Quiz 1 for BCS-6A

Time Allowed: 5 Minutes

Your Roll No: _____

Max Marks: 6 points

Your Name: _____

Date: January 28, 2025 (Tuesday)

Question1: Write two major differences between shared-memory and message-passing based parallel and distributed systems. **[2 Points]**

(1) Processors in shared-memory system have the same physical address-space which is often kept coherent by the hardware when multiple processors try to read / write to the same word. Processors in a message-passing system have their own private memories and associated address spaces.
(2) For message-passing paradigm, explicit sending and reception of message is required to write or read data from the other processors.

Side Note: For certain classes of problems, programming on a shared-memory system might be easier than a message-passing based systems.

Question2: Name a hardware for each of the following four, which can be classified as: [**4 Points]**

(a) SISD
(b) SIMD
(c) MIMD
(d) MISD

Flynn's Classification Name	Example Hardware
SISD (Single instruction stream, single data stream)	Pentium Pro processor with just one core
SIMD (Single instruction stream, multiple data stream)	Vector processors, SSE / AVX units in Intel processors
MIMD (Multiple instruction streams, multiple data streams)	Multi-core processors
MISD (Multiple instruction streams, single data stream)	No practical hardware exists. Systolic arrays (found in Google's TPU) and some hardware in NASA's shuttles might be considered an example of MISD. (See: https://en.wikipedia.org/wiki/Multiple_instruction,_single_data)