Agenda of Lecture 4

- Types of Operating System
- Distributed Operating System
- Network operating System
- Real Time operating System
- Difference between Multiprogramming, multitasking, multithreading and multiprocessing

TYPES OF OPERATING SYSTEM

- Types of operating system
- 1.Simple Batch Systems
- 2.Multiprogramming Batched Systems
- 3.Time-Sharing Systems
- 4.Distributed Systems
- 5.Real -Time Systems

Parallel Systems

- Multiprocessor systems with more than one CPU in close communication.
- *Tightly coupled system* – processors share memory and a clock; communication usually takes place through the shared memory.
- Advantages of parallel system:
  - Increased *throughput*
  - Economical
  - Increased reliability
    - graceful degradation
    - fail-soft systems

Real-Time Systems

- Often used as a dedicated application such as controlling scientific experiments, medical imaging systems, industrial control systems, and some display systems.
- Well-defined fixed-time constraints.
- *Hard real-time system*.
  - Secondary storage limited or absent, data stored in short-term memory, or read-only memory (ROM)
  - Conflicts with time-sharing systems, not supported by general-purpose operating systems.
- *Soft real-time system*
  - Limited utility in industrial control or robotics
  - Useful in applications (multimedia, virtual reality) requiring advanced operating-system features.

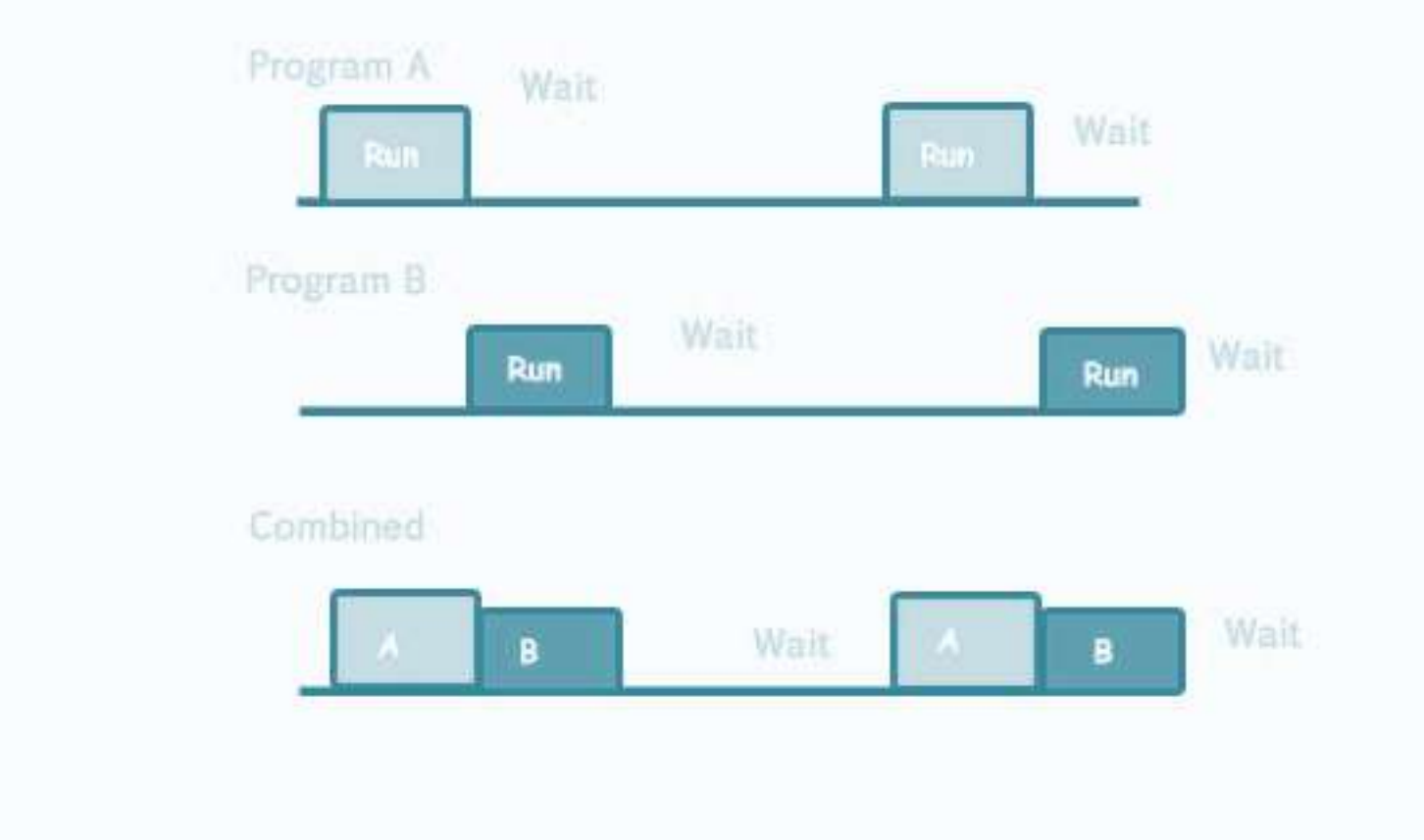
Distributed Systems

- Distribute the computation among several physical processors.
- *Loosely coupled system* – each processor has its own local memory; processors communicate with one another through various communications lines, such as high-speed buses or telephone lines.
- Advantages of distributed systems.
  - Resources Sharing
  - Computation speed up – load sharing
  - Reliability
  - Communications

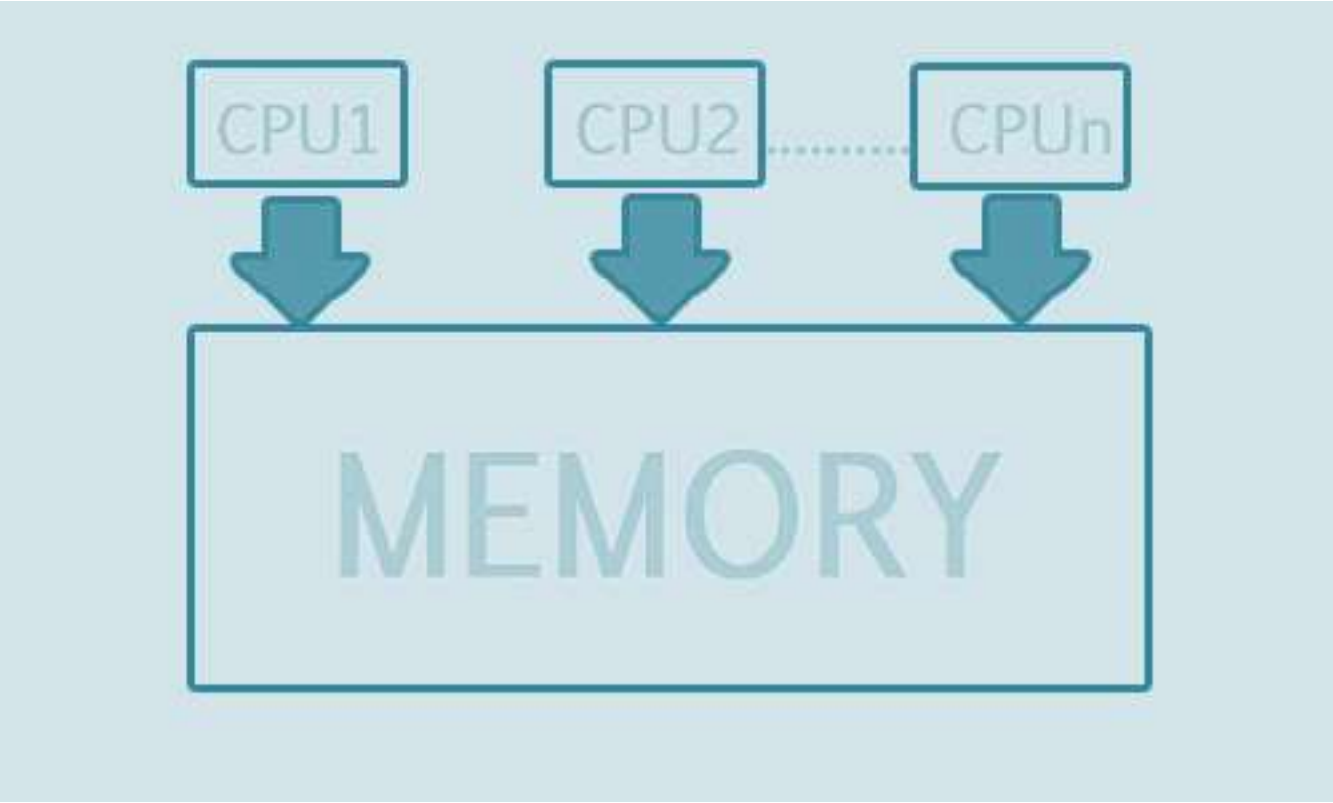
Distributed Systems (Cont.)

- Network Operating System
  - provides file sharing
  - provides communication scheme
  - runs independently from other computers on the network
- Distributed Operating System
  - less autonomy between computers
  - gives the impression there is a single operating system controlling the network.

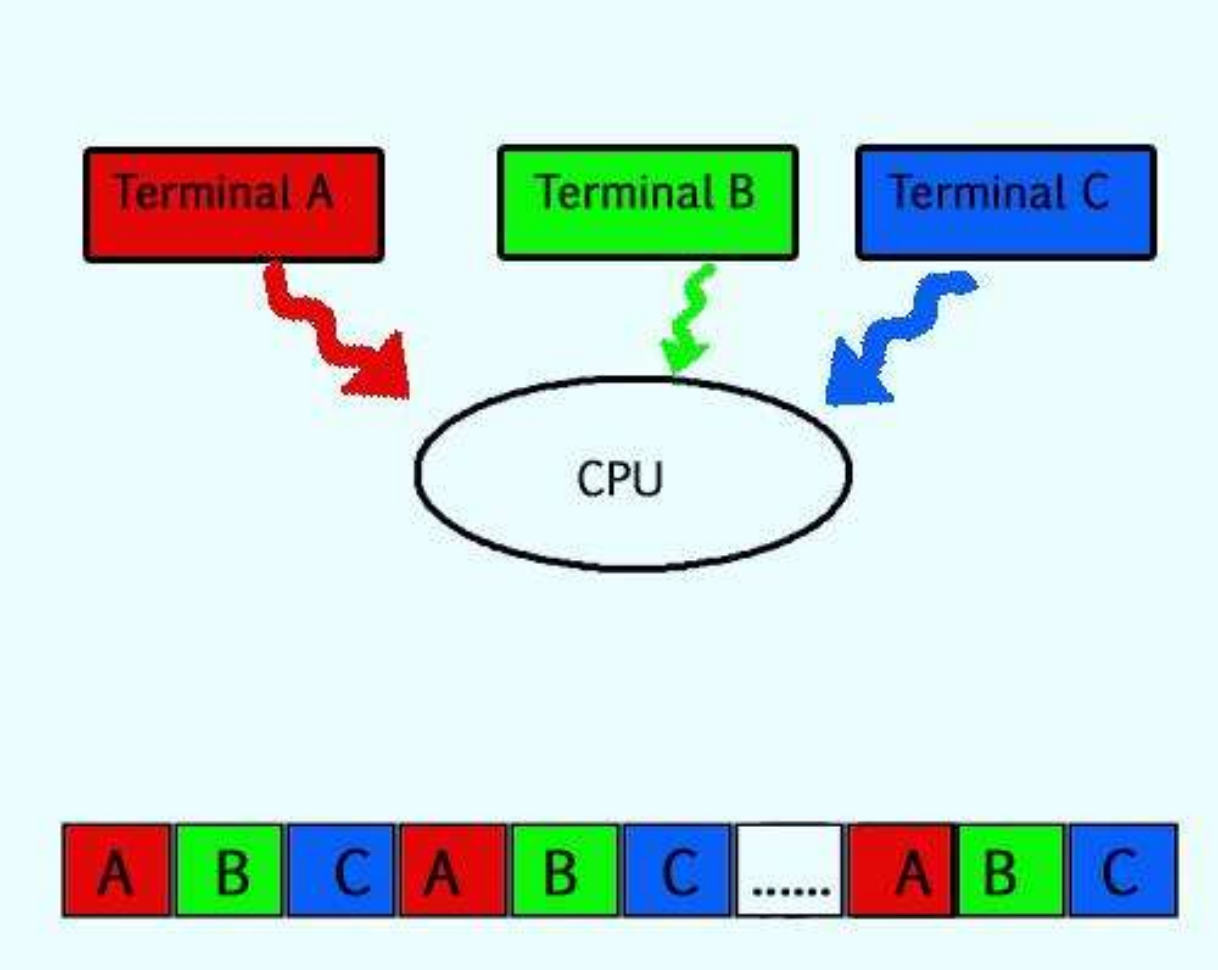
Multi programming



Multiprocessing



Multitasking



Multiprogramming v/s Multiprocessing v/s Multitasking v/s Multithreading

- **Multiprogramming –** A computer running more than one program at a time (like running Excel and Firefox simultaneously).
- **Multiprocessing –** A computer using more than one CPU at a time.
- **Multitasking –** Tasks sharing a common resource (like 1 CPU).
- **Multithreading** is an extension of multitasking.

Question & Answer

- What is multitasking, multithreading and multiprogramming?
- What is the difference between Hard and Soft real-time systems?
- What is a Real-Time System?
- What is SPOOLING
- What is a Distributed Operating System
- ExplainNetwork operating System