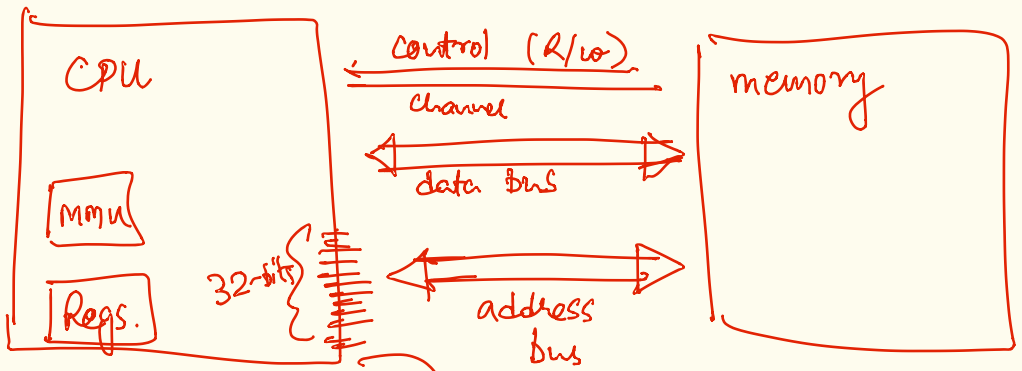
Lecture 12 13 CS 347/333 1.09.2022

memory virtualization

⊛ CPU virtualization

- every program / process "thinks" that it owns the CPU.
  - this is a scam!
    - save & restore
    - multiplexing / sharing (temporal)



addressable range: 0 to $2^{32}-1$ ⇒ 4GB

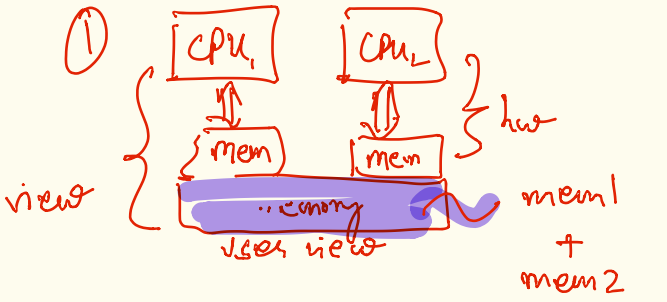
- processes need memory!
  - code / text and data
  - von Neumann model. — fetch - decode - text.

memory virtualization.

defn: share/ multiplex across processes!

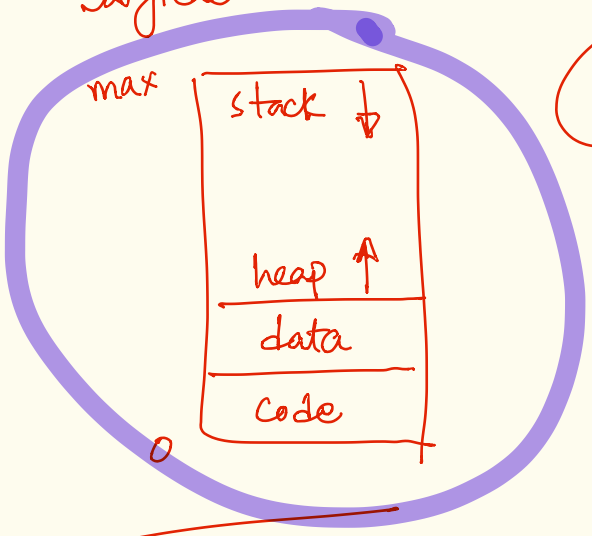
requirements: (i) isolation
(ii) flexible allocation/sharing.
(iii) efficiency
(iv) reusability
(v) transparency
(vi) full addressibility.

local vs. far-away allocation.

① 

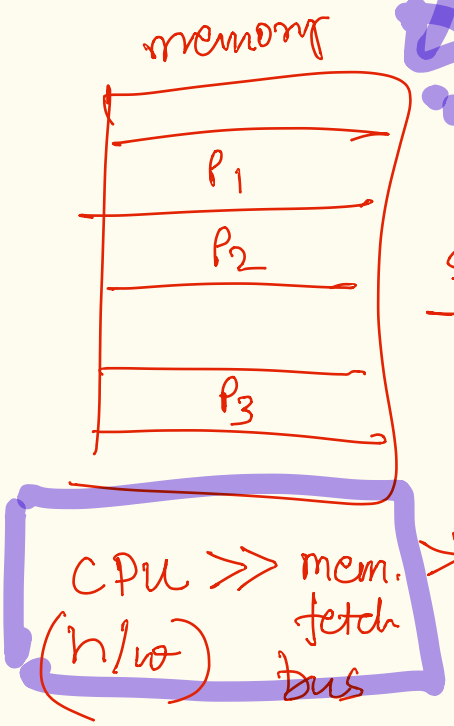
view of memory for each process.

logical



Q. how to provide this view of memory to each process?

OS



Scam!

design -1

- similar to LDE model
- process issues address
  ↓
  trapped/ interrupted.
  ↓
  OS issues actual address.