

Databases

1. Database Design

1.1 Given a scenario, design tables for storing data

- Identify entities, rows/records, columns/fields

1.2 Given a scenario, identify the appropriate primary key

- Primary key, composite/compound key

1.3 Given a scenario, choose data types to meet requirements

- Definition and importance of data types; how data types affect storage requirements; data types for storing text, numbers, dates and times, and Boolean values

1.4 Given a scenario, design relationships between tables

- How to establish relationships using primary and foreign keys, entity-relationship diagrams (ERDs), referential integrity

1.5 Normalize a database

- Reasons for normalization, how to normalize a database to third normal form (3NF)

1.6 Given a scenario, identify data protection measures

- Backups, restore, principle of least privilege, GRANT, WITH GRANT OPTION, REVOKE, purpose of roles

2. Database Object Management using DDL

2.1 Construct and analyze queries that create, alter, and drop tables

- Create, alter, and drop tables by using proper ANSI SQL syntax; NULL and NOT NULL

2.2 Construct and analyze queries that create, alter, and drop views

- Create, alter, and drop views by using proper ANSI SQL syntax; purpose of views

2.3 Construct and analyze stored procedures and functions

- Input and output parameters, return values, purpose of stored procedures

2.4 Given a scenario, choose between clustered and non-clustered indexes

- When to use clustered vs. non-clustered indexes, syntax for creating indexes

3. Data Retrieval

3.1 Construct and analyze queries that select data

- INNER JOIN, LEFT JOIN, RIGHT JOIN, CROSS JOIN (Cartesian product), and FULL OUTER JOIN; self joins; combine result sets by using UNION and INTERSECT; DISTINCT; column alias; computed columns

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3.2 Construct and analyze queries that sort and filter data

- ORDER BY, WHERE, LIKE, BETWEEN, AND, OR, NOT, TOP (LIMIT), IN, NOT IN, ANY, ALL, NULL, NOT NULL, comparison operators

3.3 Construct and analyze queries that aggregate data

- GROUP BY, HAVING, MIN, MAX, COUNT, AVG (AVERAGE), SUM

4. Data Manipulation using DML

4.1 Construct and analyze INSERT statements

- INSERT INTO SELECT, INSERT INTO VALUES

4.2 Construct and analyze UPDATE statements

- Update data in a single table

4.3 Construct and analyze DELETE statements

- Delete data from a single table

5. Troubleshooting

5.1 Troubleshoot data object management query failures

- Syntax and runtime errors

5.2 Troubleshoot data retrieval query failures

- Syntax and runtime errors

5.3 Troubleshoot data manipulation query failures

- Syntax and runtime errors



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