Match the following Windows Operating Systems components with their functionalities:  
1. System Components Functionality  
I. Terminal Services A. Allows multiple users to interact with the computer simultaneously  
II. File System B. Manages data storage and retrieval  
III. Fast User Switching C. Enables quick switching between user accounts without closing applications  
IV. Networking D. Handles communication between computers  
Choose the correct answer from the options given below:  
(1) I-D, II-B, III-C, IV-A  
(2) I-A, II-B, III-C, IV-D  
(3) I-B, II-D, III-A, IV-C  
(4) I-C, II-A, III-D, IV-B  
Answer Key: 1   
Solution:  
• Terminal Services: Allows multiple remote users to access the system concurrently, effectively handling multiple sessions.  
• File System: Responsible for organizing and controlling how data is stored and retrieved on a disk.  
• Fast User Switching: Permits users to switch between accounts without having to close applications, providing a seamless user experience.  
• Networking: Manages all aspects of data transmission between systems within a network.  
Hence, Option (1) is the right answer.  
  
Match the following networking technologies with the associated protocol or technique:  
1. Networking Technology Protocol/Technique  
I. Multiple Access B. CSMA/CD  
II. Framing C. HDLC  
III. IPv4 Addressing D. Classful Addressing  
IV. Error Control E. SCTP  
Choose the correct answer from the options given below:  
(1) I-B, II-C, III-D, IV-E  
(2) I-C, II-D, III-A, IV-B  
(3) I-B, II-A, III-D, IV-C  
(4) I-D, II-B, III-C, IV-A  
Answer Key: 1   
Solution:  
• Multiple Access: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) is used in networks to regulate how devices respond when multiple devices attempt to use a data channel simultaneously and collisions occur.  
• Framing: High-level Data Link Control (HDLC) is a type of data framing that provides both flow and error control.  
• IPv4 Addressing: Classful addressing is a method in IPv4 that divides the address space into five classes, A through E.  
• Error Control: Stream Control Transmission Protocol (SCTP) provides robust error control mechanisms, which are crucial in ensuring data integrity across networks.  
Hence, Option (1) is the right answer.  
  
Match the following process management techniques with their descriptions:  
1. Process Management Techniques Description  
I. Process Synchronization A. Uses semaphores or mutexes to manage the race conditions  
II. Critical-Section Problem B. Problem ensuring no two processes are in their critical section simultaneously  
III. Peterson's Solution C. Specific solution to the critical-section problem using two process variables  
IV. Interprocess Communication D. Mechanism allowing processes to communicate and synchronize their actions  
Choose the correct answer from the options given below:  
(1) I-A, II-B, III-C, IV-D  
(2) I-B, II-A, III-D, IV-C  
(3) I-C, II-D, III-B, IV-A  
(4) I-D, II-C, III-A, IV-B  
Answer Key: 1   
Solution:  
• Process Synchronization: Involves coordination among processes, where semaphores or mutexes are typical tools used to handle race conditions.  
• Critical-Section Problem: A classical concurrency control problem where the system must ensure that no two processes are executing their critical sections at the same time.  
• Peterson's Solution: A software-based solution to the critical-section problem, using two process variables to prevent simultaneous execution in the critical section.  
• Interprocess Communication: Facilitates the exchange of data between processes, crucial for coordinating actions and state across different executing threads.  
Hence, Option (1) is the right answer.  
  
Match the following algorithmic strategies with their primary application:  
1. Algorithm Strategy Application  
I. Divide and Conquer B. QuickSort  
II. Dynamic Programming C. Optimal Substructure  
III. Greedy Algorithms D. Minimum Spanning Tree  
IV. Backtracking E. Solving puzzles with constraints  
Choose the correct answer from the options given below:  
(1) I-D, II-C, III-B, IV-A  
(2) I-B, II-D, III-A, IV-C  
(3) I-B, II-C, III-D, IV-E  
(4) I-D, II-B, III-C, IV-A  
Answer Key: 1   
Solution:  
• Divide and Conquer: QuickSort is a classic example of divide and conquer, where the problem is divided into smaller problems, each sorted individually and then combined.  
• Dynamic Programming: Utilizes the principle of optimal substructure; complex problems are broken down into simpler sub-problems in a recursive manner.  
• Greedy Algorithms: Often used for problems like finding the minimum spanning tree, where local optimal choices are made with the hope of finding a global optimum.  
• Backtracking: Applied to problems like puzzle solving, where constraints must be met, and the algorithm backtracks when a constraint is violated to explore other possibilities.  
Hence, Option (1) is the right answer.  
  
Match the following fuzzy set operations with their descriptions:  
1. Fuzzy Set Operations Description  
I. Fuzzification A. Converts a real number input into a fuzzy set representation  
II. Defuzzification B. Produces a crisp output from a fuzzy set  
III. Fuzzy Inference C. Applies rules to determine output fuzzy sets  
IV. Fuzzy Control System D. Utilizes fuzzy logic to control processes  
Choose the correct answer from the options given below:  
(1) I-A, II-B, III-C, IV-D  
(2) I-B, II-A, III-D, IV-C  
(3) I-C, II-D, III-B, IV-A  
(4) I-D, II-C, III-A, IV-B  
Answer Key: 1   
Solution:  
• Fuzzification: Converts crisp values into degrees of membership for fuzzy analysis.  
• Defuzzification: Converts the fuzzy output derived from fuzzy inference back into a single scalar quantity.  
• Fuzzy Inference: Uses fuzzy logic rules to combine fuzzy sets into a mapped output according to logical rules.  
• Fuzzy Control System: Implements fuzzy logic for controlling systems and processes, adjusting changes dynamically based on fuzzy rules.  
Hence, Option (1) is the right answer.