

Flynn's Classification Of Computer Architectures

- In 1966, Michael Flynn proposed a classification for computer architectures based on the number of instruction streams and data streams (Flynn's Taxonomy).
- Flynn uses the stream concept for describing a machine's structure
- A stream simply means a sequence of items (data or instructions).
- The classification of computer architectures based on the number of instruction streams and data streams (Flynn's Taxonomy).

Flynn Classification Of Computer architectures

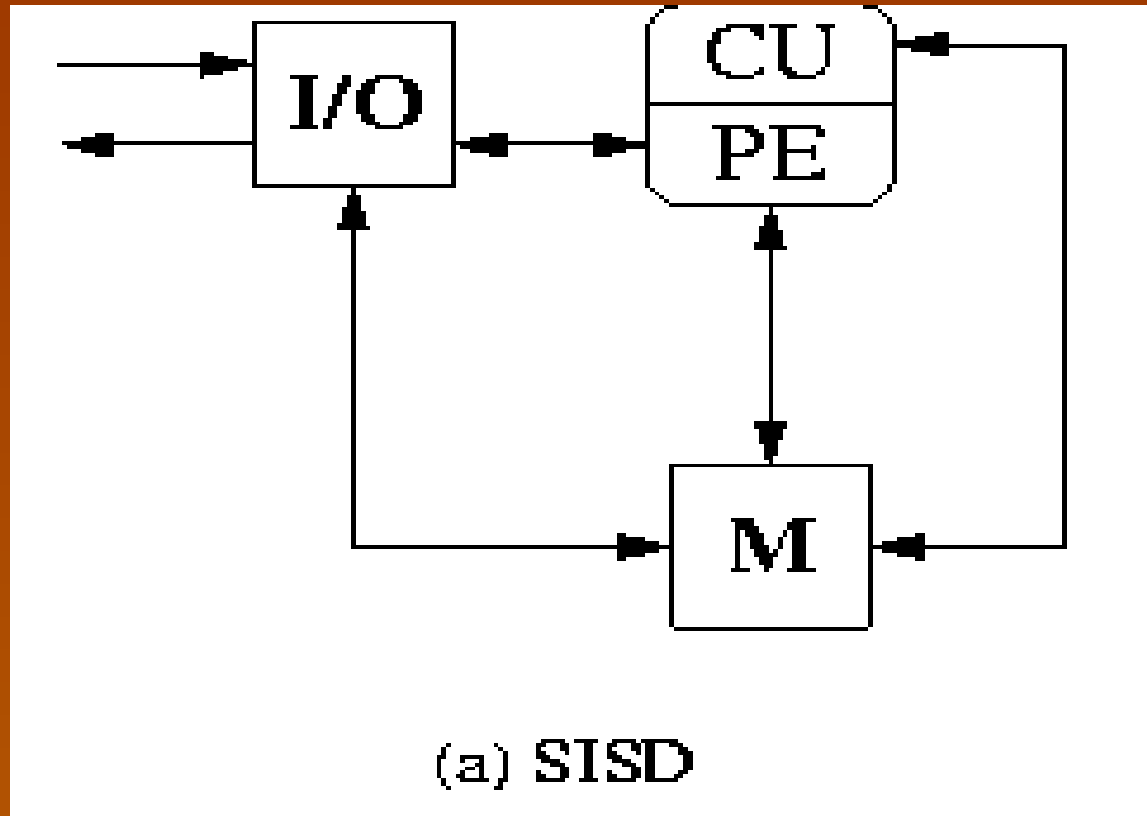
Flynn's Taxonomy

- SISD: Single instruction single data
 - Classical von Neumann architecture
- SIMD: Single instruction multiple data
- MISD: Multiple instructions single data
 - Non existent, just listed for completeness
- MIMD: Multiple instructions multiple data
 - Most common and general parallel machine

SISD

- **SISD** (Single-Instruction stream, Single-Data stream)
- SISD corresponds to the traditional mono-processor (von Neumann computer). A single data stream is being processed by one instruction stream OR
- A single-processor computer (uni-processor) in which a single stream of instructions is generated from the program.

SISD

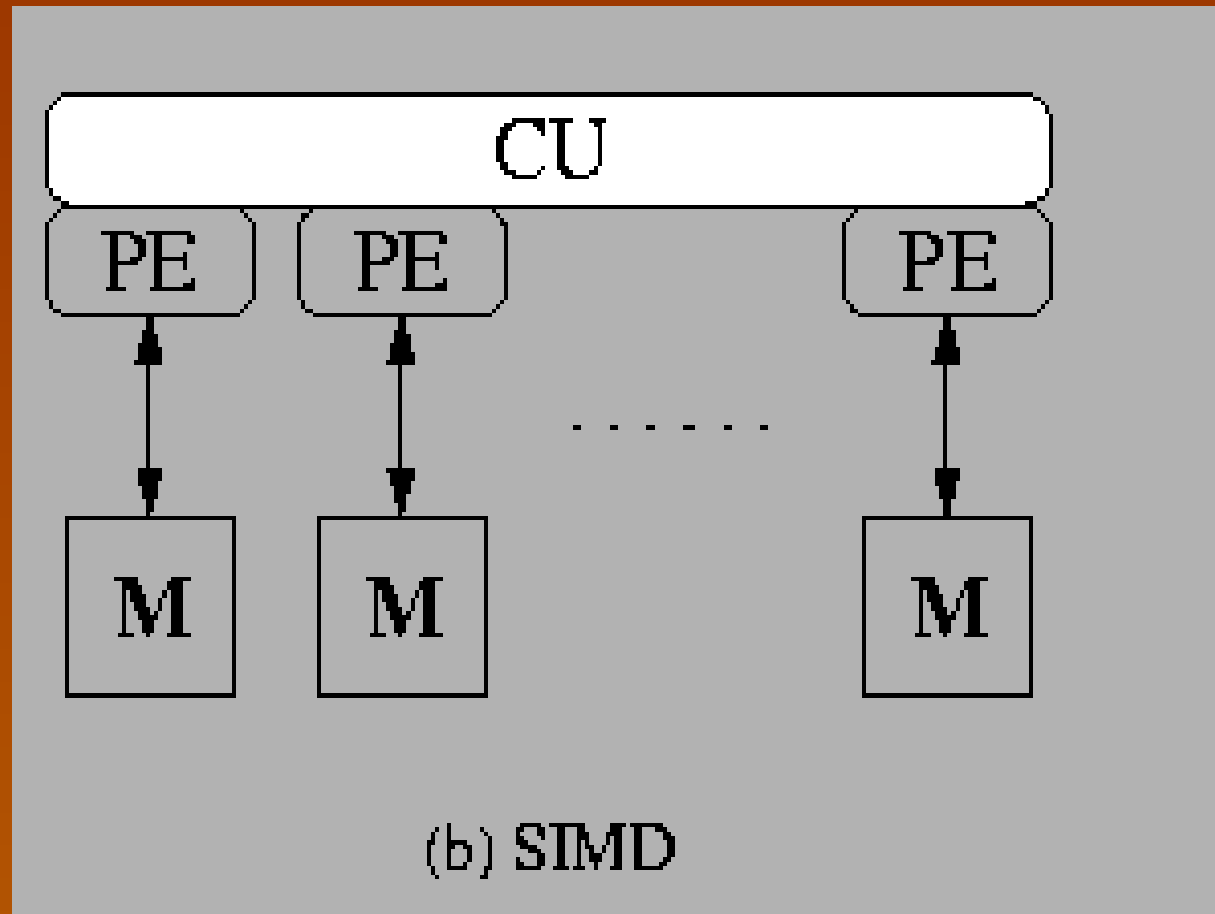


where CU= Control Unit, PE= Processing Element,
 M= Memory

SIMD

- **SIMD** (Single-Instruction stream, Multiple-Data streams)
- Each instruction is executed on a different set of data by different processors i.e multiple processing units of the same type process on multiple-data streams.
- This group is dedicated to array processing machines.
- Sometimes, vector processors can also be seen as a part of this group.

SIMD



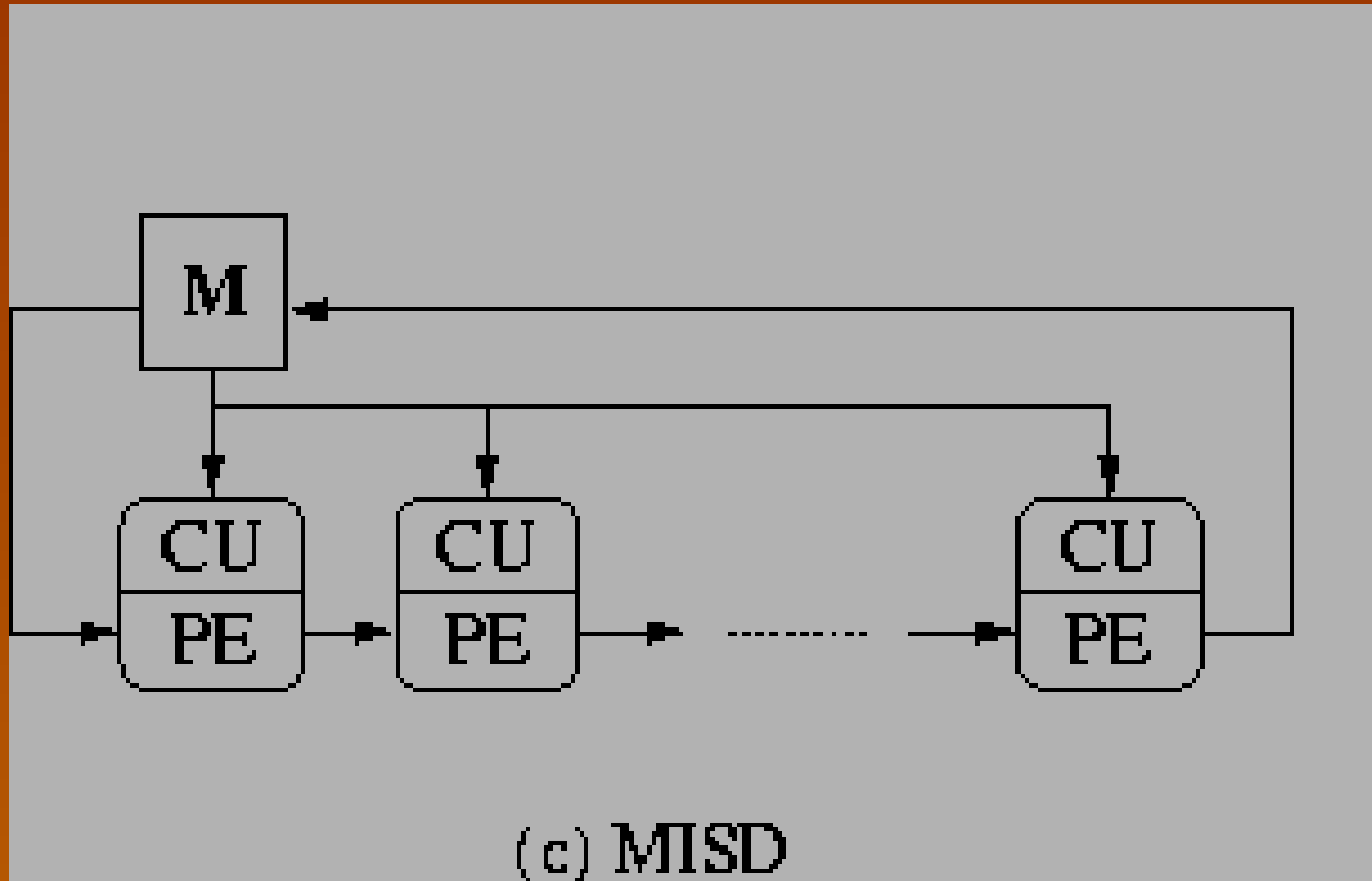
where

CU= Control Unit, PE= Processing Element,
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MISD

- MISD (Multiple-Instruction streams, Single-Data stream)
- Each processor executes a different sequence of instructions.
- In case of MISD computers, multiple processing units operate on one single-data stream .
- In practice, this kind of organization has never been used

MISD



where CU= Control Unit, PE= Processing Element,
M= Memory

MIMD

- **MIMD** (Multiple-Instruction streams, Multiple-Data streams)
- Each processor has a separate program.
- An instruction stream is generated from each program.
- Each instruction operates on different data.
- This last machine type builds the group for the traditional multi-processors. Several processing units operate on multiple-data streams.

MIMD Diagram

