# MULTIPROCESSOR

- Characteristics of Multiprocessor
- Interconnection Structures
- Inter processor Arbitration
- Inter Processor Communication and Synchronization.

# Characteristics of Multiprocessor

- A multiprocessor system is an interconnection of two or more CPUs with memory and I/O equipment.
- IOPs are generally not included in the definitions of multiprocessor system unless they have computational facilities comparable to CPUs.
- Multiprocessor are MIMD system.
- Multicomputer system includes number of computers connected together by means of communication lines.

# Multiprocessor and Multicomputer

| Multiprocessor | Multicomputer |
|---|---|
| • A multiprocessor system is simply a computer that has more than one CPU on its motherboard.<br><br>• Multiprocessing is the use of two or more central processing units (CPUs) within a single computer system. | • A computer made up of several computers. The term generally refers to an architecture in which each processor has its own memory rather than multiple processors with a shared memory |

# Characteristics of Multiprocessor

- It improves reliability.
- If one system fails, the whole system continue to function with perhaps low efficiency.
- The computation can proceed in parallel in two ways:
  - Multiple independent jobs operate in parallel
  - A single job can be partitioned into multiple parallel tasks

# Characteristics of Multiprocessor

- Multiprocessor are classified by the way their memory is organized:
  - Shared memory or tightly coupled microprocessor
  - Distributed memory or loosely coupled microprocessor

# Tightly coupled Multiprocessor

- Multiprocessor system with common shared memory.

- Each processor provide a cache memory with in it and there is common shared memory that all CPU's can access.

- Information can be shared among the CPU's by placing it in a common global memory.

- Tightly coupled system can tolerate a high degree of interaction between tasks.

# Loosely-coupled multiprocessor

- Multiprocessor system with distributed memory.
- Each processor has it's own private local memory and the processors are tied together.
- Messages are transferred from one processor to another processor through message passing scheme
- Loosely coupled system are more efficient when the interaction between the task is minimum