

## Multilevel page table (RISC-V)

- One-level page table would be  $2^{20} \times 4 = 4\text{MiB}$ , much of it unused
- Page table represented as a tree
  - compacts the structure
  - each section of page table fits into a page =  $2^{12} = 4\text{KiB} = \text{PAGESIZE}$
  - PAGESIZE = 4 bytes
  - supervisor address protection and translation (satp) register hold the base of the tree in the physical page number (ppn) field
- First PTE lookup address =  $\text{satp.ppn} \times \text{PAGESIZE} + \text{VPN}[1] \times \text{PAGESIZE}$
- If X=1 or R=1 it's a superpage (where ~~VPN[0]=0~~ and PPN[0]=0)  
else lookup address =  $\{\text{PPN}[1], \text{PPN}[0]\} \times \text{PAGESIZE} + \text{VPN}[0] \times \text{PAGESIZE}$
- More translation levels for a 64-bit machine