Consider a machine with 64 MB physical memory and a 32-bit virtual address space. If the page size is 4KB, what is the approximate size of the page table?

$1\ KB = 2^{10}$ bytes, $1\ MB = 2^{20}$ bytes, $1\ GB = 2^{30}$ bytes

2^n values $\longrightarrow$ n bits, n bits $\longrightarrow$ 2^n values

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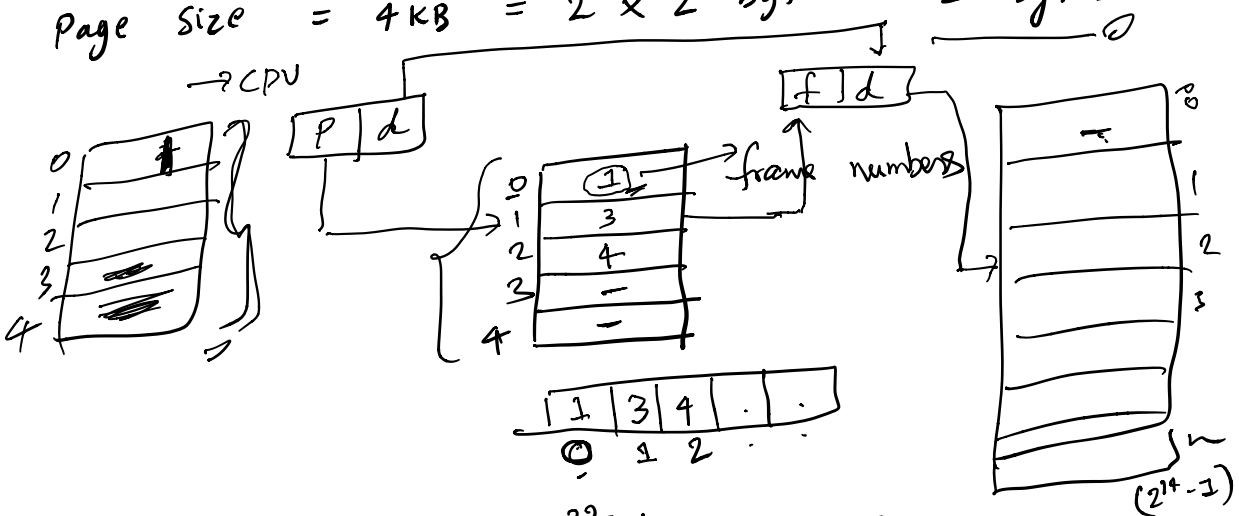
Physical memory = 64 MB = $2^6 \times 2^{20}$ bytes = 2^{26} bytes

virtual address space = 32-bit = 2^{32} bytes

Page size = 4 KB = $2^2 \times 2^{10}$ bytes = 2^{12} bytes



Total no of pages = $\frac{2^{32}\ bytes}{2^{12}\ bytes} = 2^{20}$ → entries in page Table

How many bits are required to store the frame number?

Total no of frames = $\frac{2^{26}}{2^{12}} = 2^{14}$ frames

$0 - (2^{14} - 1)$

2^n values $\longrightarrow$ n bits

2^{14} frames $\longrightarrow$ 14 bits

14 bits

Page table size $= 2^{20} \times 14$ bits $= 2^{20} \times 2$ bytes

1 byte = 8 bits

$= 2$ MB