Parallel computing platforms

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recap

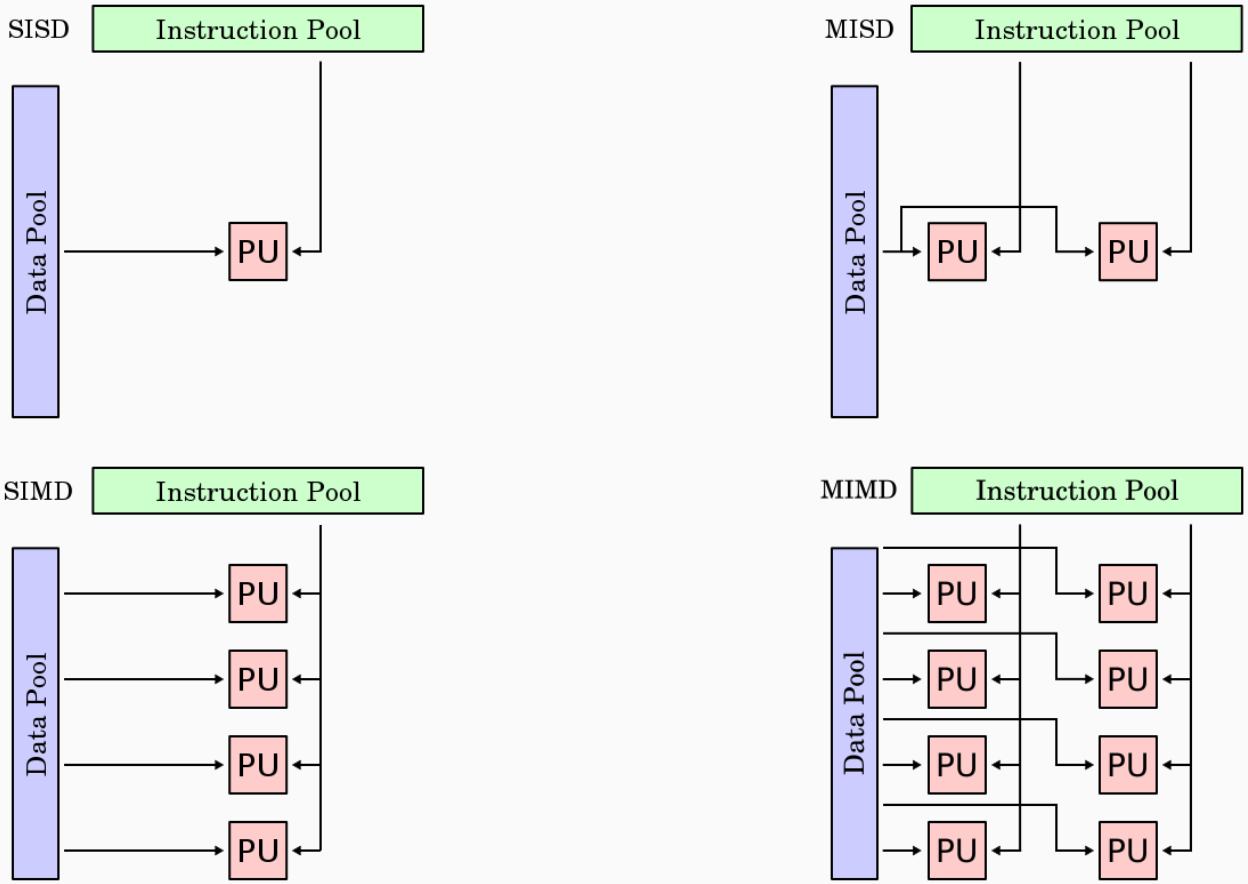
- von Neumann architecture
  - central processing unit
  - memory
    - cache ($)
  - interconnection
- operating system
  - processes vs threads

parallel computing platform

- logical organization
  - the user's view of the machine as it is being presented via its system software
- physical organization
  - the actual hardware architecture

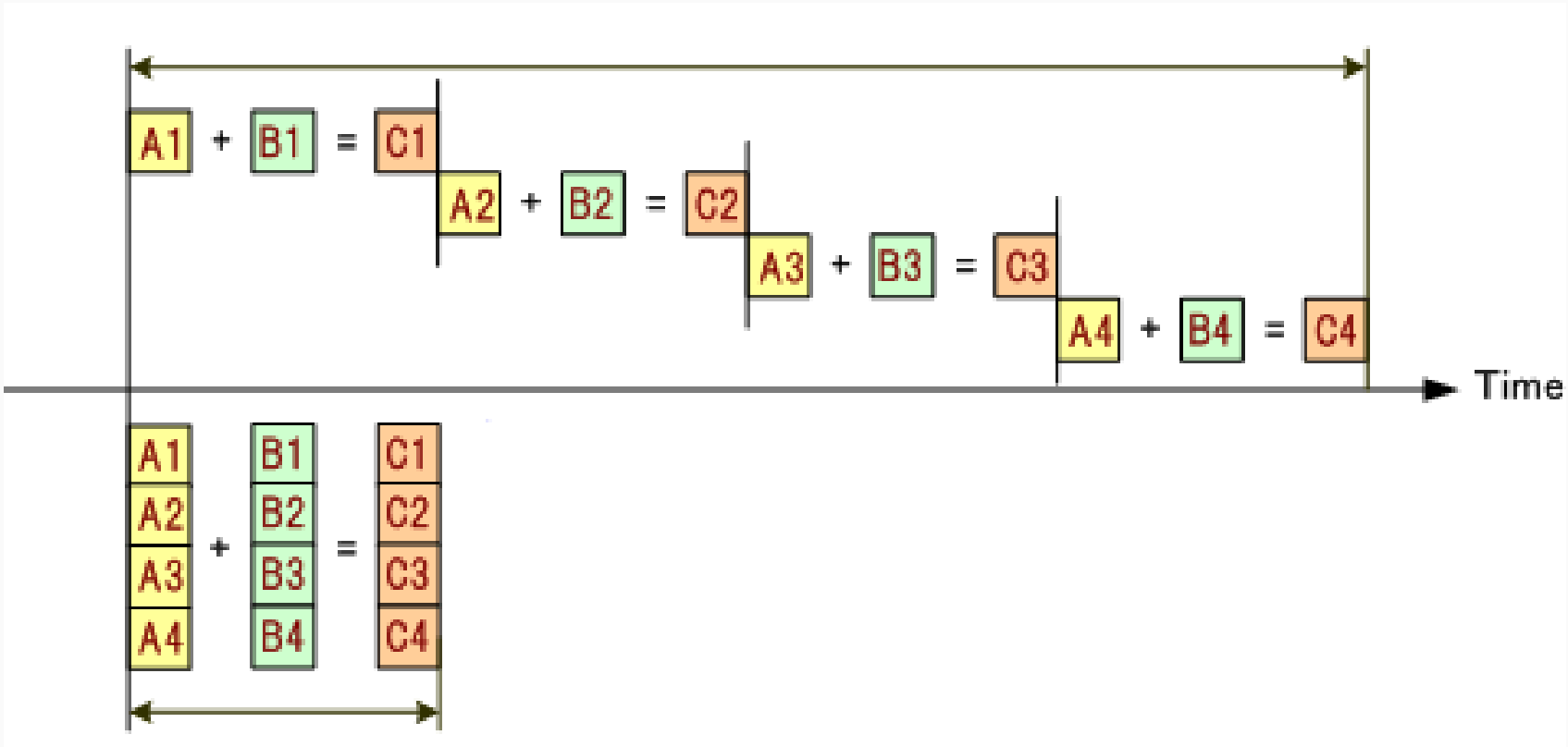
flynn's taxonomy

- based on the number of instruction streams and data streams available in the architecture



Flynn's taxonomy by Cburnett / CC BY 3.0 / presenting the four together

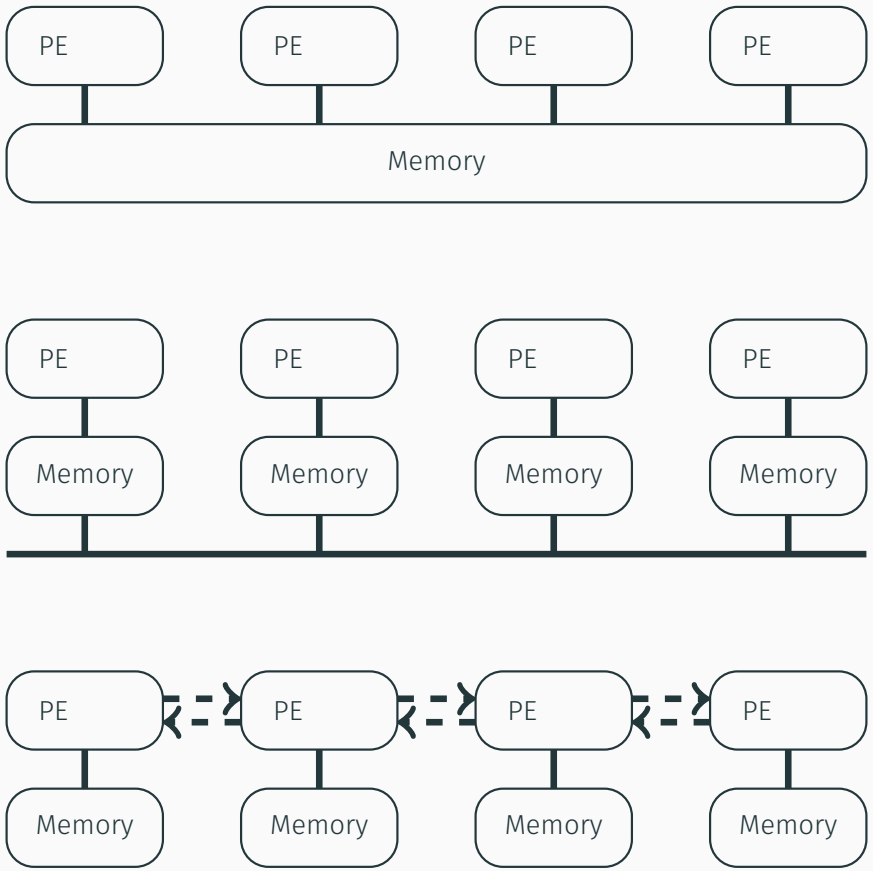
simd



SIMD / cropped from original

communication models

- shared-address space
  - UMA / NUMA / ccNUMA
- message-passing



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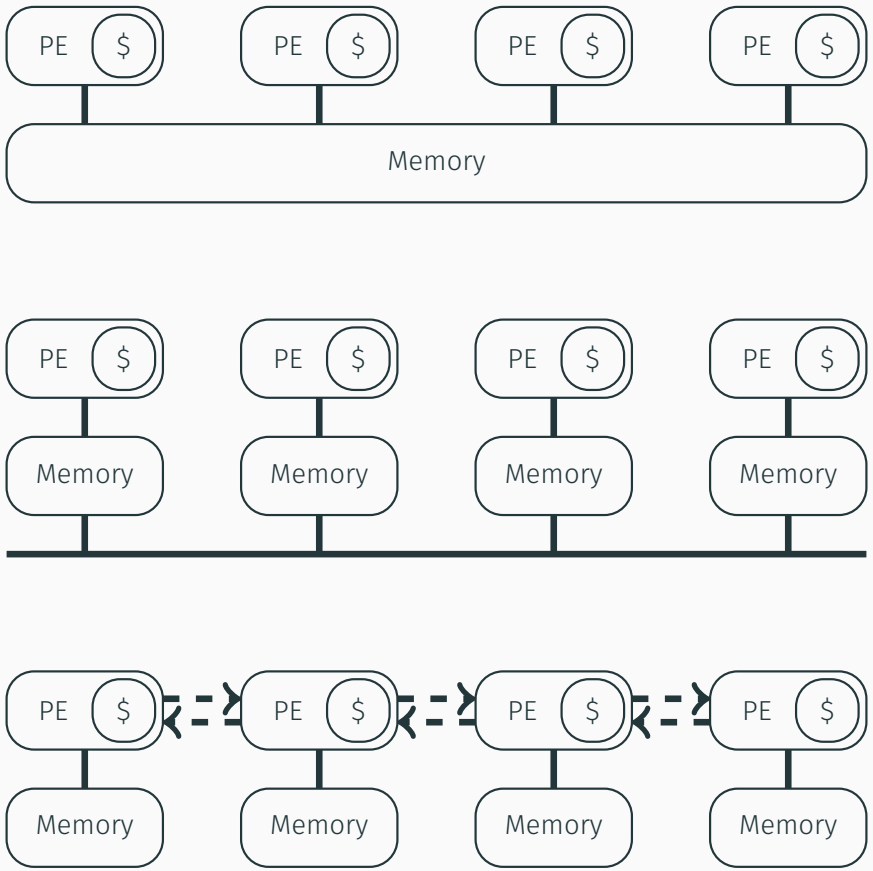

cache coherence

- update
  - increases communication on the bus
- invalidate
  - increases idling time

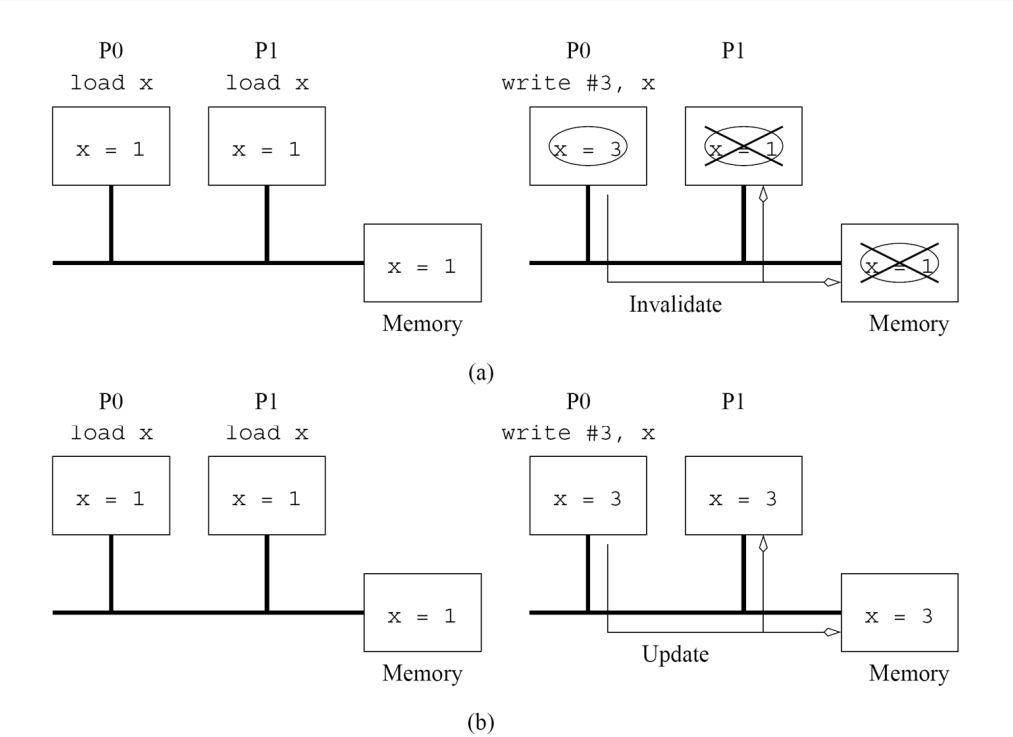

Figure 2.21 Cache coherence in multiprocessor systems: (a) Invalidate protocol; (b) Update protocol for shared variables.

false sharing