Assignment No. 01

Page No.
Date 13/3/2023

Q.1) what is pipelining and superscalar execution.

⇒ Pipelining is an implementation technique where by multiple instructions are overlapped in execution.

this is solved without additional hardware but only by letting different instructions at the same time. this technique responsible for large increases in program execution speed.

- A superscalar architecture is one in which several instructions can be initiated simultaneously & executed independently.

- Pipelining is a technique of decomposing a sequential process into sub operations with each sub process being executed in a special dedicated segment that operates concurrently with all other segments.

A pipeline can be visualized as a collection of processing segment through which binary information flows.

Each segment perform partial processing dictated by the way the task is partitioned.

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Q. 2] what is parallel computing? write application of parallel computing.

⇒ Parallel computing is a study, design and implementation of algorithms in a way as to make use of multiple processors to solve a problem.

The primary purpose is the solve a problem faster or a bigger problem in the same amount of time by using more processors to share the work.

Parallel computing is a type of computation in which many calculations are carried out simultaneously, operating on the principle that large problem can often be divided into smaller ones, which are then solved at the same time.

- Applications of parallel computing:-
  1) smartphones
  2) Laptops & desktops
  3) ILLIAC
  4) NASA's space
  5) SETI
  6) Bitcoin,
  7) IOT.

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Page No.
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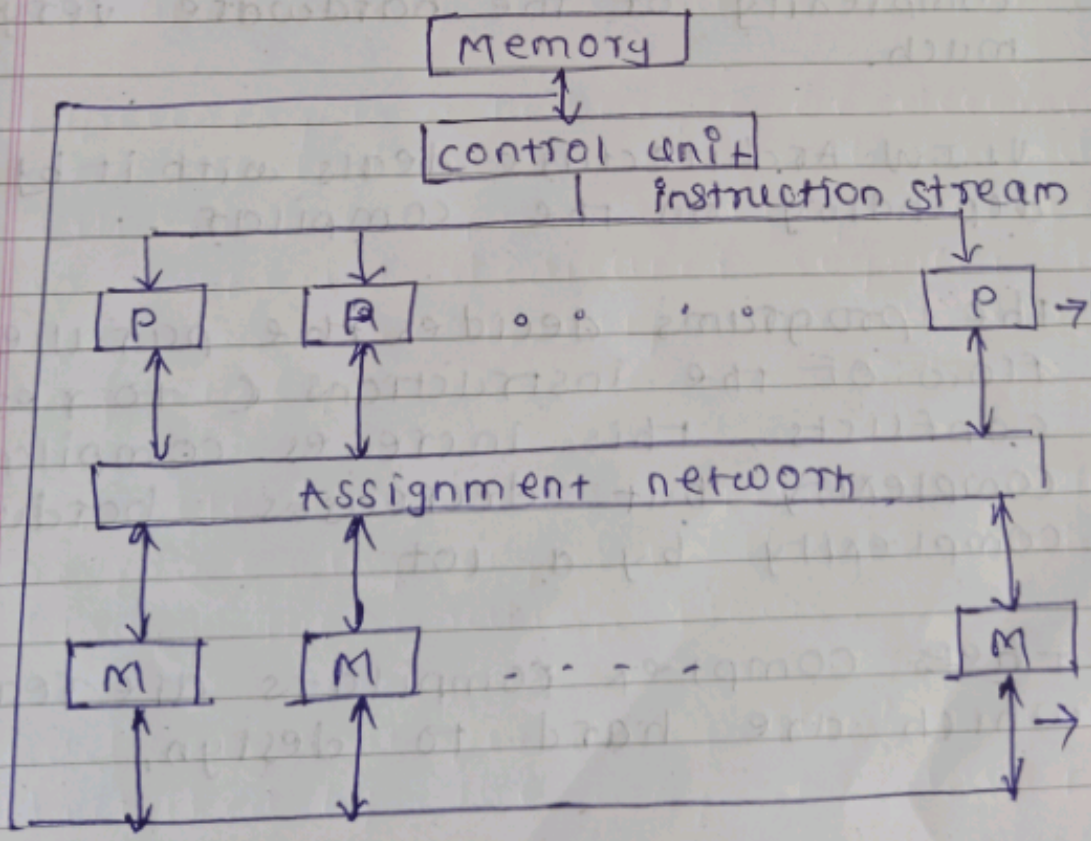
3) Explain SIMD processors.

⇒ SIMD stands for 'single instruction and multiple data stream. It represents an organization that includes many processing unit under the supervision of a common control unit.

All processors receive the same instructio from the control unit but operate on different items of data.

The shared memory unit must contain multiple modules so that it can communicate with all the processors simultaneously.



4) Explain very long instruction word (VLIW) processors.

⇒ VLIW uses instruction level parallelism i.e. it has programs to control the parallel execution of the instructions.

In other architectures, the performance of the processor is improved by using either of the following methods :-

1) pipelining
2) superscalar
3) out-of-order execution

But each of these methods add to the complexity of the hardware very much.

VLIW Architecture deals with it by depending on the compiler.

The programs decides the parallel flow of the instructions & to resolve conflicts, this increses compiler complexity but decreases hardware complexity by a lot.

~~Ther~~ complex compilers are required which are hard to design.

5) ⇒

5) Explain MIMD processors.

⇒ Multiple instruction, Multiple data (MIMD) refers to a parallel architecture which is probably the most basic but most familiar type of parallel processor.