Computer Organization & Architecture (Flynn's Taxonomy)

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High Performance Architecture

- High performance artchitecture exploits concurrent event execution
- Concurrency implies to:
  - Parallelism: two or more events are executed in same time period
  - Simultaneous: two or more events are executed in same time instant
  - Pipeling:two or more events are executed in the overlapping time span
- What is Parallel Computing?

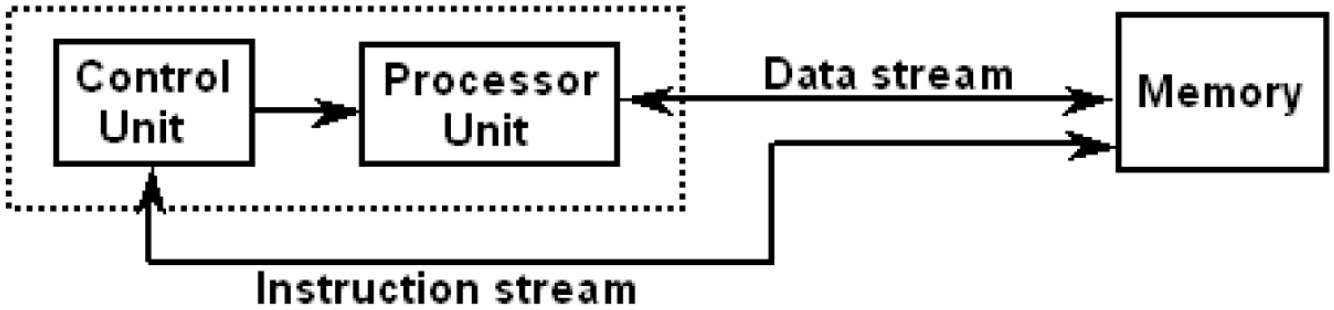
Flynn's Classification Of Computer Architectures

- Proposed by Michael Flynn in 1966
- Flynn uses the stream concept for describing a machine's structure
- The classification of computer architectures based on the number of instruction steams and data streams

Flynn's Classification Of Computer Architectures

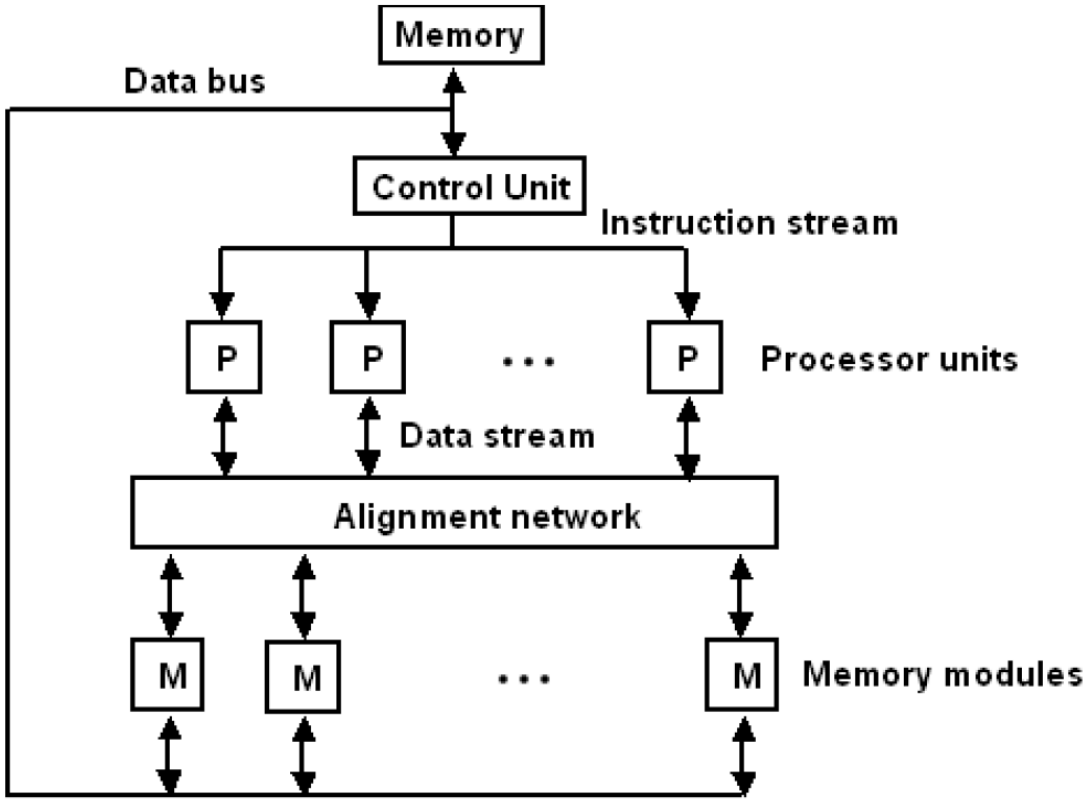
	Single Instruction	Multiple Instruction
Single Data	SISD	MISD
Multiple Data	SIMD	MIMD

SISD (Singe-Instruction, Singe-Data)



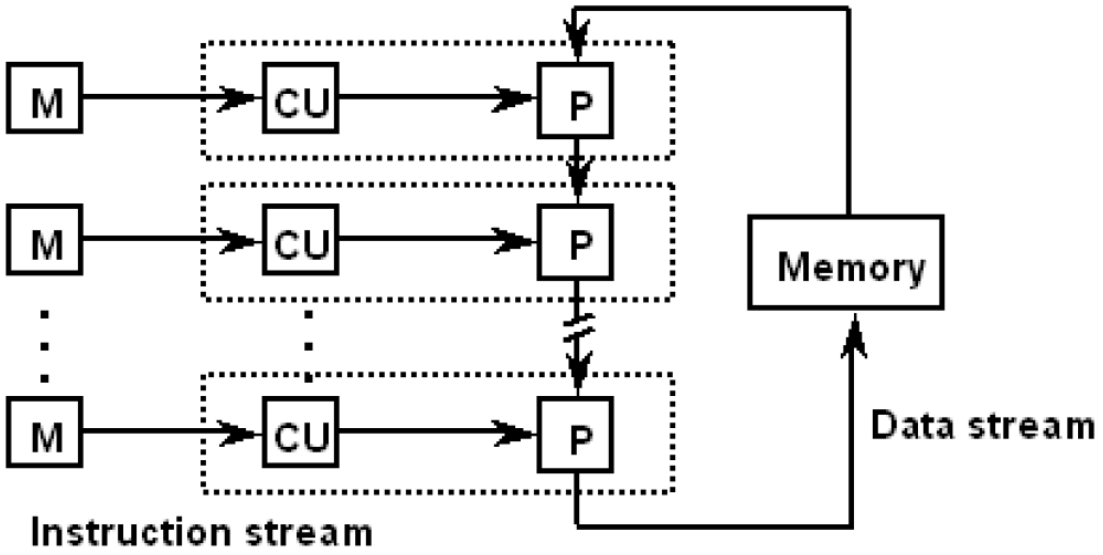
- Example: IBM 701, IBM 1620

SIMD (Single-Instruction, Multiple-Data)

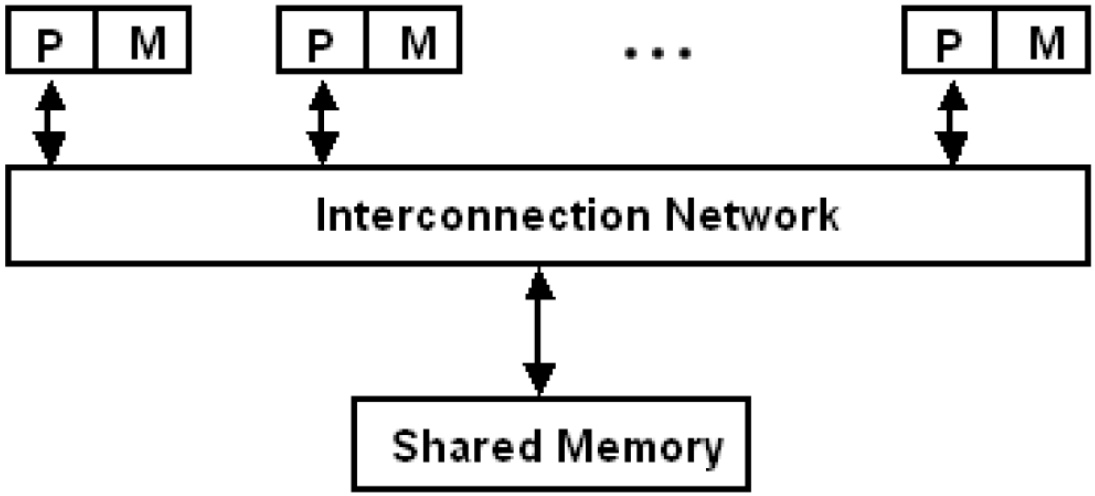


- Example:Array Processors (ILLIAC IV, STARAN)

MISD (Multiple-Instruction, Singe-Data)



MIMD (Multiple-Instruction, Multiple-Data)



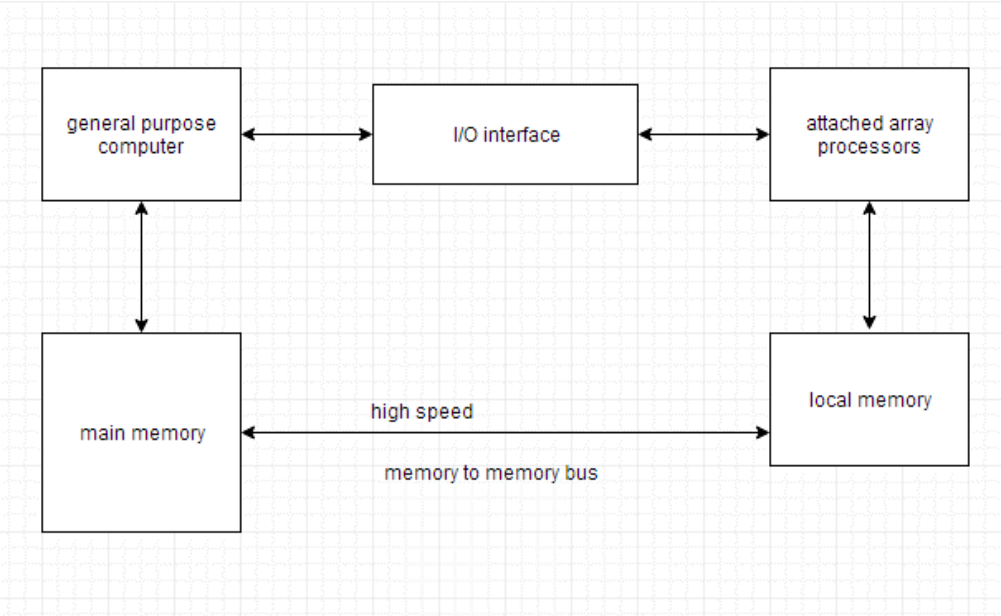
- Example: UNIVAC 1100, Borroughs D-825, Intel IA32

Array Processors

- A processor that has an architecture especially designed for processing arrays
- Also known as multiprocessors or vector processors
- Two of Array Processors
  - Attached Array Processor
  - SIMD Array Processor

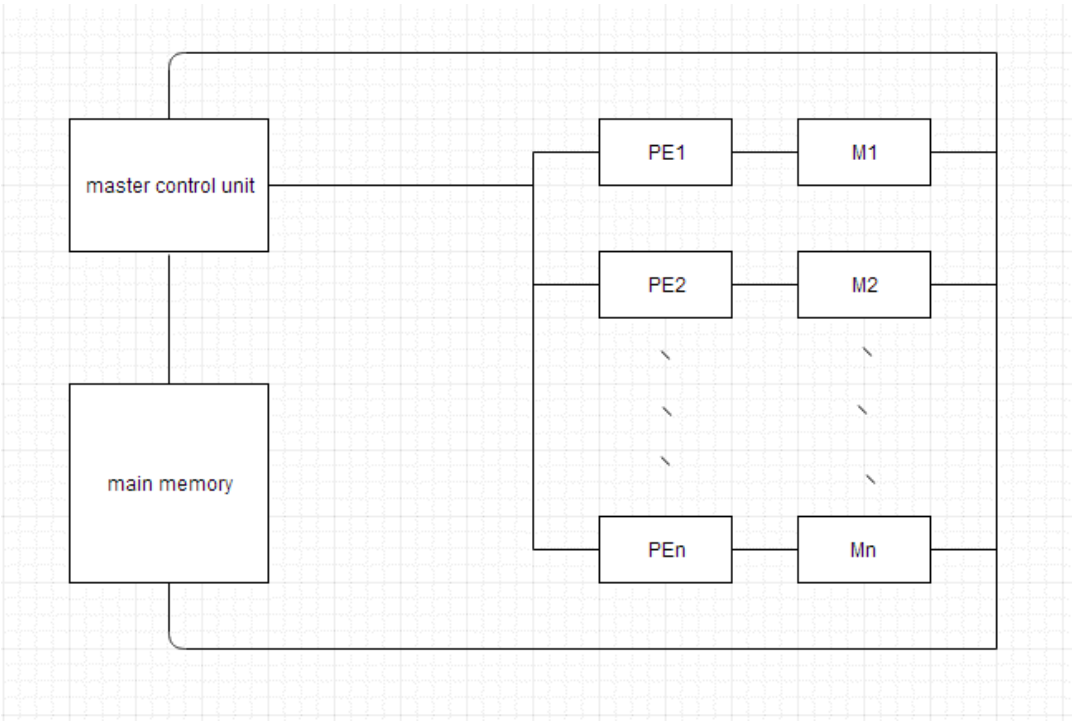
Attached Array Processors

- Improves the performance of the host computer

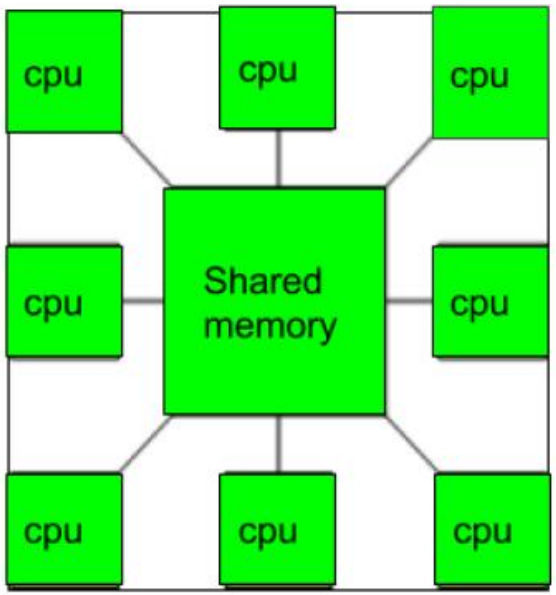


SIMD Array Processors

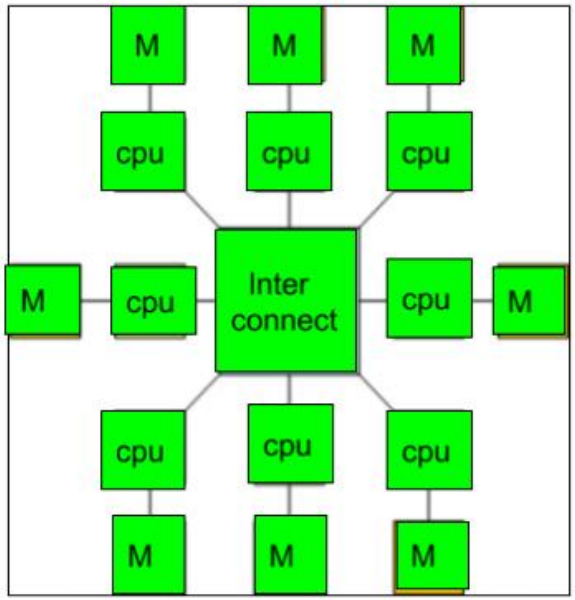
- A single computer containing multiple processors operating in parallel.



Multiprocessor Vs Multicomputer



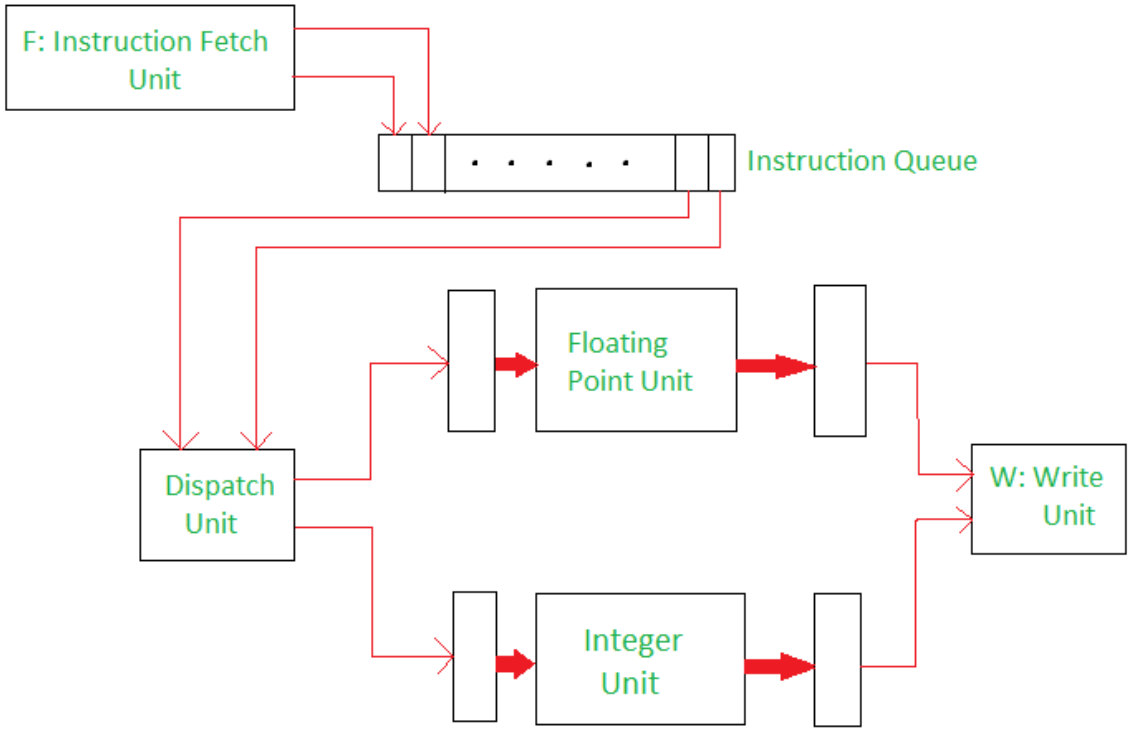
Multiprocessor



Multicomputer

Superscalar Architecture

A processor that can execute more than one instruction during a clock cycle



Processor with Two Execution Units

Thank You