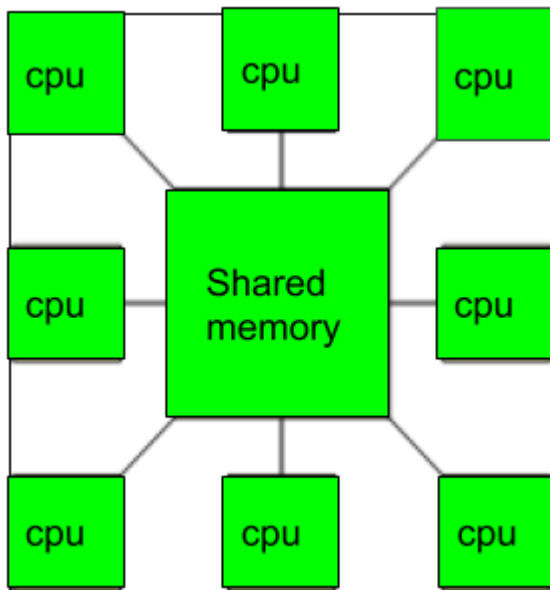


# Introduction of Multiprocessor and Multicomputer

## 1. Multiprocessor:

A Multiprocessor is a computer system with two or more central processing units (CPUs) share full access to a common RAM. The main objective of using a multiprocessor is to boost the system's execution speed, with other objectives being fault tolerance and application matching.

There are two types of multiprocessors, one is called shared memory multiprocessor and another is distributed memory multiprocessor. In shared memory multiprocessors, all the CPUs share the common memory but in a distributed memory multiprocessor, every CPU has its own private memory.



## Applications of Multiprocessor –

1. As a uniprocessor, such as single instruction, single data stream (SISD).
2. As a multiprocessor, such as single instruction, multiple data stream (SIMD), which is usually used for vector processing.
3. Multiple series of instructions in a single perspective, such as multiple instruction, single data stream (MISD), which is used for describing hyper-threading or pipelined processors.
4. Inside a single system for executing multiple, individual series of instructions in multiple perspectives, such as multiple instruction, multiple data stream (MIMD).

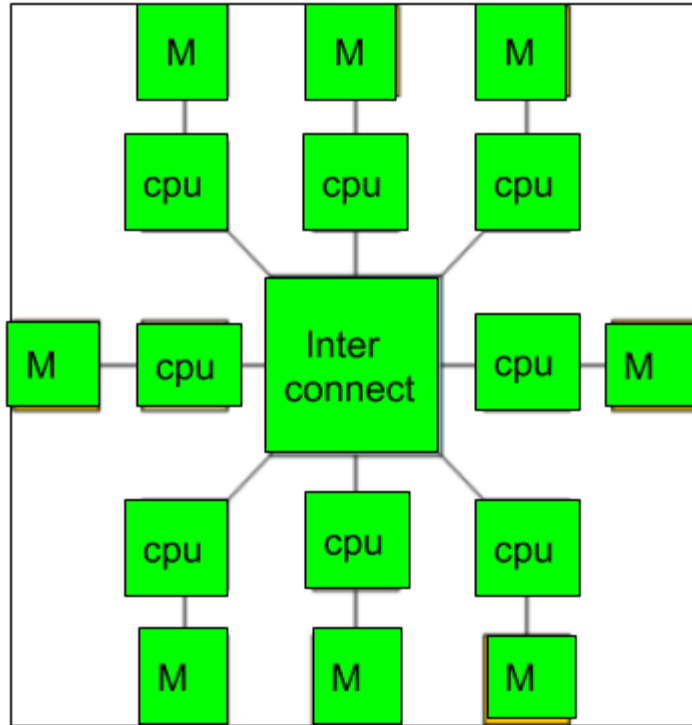
## Benefits of using a Multiprocessor –

- Enhanced performance.
- Multiple applications.

- Multi-tasking inside an application.
- High throughput and responsiveness.
- Hardware sharing among CPUs.

## 2. Multicomputer:

A [multicomputer system](#) is a computer system with multiple processors that are connected together to solve a problem. Each processor has its own memory and it is accessible by that particular processor and those processors can communicate with each other via an interconnection network.



As the multicomputer is capable of messages passing between the processors, it is possible to divide the task between the processors to complete the task. Hence, a multicomputer can be used for distributed computing. It is cost effective and easier to build a multicomputer than a multiprocessor.

### **Difference between multiprocessor and Multicomputer:**

1. Multiprocessor is a system with two or more central processing units (CPUs) that is capable of performing multiple tasks where as a multicomputer is a system with multiple processors that are attached via an interconnection network to perform a computation task.
2. A multiprocessor system is a single computer that operates with multiple CPUs where as a multicomputer system is a cluster of computers that operate as a singular computer.
3. Construction of multicomputer is easier and cost effective than a multiprocessor.
4. In multiprocessor system, program tends to be easier where as in multicomputer system, program tends to be more difficult.

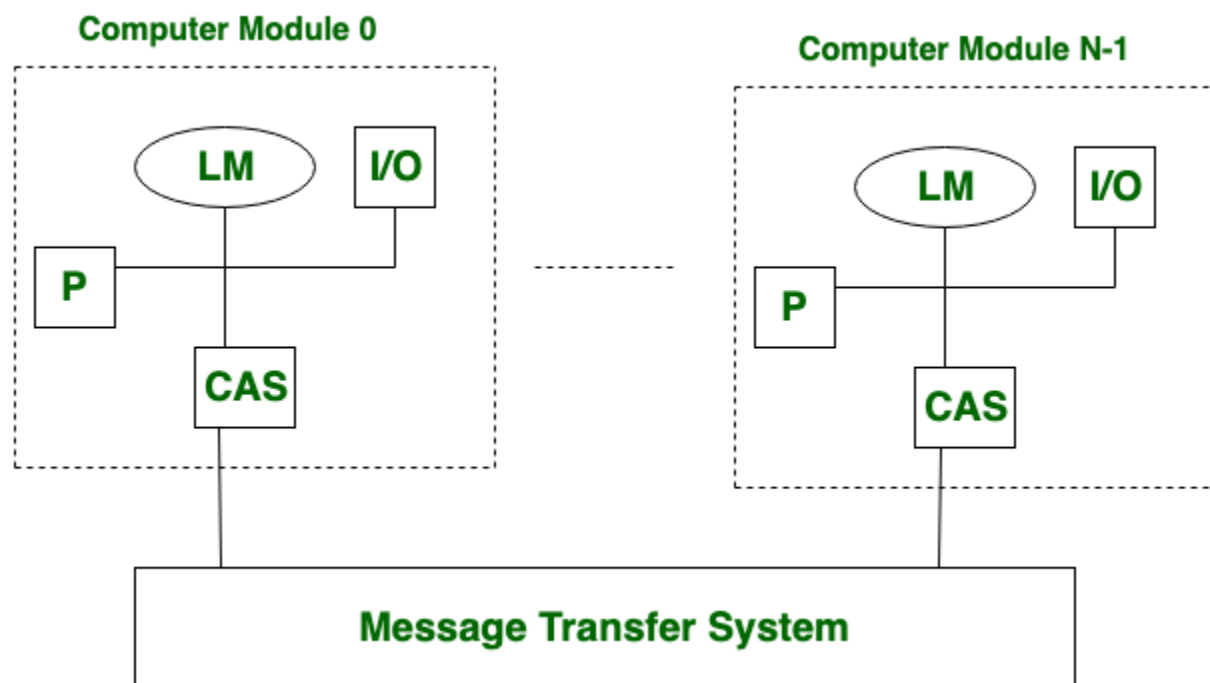
5. Multiprocessor supports parallel computing, Multicomputer supports distributed computing.

## Difference between Loosely Coupled and Tightly Coupled Multiprocessor System

- Difficulty Level : [Medium](#)
- Last Updated : 31 Mar, 2020

### Loosely Coupled Multiprocessor System:

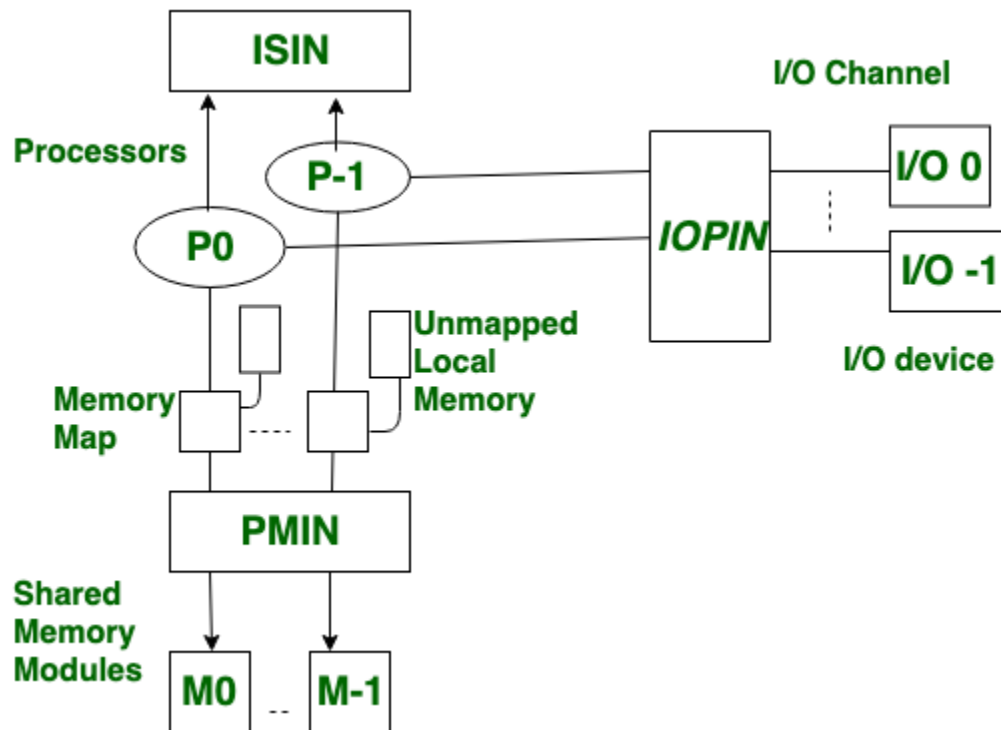
It is a type of multiprocessing system in which, There is distributed memory instead of shared memory. In loosely coupled multiprocessor system, data rate is low rather than tightly coupled multiprocessor system. In loosely coupled multiprocessor system, modules are connected through MTS (Message transfer system) network.



### Tightly Coupled Multiprocessor System:

It is a type of multiprocessing system in which, There is shared memory. In tightly coupled multiprocessor system, data rate is high rather than loosely coupled

multiprocessor system. In tightly coupled multiprocessor system, modules are connected through PMIN, IOPIN and ISIN networks.



Let's study the difference between loosely coupled and tightly coupled multiprocessor system:

#### Loosely Coupled

1. There is distributed memory in loosely coupled multiprocessor system.
2. Loosely Coupled Multiprocessor System has low data rate.
3. The cost of loosely coupled multiprocessor system is less.
4. In loosely coupled multiprocessor system, modules are connected

#### Tightly Coupled

- There is shared memory, in tightly coupled multiprocessor system.
- Tightly coupled multiprocessor system has high data rate.
- Tightly coupled multiprocessor system is more costly.
- While there is PMIN, IOPIN and ISIN networks.

through **Message transfer system** network.

- |    |  |  |
|----|--|--|
| 5. | In loosely coupled multiprocessor, Memory conflicts don't take place.                            | While tightly coupled multiprocessor system have memory conflicts.                                 |
| 6. | Loosely Coupled Multiprocessor system has low degree of interaction between tasks.               | Tightly Coupled multiprocessor system has high degree of interaction between tasks.                |
| 7. | In loosely coupled multiprocessor, there is direct connection between processor and I/O devices. | While in tightly coupled multiprocessor, IOPIN helps connection between processor and I/O devices. |
| 8. | Applications of loosely coupled multiprocessor are in distributed computing systems.             | Applications of tightly coupled multiprocessor are in parallel processing systems.                 |