Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2024-25

Class:	S.E.	Semester:	III
Course Code:	CSC304	Course Name:	DIGITAL LOGIC & COMPUTER ARCHITECTURE

Name of Student:	SHRUTI GAUCHANDRA
Roll No. :	15
Assignment No.:	06
Title of Assignment:	Compare Serial/Parallel processing & ISA, PCI, USB Buses
Date of Submission:	
Date of Correction:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Completeness	5	4
Demonstrated Knowledge	3	3
Legibility	2	1
Total	10	8

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Completeness	5	3-4	1-2
Demonstrated Knowledge Legibility	3	2	1
Legibility	2	1	0

Checked by

Name of Faculty : MS KSHITIJA GHARAT

Signature : Kharat

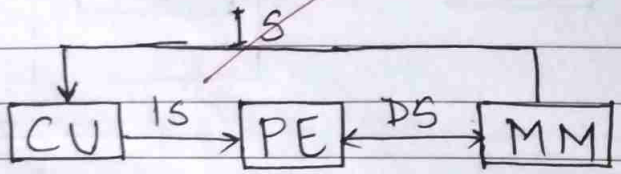
Date : 11/10/24

Q1 List the Flynn's classification of Parallel Processing system.

→ Flynn introduced a method for classification of parallel processors. It is most commonly used. This classification is based on the number of instruction streams (IS) and Data streams (DS) in the system.

Hence, Flynn classified the parallel processing into four categories:
1. Single instruction Single Data (SISD)
2. Single instruction Multiple Data (SIMD)
3. Multiple Instruction Single Data (MISD)
4. Multiple Instruction Multiple Data (MIMD)

1. Single Instruction Single Data (SISD)
In this case, there is a single processor that executes one instruction at a time on single data stored in the memory.



CU - It accepts the instruction from the processor and decodes it.
PE - It accesses the data from the memory and performs the operation on this data

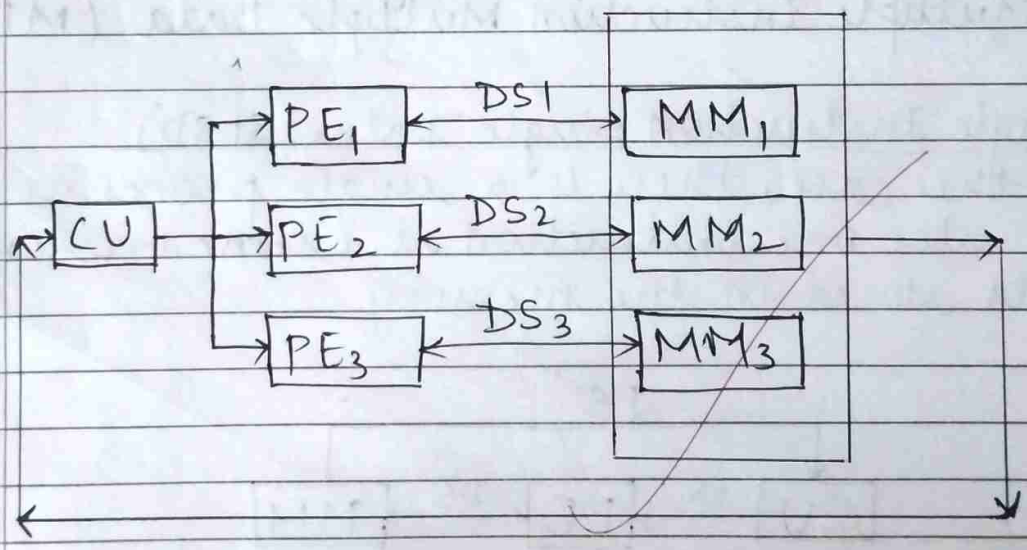
as per the signal given by Control Unit.

MM - It is connected to the PE and the CU for the data and the instruction streams respectively.

2. Single Instruction Multiple Data (SIMD)

In this case, the same instruction is given to multiple processing elements, but different data. ~~This~~

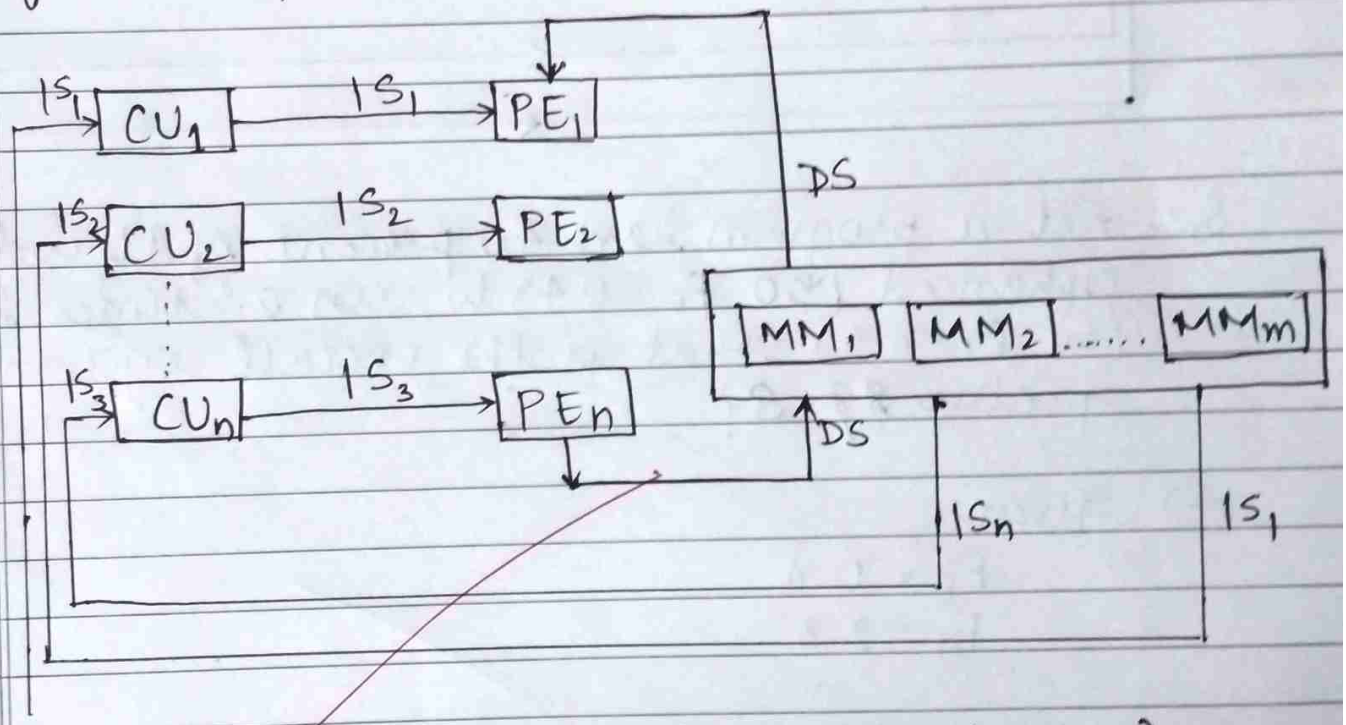
This kind of system is mainly used when many data have to be operated with same operation.



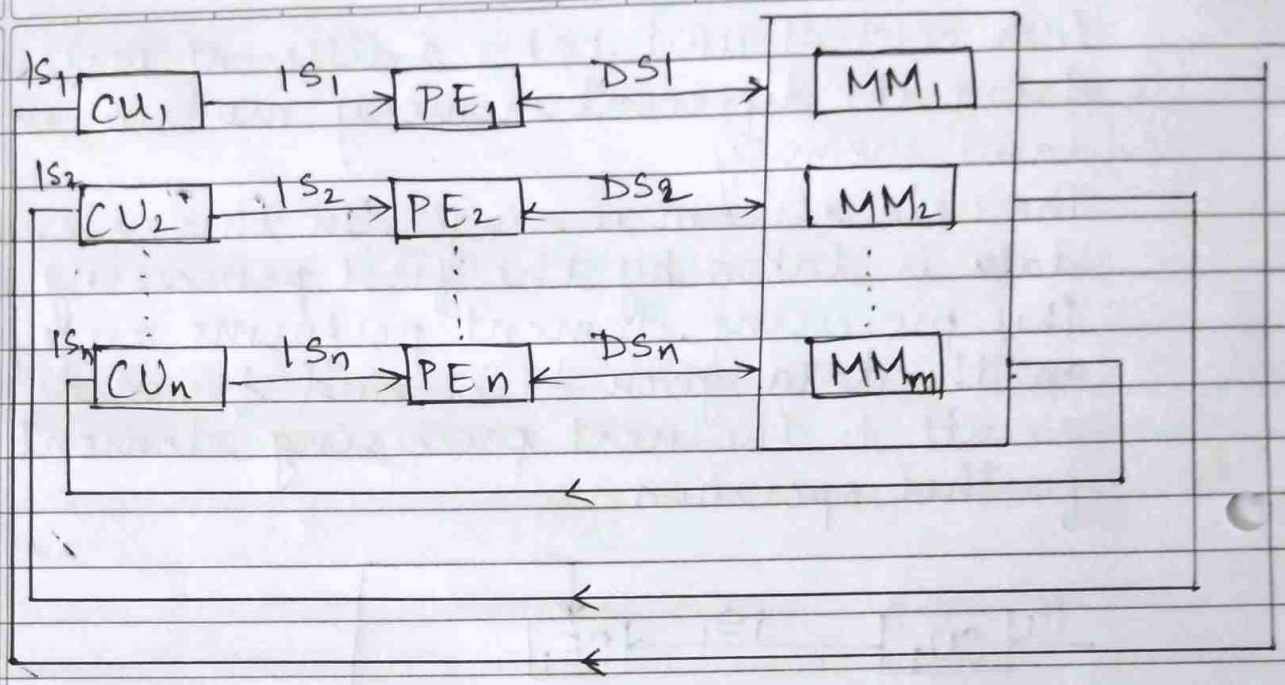
3. Multiple Instruction Single Data (MISD)

In case of MISD, there are multiple instruction streams and hence multiple control units to decode these instructions.

Each control unit takes a different instruction from the different memory module in the same memory.
The data stream is single. In this case, the data is taken by the first processing element This processing element performs an operation on the data given to it and forwards the result to the next processing element for further operation.



4. Mutliple Instruction Multiple Data (MIMD)
This is a complete parallel processing example. Here each processing element is having a different set of data and different set of data and different instruction.



Q2. Let a program have 40 percent of its code enhanced (so $F_E = 0.4$) to run 2.3 times faster (so $F_1 = 2.3$) What is the overall system speedup ~~S~~ S?

→ Given:

$F_E = 0.4$

$F_1 = 2.3$

$$S(n) = \frac{ts}{Fts + (1-F)ts/n} = \frac{ts}{0.6ts + \frac{0.4\,ts}{2.3}}$$

$$= \frac{1 \times 2.3}{0.6 \times 2.3 + 0.4}$$

$$S(n) = 1.29$$