--Question Starting--

Match the following syntax analysis techniques with their defining characteristics, considering their approach to parsing:

1. Associativity and Precedence Characteristic

I. Recursive Descent A. Primarily top-down, uses lookahead and predictive parsing

II. LL(1) Parsing B. Uses a stack, performs left-to-right parsing with one lookahead token

III. LR Parser C. Handles more complex grammars via shift-reduce methodology

IV. Bottom-up Parsing D. Deals with associativity and precedence via grammar transformations

Choose the correct answer from the options given below:

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

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

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

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

Answer Key: 4

Solution:

? Associativity and precedence influence grammar transformations and parsing strategies, especially in bottom-up parsing methods.

? Recursive Descent and LL(1) are top-down parsers, relying on lookahead and grammar predictions, less directly concerned with associativity.

? LR parsers, a class of bottom-up parsers, manage shift-reduce operations that inherently handle associativity and precedence via grammar rules.

? Bottom-up parsing techniques systematically reduce input to start symbols, naturally integrating precedence, and associativity considerations.

Hence, Option (4) is the right answer.

--Question Starting--

3. Match the following data processing models with their key characteristics, reflecting their handling of distributed data and fault tolerance:

1. Big Data Architecture Characteristic

I. MapReduce A. Processes large datasets by mapping and reducing, inherently fault-tolerant

II. Hadoop Distributed File System B. Provides distributed storage with replication for fault tolerance

III. Data Lake C. Centralized storage for raw data, schema on read approach

IV. Distributed File System D. Supports scalable, distributed data processing frameworks

Choose the correct answer from the options given below:

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

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

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

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

Answer Key: 1

Solution:

? MapReduce leverages a model where data is processed in distributed tasks with inherent fault tolerance via task re-execution, fitting characteristic A.

? Hadoop Distributed File System (HDFS) offers distributed storage with data replication, ensuring fault tolerance, matching characteristic B.

? Data Lake is a centralized repository storing raw data with a schema-on-read approach, aligning with characteristic C.

? Distributed File Systems underlie frameworks like HDFS, providing scalable, distributed storage, matching characteristic D.

Hence, Option (1) is the right answer.

--Question Starting--

4. Match the following sets and relations with their properties, considering their mathematical definitions:

1. Properties of Relations Characteristic

I. Symmetric A. For any (a, b), if (a, b) ? R then (b, a) ? R

II. Transitive B. For any (a, b) and (b, c), (a, c) ? R

III. Equivalence Relation C. A relation that is reflexive, symmetric, and transitive

IV. Partial Order D. A relation that is reflexive, antisymmetric, and transitive

Choose the correct answer from the options given below:

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

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

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

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

Answer Key: 2

Solution:

? Symmetric property (I) states that if (a, b) ? R then (b, a) ? R, matching option A.

? Transitivity (II) ensures that if (a, b) and (b, c) are in R, then (a, c) must also be in R, matching B.

? An Equivalence Relation (III) is characterized by being reflexive, symmetric, and transitive, thus matching C.

? A Partial Order (IV) is a relation that is reflexive, antisymmetric, and transitive, aligning with D.

Hence, Option (2) is the right answer.