

1A.

In architectures referred to as single instruction stream, multiple data stream (SIMD), a single control unit dispatches instructions to each processing unit. In an SIMD parallel computer, the same instruction is executed synchronously by all processing units.

Computers in which each processing element is capable of executing a different program independent of the other processing elements are called multiple instruction stream, multiple data stream (MIMD) computers.

SIMD computers require less hardware than MIMD computers because they have only one global control unit.

SIMD computers require less memory because only one copy of the program needs to be stored. In contrast, MIMD computers store the program and operating system at each processor.

2A.

If the time taken by a processor to access any memory word in the system (global or local) is identical, the platform is classified as a uniform memory access (UMA) multicomputer. On the other hand, if the time taken to access certain memory words is longer than others, the platform is called a non-uniform memory access (NUMA) multicomputer.

3A.

In shared address space platform ensuring that concurrent operations on multiple copies of the same memory word have well-defined semantics is called cache coherence.

4A.

A Model of computation (the Random Access Machine, or RAM) consists of processors and a global memory of unbounded size that is uniformly accessible to all processors. All processors access the same address space. Processors share a common clock but may execute different instructions in each cycle. This ideal model is also referred to as a parallel random access machine (PRAM).