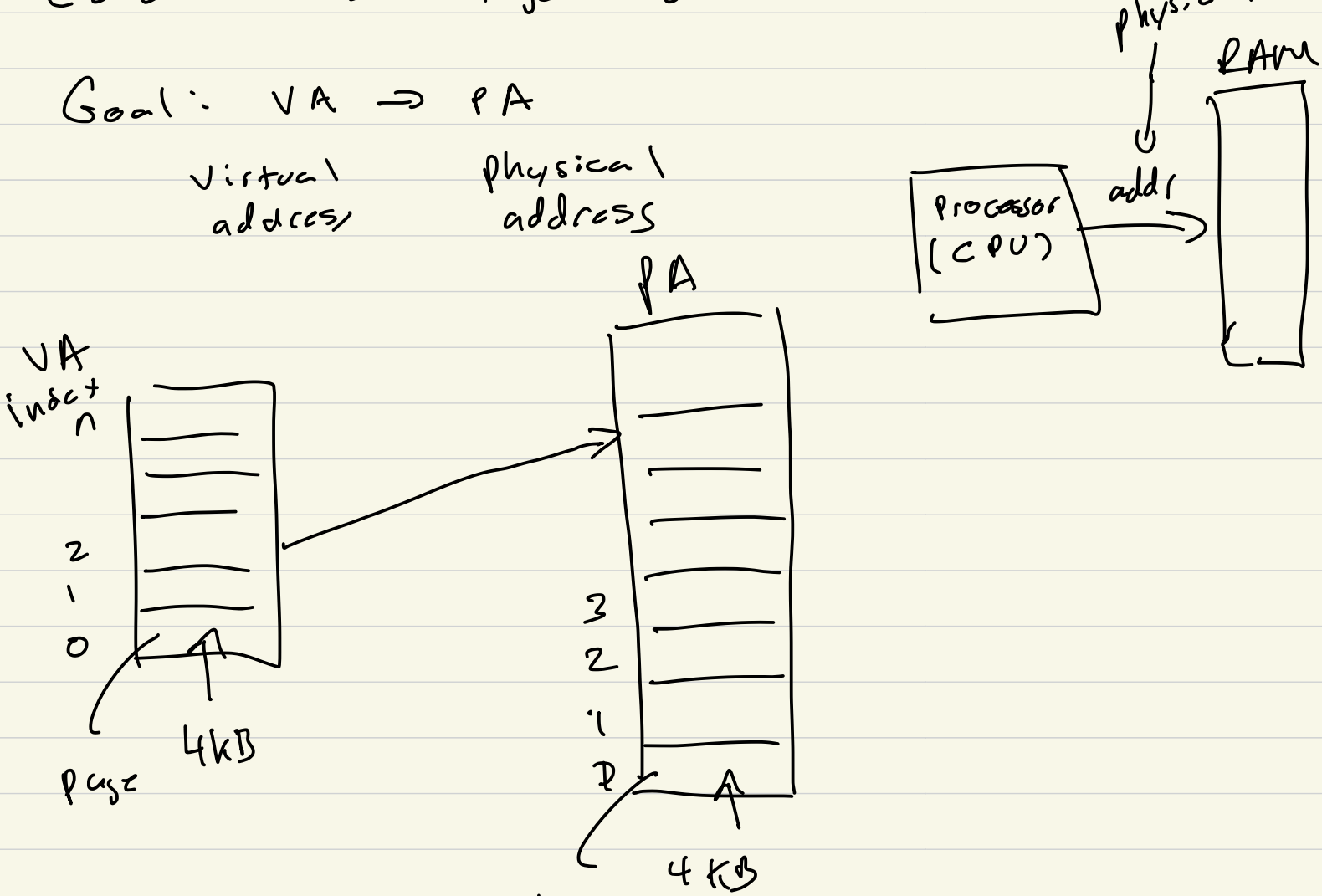
# CS 326-01 Lab PageTables in xv6

Goal: VA → PA



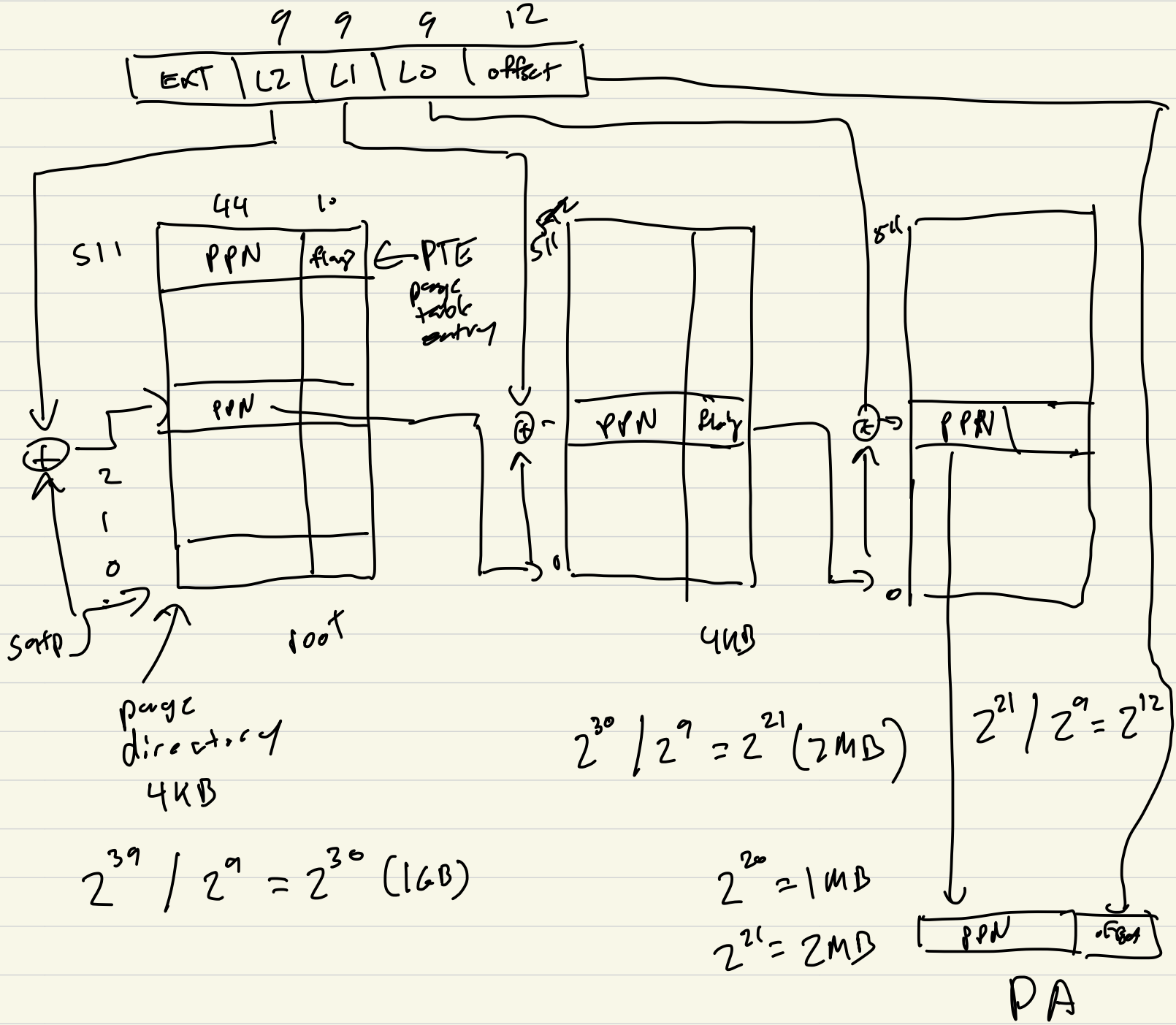

if one page table array, then the page table would take 1 GB RAM

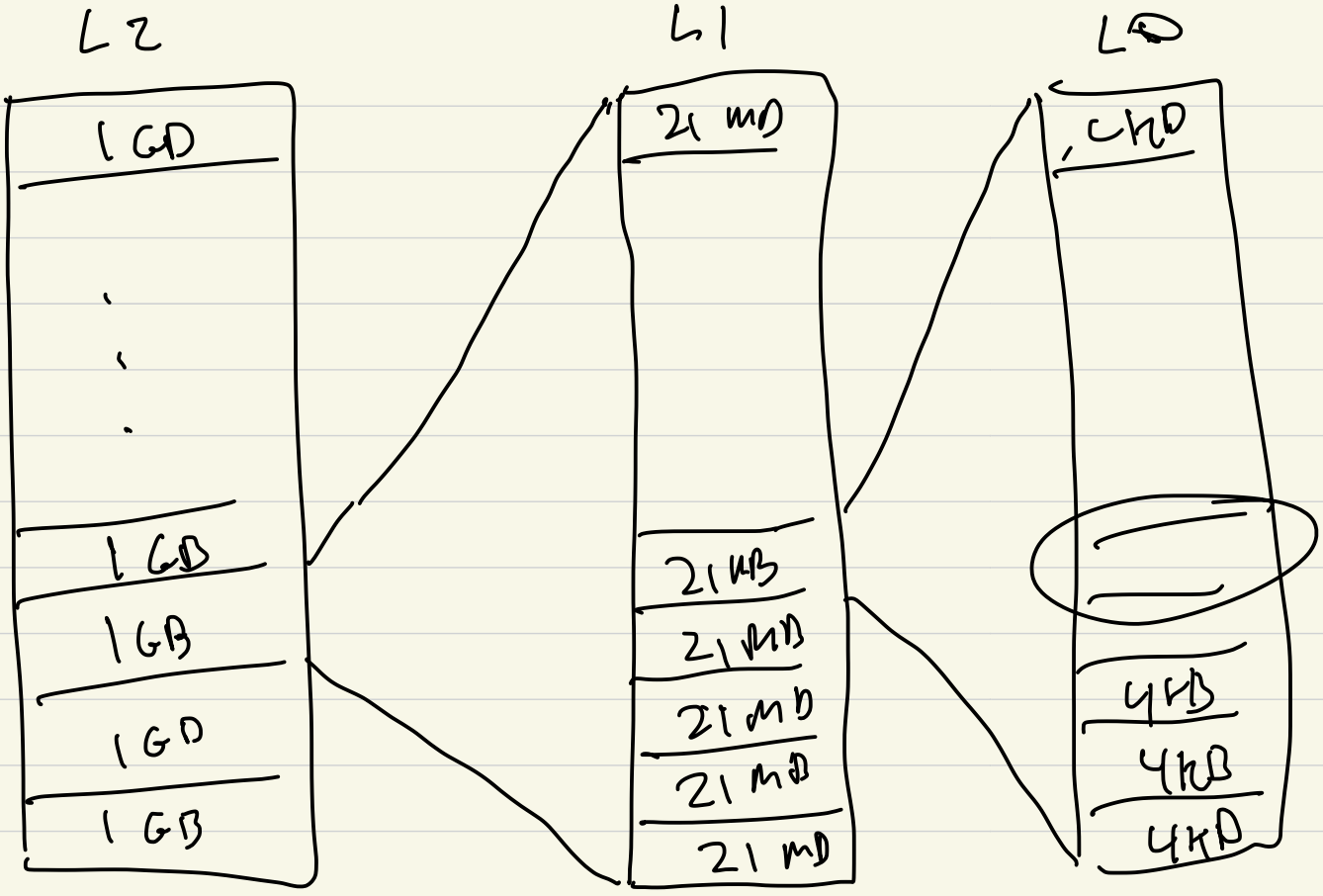
$2^{27}$ pages

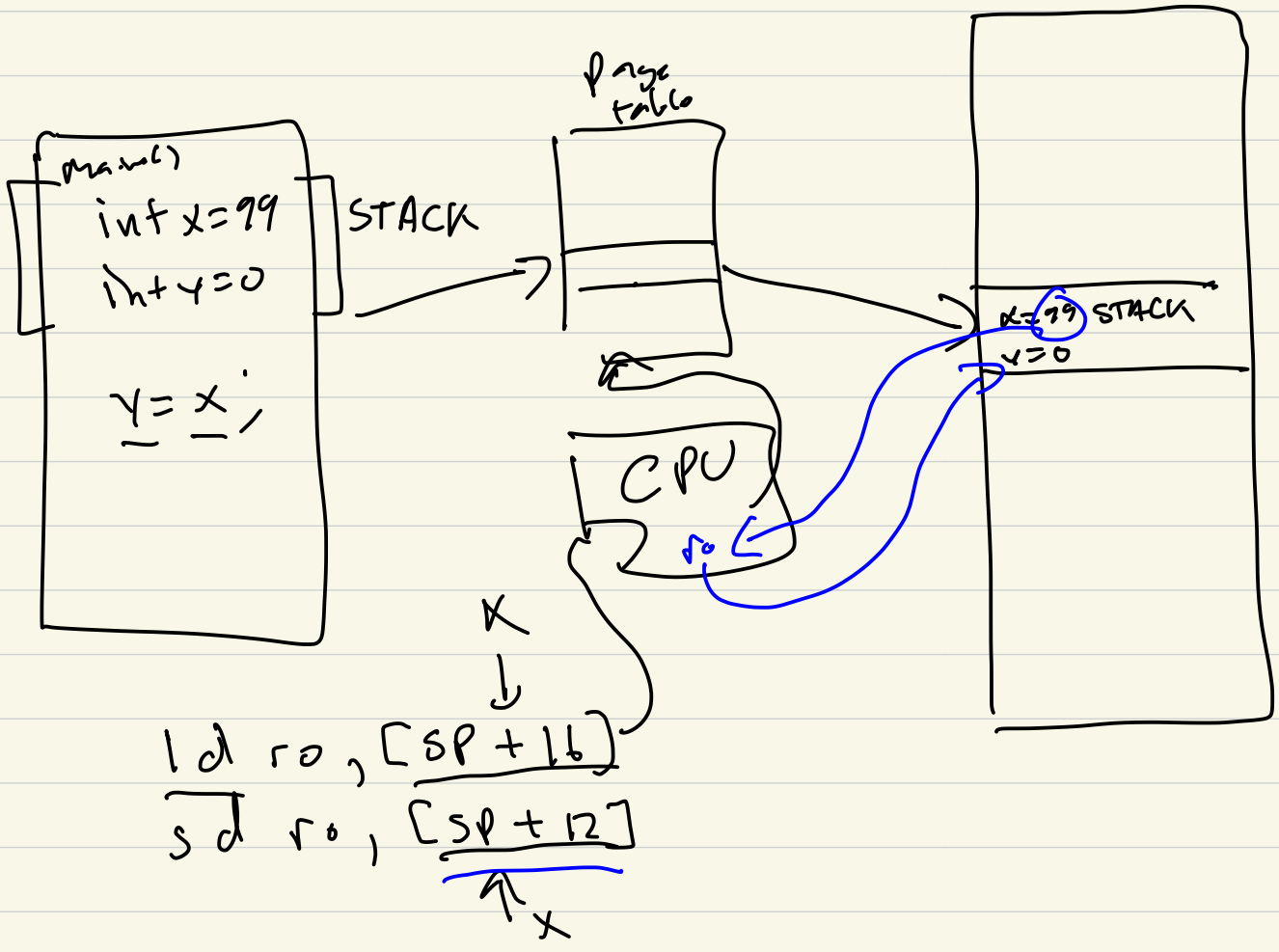
$2^{27} \times 2^{12} = 2^{39}$ (SV39)

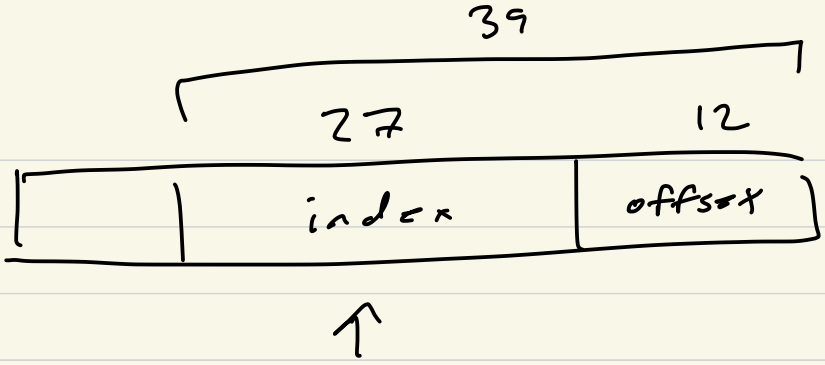
$2^{39} / 2^{30} = 2^9$ GB (1GB)

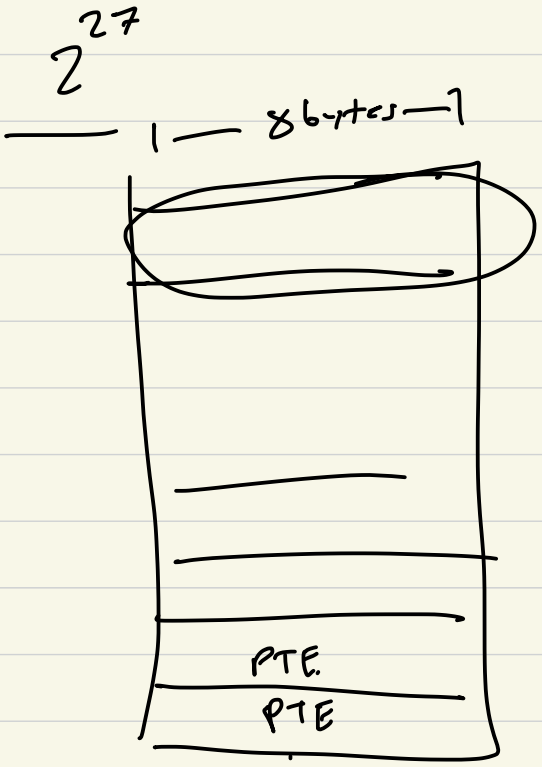
512 GB




L2
L1
L0
1GB
1GB
1GB
1GB
2MB
2MB
2MB
2MB
2MB
4KB
4KB
4KB


main()
int x=99
int y=0
y=x;
STACK
Page table
CPU
r0
x=99
STACK
y=0
x
ld r0, [SP+16]
sd r0, [SP+12]
x




$$2^{27} \times 2^{3} = 2^{30} = 1\,GB$$

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$$2^{12} + 512 \times 2^{12} + 512 \times 512 \times 2^{12}$$

$$2^{12} + 2^{9} \times 2^{12} + 2^{9} \times 2^{9} \times 2^{12}$$

$$2^{12} + 2^{21} + 2^{30}$$

$$4K + 2MB + 1GB$$