

Match the following multiprocessor architectures with their defining characteristics:

1. Architecture Characteristic

I. Symmetric Multiprocessing (SMP) A. All processors share a common memory and operate under a single OS kernel, facilitating uniform memory access.

II. Distributed Memory Multiprocessing (DMP) B. Processors have private memory; communication occurs through message passing, leading to scalable architectures.

III. Asymmetric Multiprocessing (AMP) C. One master processor manages task scheduling, while slave processors execute assigned tasks independently.

IV. Multi-core Processor D. Multiple cores integrated on a single chip, sharing cache and interconnection pathways for efficient parallel processing.

Choose the correct answer from the options given below:

(1) I-B, II-A, III-C, IV-D

(2) I-A, II-B, III-D, IV-C

(3) I-C, II-D, III-A, IV-B

(4) I-B, II-C, III-D, IV-A

Answer Key: 1

Solution:

? SMP: All processors share a common memory and operate under a single OS, enabling uniform data access and easier programming.

? DMP: Each processor has its private memory, communicating via message passing, which allows scalability but increases complexity.

? AMP: A single master processor controls task distribution; slave processors perform specific tasks, often used in specialized systems.

? Multicore: Multiple processing units on a single chip share cache and pathways, enhancing throughput and power efficiency.

Hence, Option (1) is the right answer.

Match the following knowledge representation techniques with their fundamental features:

1. Technique Feature

I. Logic A. Expresses knowledge through formal rules and propositional or predicate calculus, enabling inferencing.

II. Semantic Networks B. Graphical structures representing concepts and their relationships, facilitating intuitive understanding.

III. Frames C. Data structures encapsulating attributes and values about objects, supporting inheritance.

IV. Rules D. Conditional statements that derive conclusions based on premises, used in expert systems.

Choose the correct answer from the options given below:

(1) I-B, II-C, III-D, IV-A

(2) I-A, II-B, III-C, IV-D

(3) I-D, II-A, III-B, IV-C

(4) I-C, II-D, III-A, IV-B

Answer Key: 2

Solution:

? Logic: Formal systems based on propositional or predicate calculus allow rigorous reasoning and inference.

? Semantic Networks: Graph structures that depict concepts and their relationships, aiding in knowledge visualization.

? Frames: Data structures that define objects with attributes, supporting inheritance and modular representation.

? Rules: Conditional statements used in expert systems to infer new knowledge from existing facts.

Hence, Option (2) is the right answer.

3. Match the following input-output transfer modes with their descriptions:

1. Transfer Mode Characteristic

I. Synchronous Transfer A. Data transfer occurs with synchronization signals, requiring precise timing.

II. Asynchronous Transfer B. Data is transferred without clock signals, often via start and stop bits.

III. Programmed I/O C. The CPU actively polls the device to transfer data.

IV. Direct Memory Access (DMA) D. Data transfer involves a dedicated controller that transfers data directly between I/O device and memory without CPU intervention.

Choose the correct answer from the options given below:

(1) I-B, II-A, III-C, IV-D

(2) I-A, II-B, III-D, IV-C

(3) I-C, II-D, III-A, IV-B

(4) I-B, II-A, III-D, IV-C

Answer Key: 2

Solution:

? Synchronous: Data transfer synchronized with a clock signal, ensuring data integrity at the cost of requiring precise timing.

? Asynchronous: Transfers data without a shared clock, relying on start/stop bits, suitable for irregular data rates.

? Programmed I/O: CPU directly controls data transfer by polling device status, suitable for low-speed devices.

? DMA: A controller manages data transfer directly between device and memory, freeing CPU resources and increasing efficiency.

Hence, Option (2) is the right answer.