Department of Computer Science and Engineering

FACULTY OF ENGINEERING AND TECHNOLOGY
UNIVERSITY OF LUCKNOW
LUCKNOW

CS-501

Dr. Zeeshan Ali Siddiqui
Assistant Professor
Deptt. of C.S.E.

MULTIPLE-PROCESSOR SCHEDULING CONCEPT

Multiple-Processor Scheduling

- CPU scheduling more complex when multiple CPUs are available
  - Homogeneous processors within a multiprocessor

- Asymmetric multiprocessing – Only one processor accesses the system data structures, reducing the need for data sharing.

- Symmetric multiprocessing – Each processor is self-scheduling, all processes in common ready queue, or each has its own private queue of ready processes.

Processor Affinity

- Process has affinity for processor on which it is currently running (e.g., to avoid repopulating caches)

- Soft affinity- When an operating system has a policy of attempting to keep a process running on the same processor—but not guaranteeing that it will do so.

- Hard affinity- Allowing a process to specify a subset of processors on which it may run.

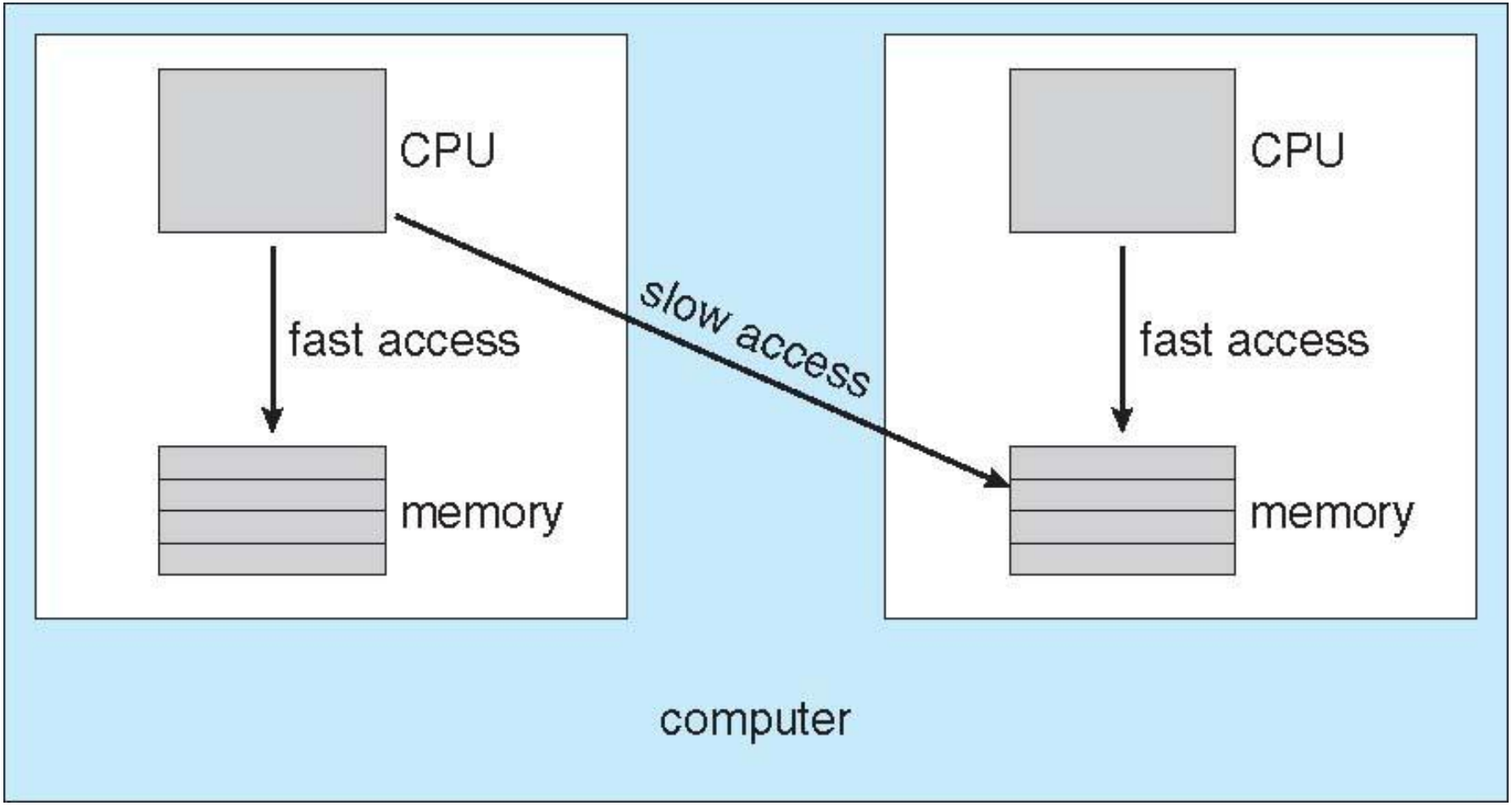
Load Balancing

- Push migration - A specific task periodically checks the load on each processor and, if it finds an imbalance, evenly distributes the load by moving (or pushing) processes from overloaded to idle or less-busy processors.

- Pull migration - Pull migration occurs when an idle processor pulls a waiting task from a busy processor.

NUMA and CPU Scheduling 1/2

- NUMA -*Non-uniform memory access*
- CPU Scheduling -Architecture can affect processor affinity



NUMA and CPU Scheduling 2/2

- NUMA, in which a CPU has faster access to some parts of main memory than to other parts.
  - Typically, this occurs in systems containing combined CPU and memory boards.
  - The CPUs on a board can access the memory on that board faster than they can access memory on other boards in the system.
- If the operating system's CPU scheduler and memory-placement algorithms work together, then a process that is having affinity to a particular CPU can be allocated to the same CPU.

References

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley.

2. William Stallings, “Operating Systems: Internals and Design Principles”, 6th Edition, Pearson Education.

3. D M Dhamdhere, “Operating Systems: A Concept based Approach”, 2nd Edition, TMH.

Thank You.