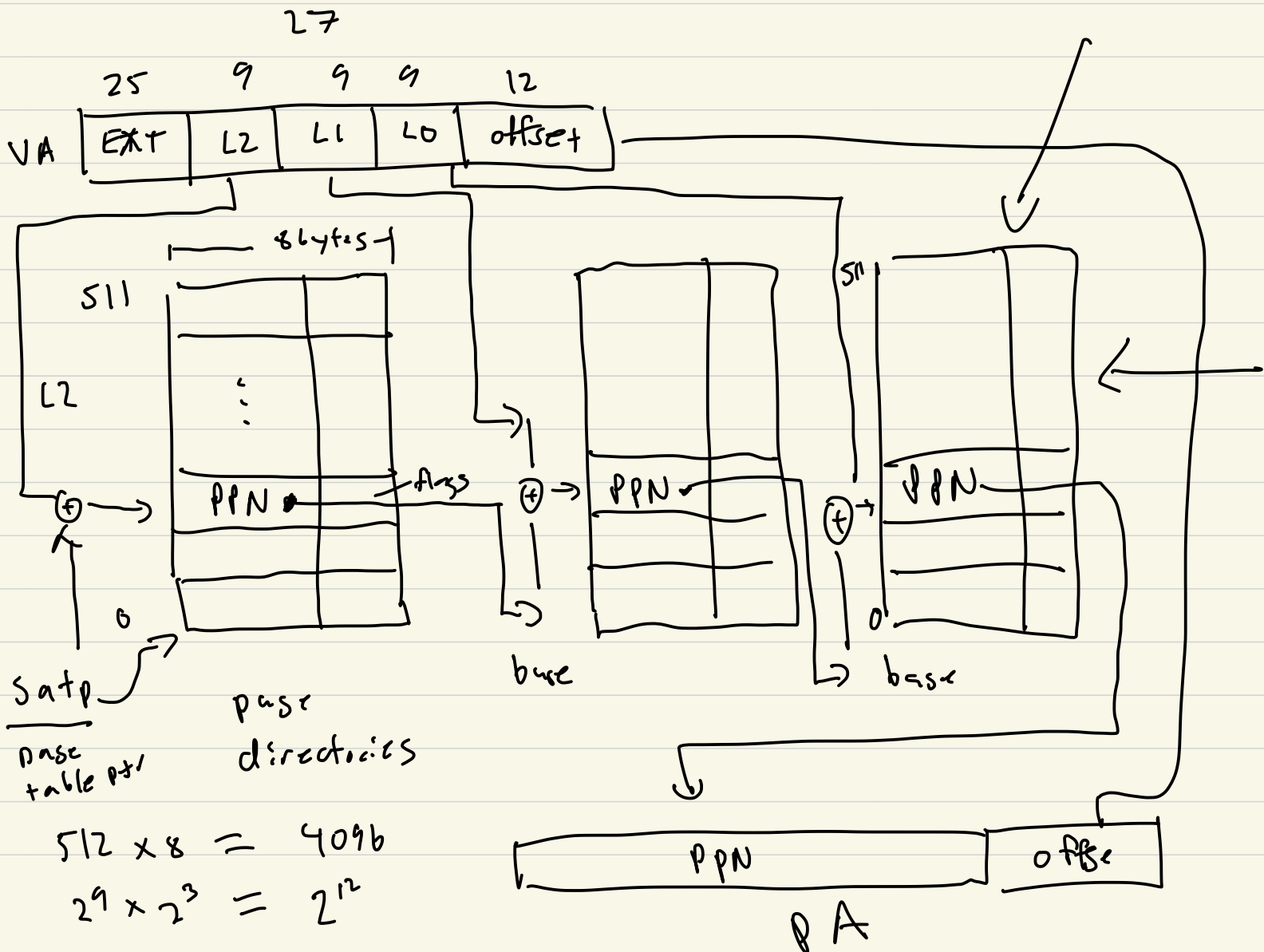


$$2^4 = 16$$

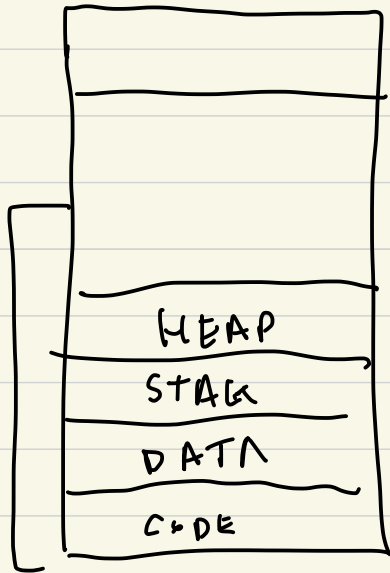
$$\text{sizeof(PTE)} = 8 \text{ bytes}$$

$$2^{27} * 8$$

$$2^{27} * 2^3 = 2^{30} = \underline{1 \text{ GB}}$$



PA



512 pages

512 x 4kB

$$2^9 \times 2^{12} = 2^{21}$$

2 MB