Types of Pipelining:

1. **Arithmetic Pipeline** – Used in floating-point operations.
2. **Instruction Pipeline** – Used in RISC processors.

2. Array Processor

Concept:

- A type of SIMD (Single Instruction Multiple Data) architecture.
- Multiple processing elements (PEs) perform the same instruction on different data simultaneously.

Key Characteristics:

- Suitable for vector processing applications.
- Improves performance in matrix operations and image processing.
- Uses a central control unit to manage operations.

Example:

- **Graphics Processing Units (GPUs)** use array processing for parallel execution of pixel operations.

3. Multiprocessor Architecture

Concept:

- Multiple CPUs (processors) work together to solve a problem faster.
- Can be **tightly coupled (shared memory)** or **loosely coupled (distributed memory)**.

Types of Multiprocessor Architectures:

1. **Symmetric Multiprocessing (SMP)**
    - All processors share the same memory and operate under a single OS.
    - Example: Modern multi-core processors.
2. **Asymmetric Multiprocessing (AMP)**
    - One processor controls others, which may have specific tasks.
    - Example: Older supercomputers.
3. **Massively Parallel Processing (MPP)**
    - Hundreds or thousands of processors working on separate tasks.
    - Example: Supercomputers used for climate modeling.