CS 208

7 Mar 2022

Monday

VM

0

Pages

0

1

2

3

$2^{64}-1$

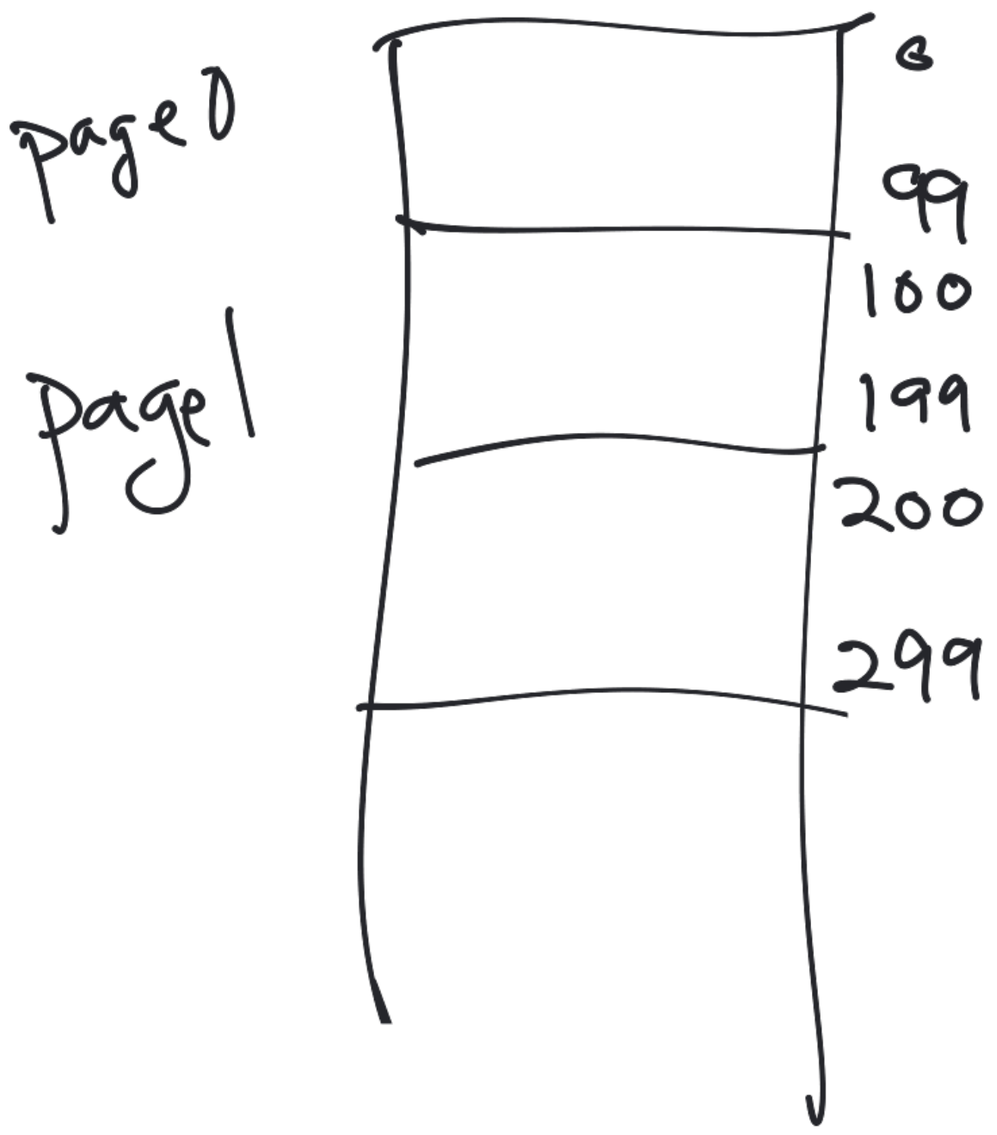
Page table

Phys. Mem.

Pages

array of pt_entries

Pretend base ten, 4080 bytes of memory
100-byte pages



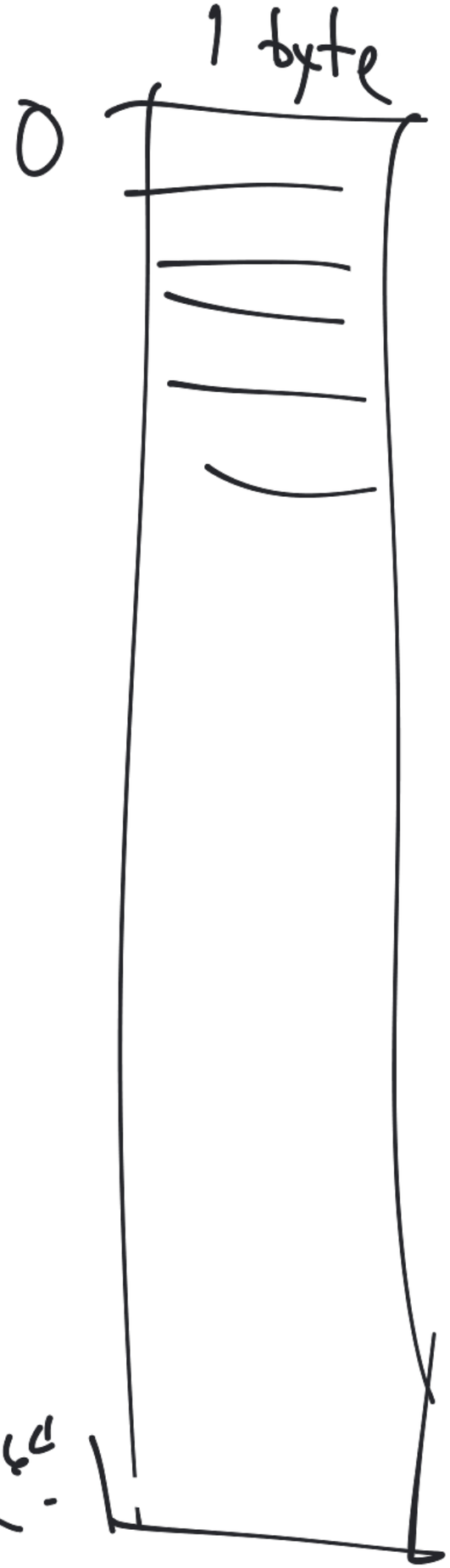
40 pages

page #

A = 3127 ← byte offset

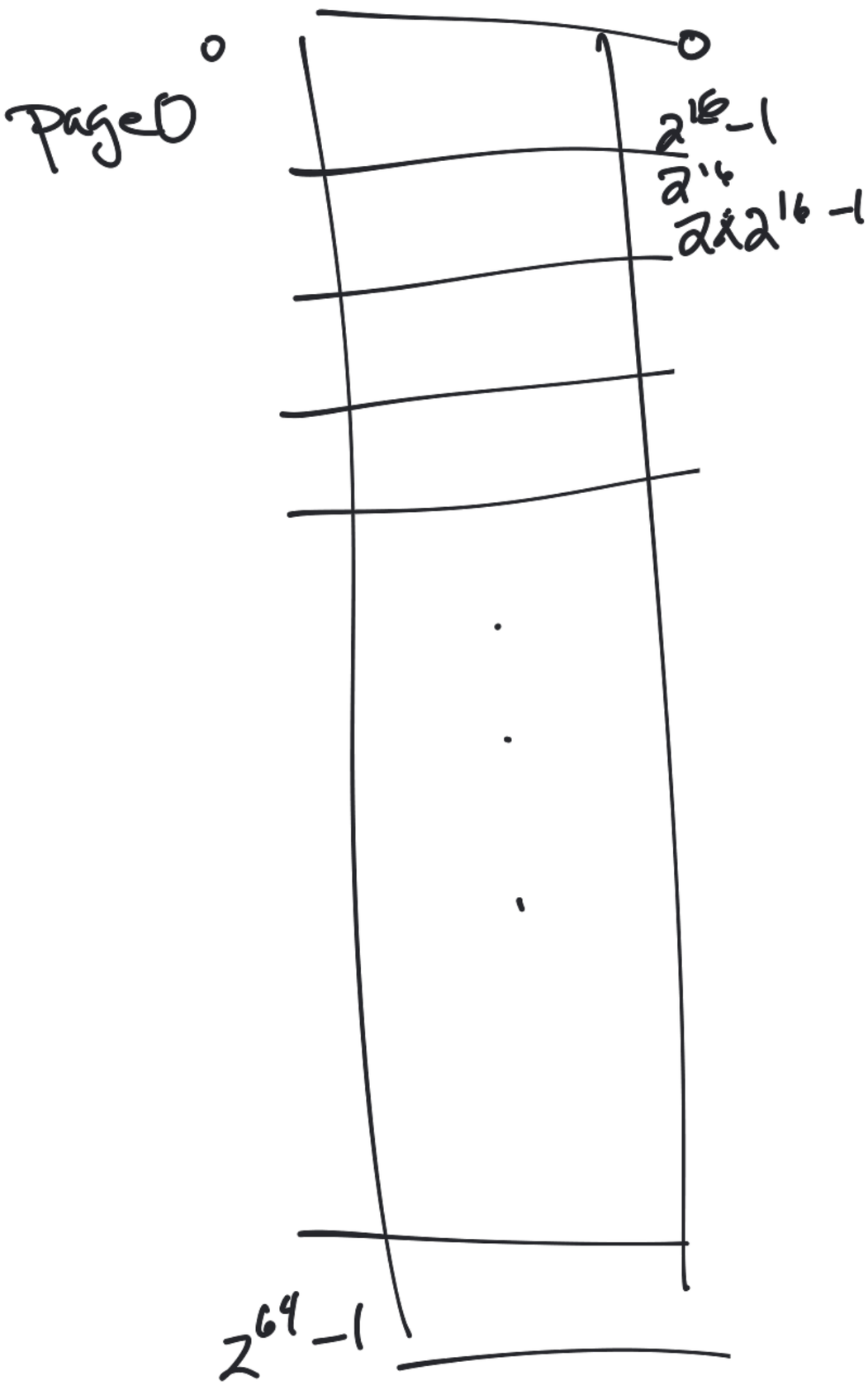
What page? 31

What byte offset? 27



2^{64} bytes

$2^{10} \sim$ "1024



64KB pages

$\frac{2^6}{2^{10}}$

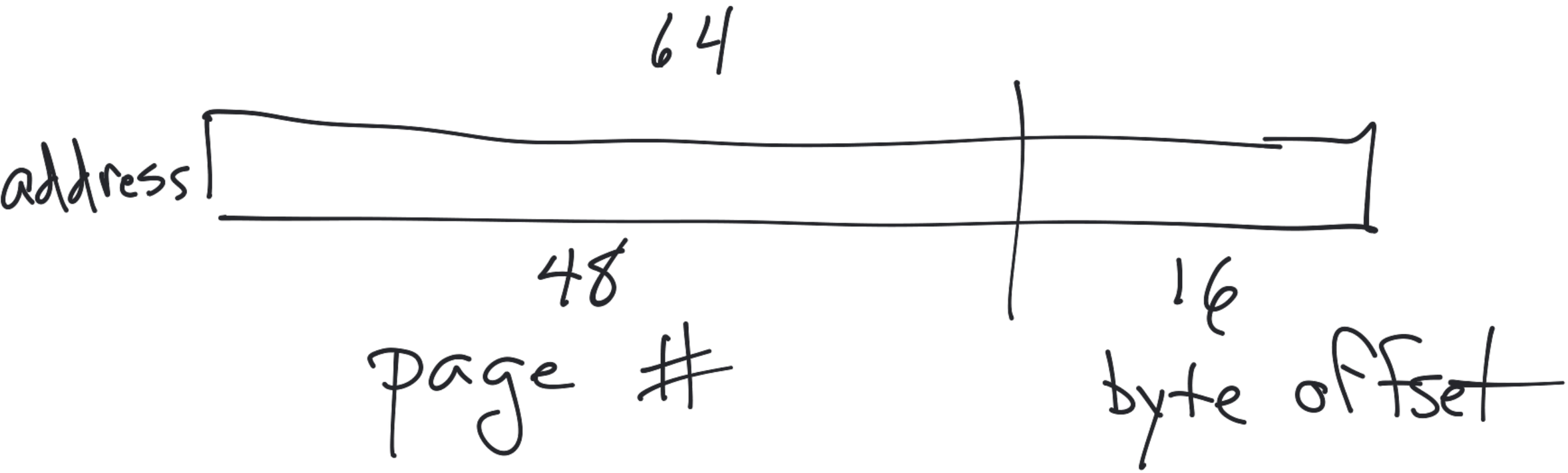
2^{16} bytes per page

2^{64} bytes —

2^{16} bytes/page —

$2^{64} / 2^{16}$ pages

$= 2^{48}$


64
address
48
16
page #
byte offset

$$\#\text{ physical pages} = \frac{\#\text{ phys. bytes}}{\#\text{ bytes / page}}$$

$$= 2^{34} / 2^{16} = 2^{18}$$

2^{34} (16GB)

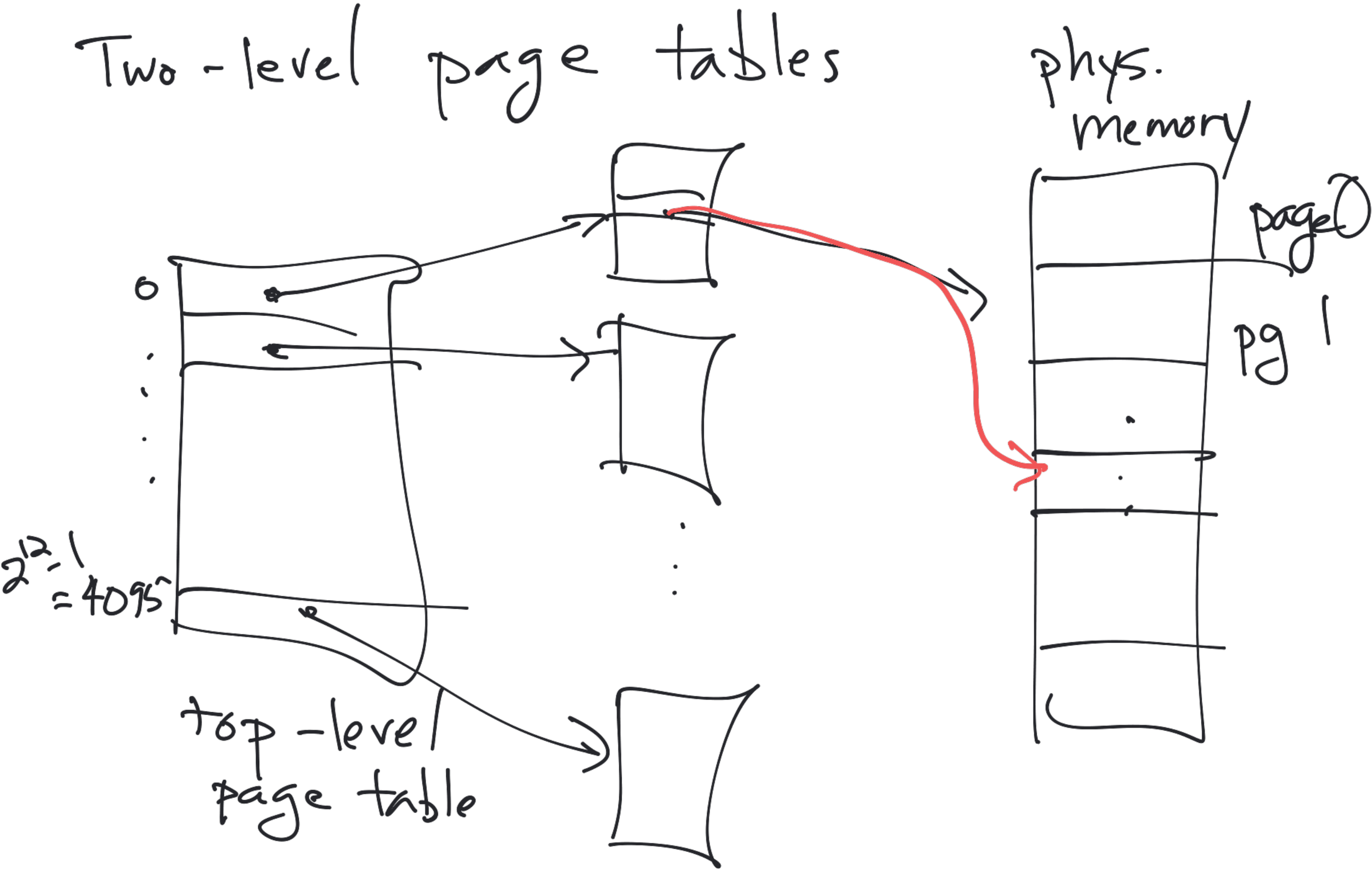
One-level page table

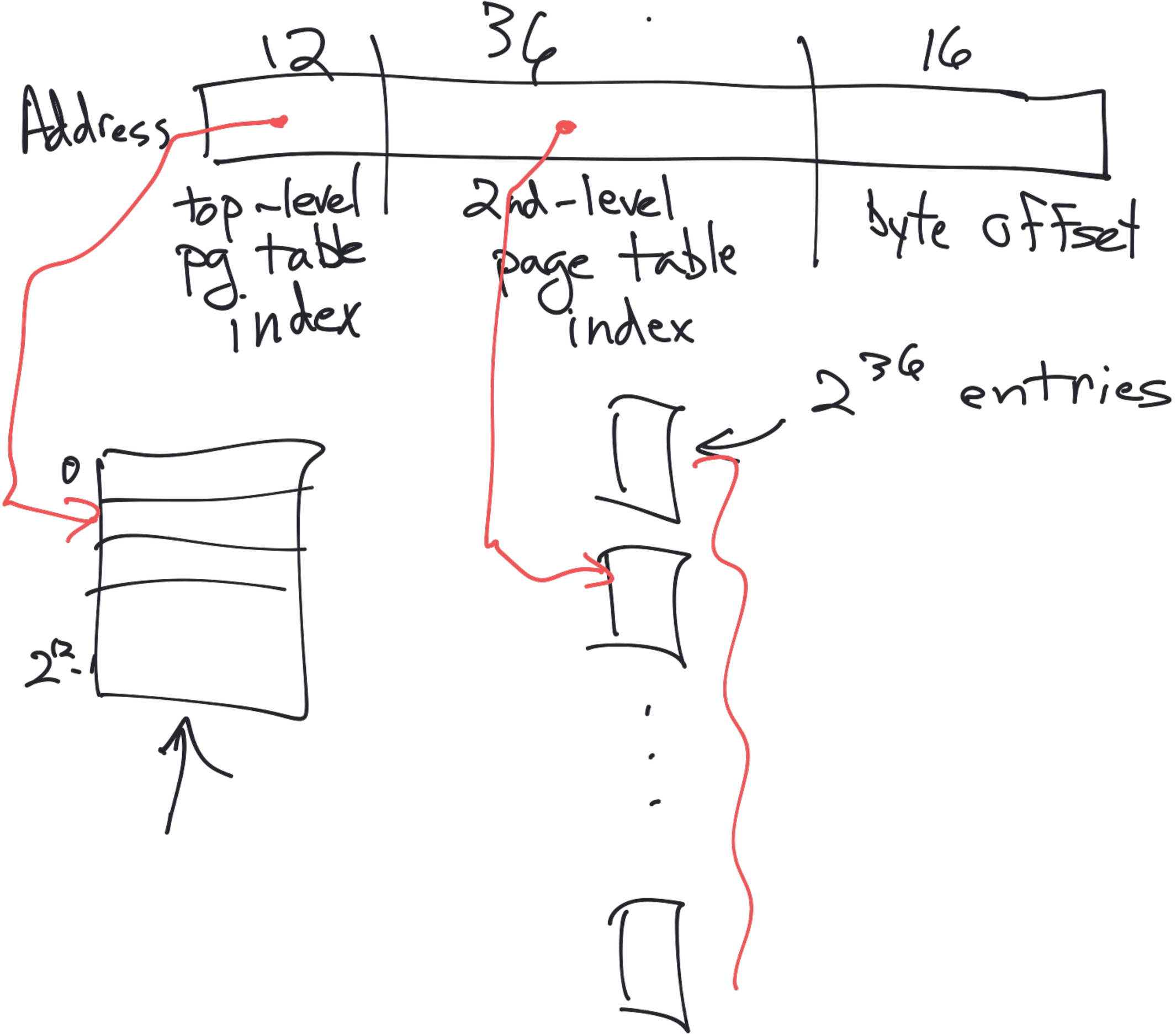
2^{48} entries (quadrillions)

$\times$ 72 bits/entry

= a lot

Two-level page tables




12
36
16
Address
top-level pg table index
2nd-level page table index
byte offset
0
$2^{12}-1$
2^{36} entries