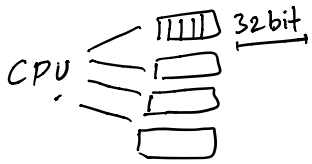
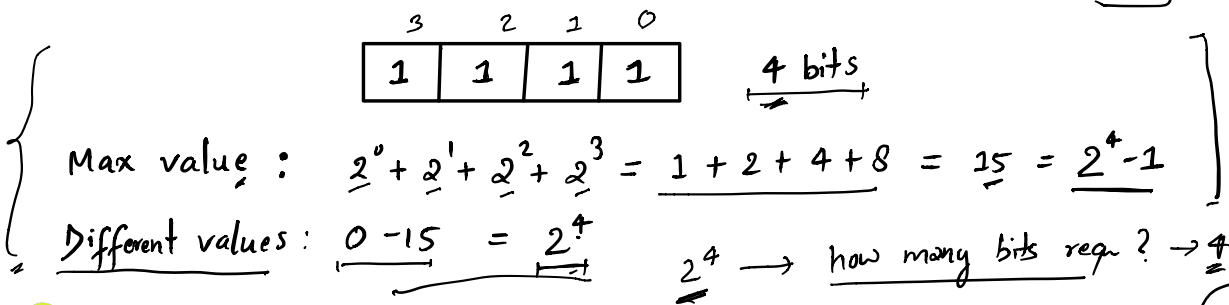
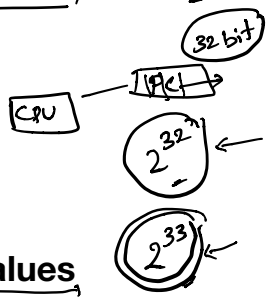
MAXIMUM SIZE OF A PROCESS IN AN OPERATING SYSTEM

- Assume that the operating system uses virtual memory
- What can be the maximum size of virtual address space of a process?
- Depends upon the size of the hardware registers
- 32 bit system/processor - 32 bit registers

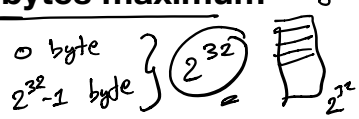




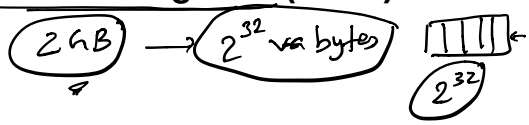
- N bits
  - Max value : 2^N - 1
  - Different values : 2^N



- A 32 bit register can hold a maximum of 2^32 different values
- Remember that logical addresses are also stored in registers(program counter)
- So, the maximum logical address space of a process depends on or is bounded by the size of system registers
- 32 bit system/processor -> 32 bit registers -> 2^32 bytes maximum process size



- Similarly, the maximum physical address space size can be 2^32 bytes(4GB) since physical address are also stored in registers(MMU)
- 32 bit processor having 6GB RAM? 😅



- 64 bit systems/processor -> 64 bit registers -> 2^64

bytes(17,179,869,184 GB) 😳