```
insert into Course (courseName, minDegree, maxDegree, description)
values
('Database Systems', 50.00, 100.00, 'Introduction to relational databases
and SQL queries'),
('Software Engineering', 50.00, 100.00, 'Overview of software development
methodologies and project management'),
('Operating Systems', 50.00, 100.00, 'Study of operating system concepts
including memory management and process scheduling'),
('Data Structures and Algorithms', 50.00, 100.00, 'Introduction to data
structures, algorithms, and their time complexity analysis'),
('Web Development', 50.00, 100.00, 'Design and development of modern web
applications using HTML, CSS, and JavaScript');
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--Database Systems
insert into question (questionType, questionText, degree, courseID)
values
('MCQ', 'Which of the following is a SQL command used to retrieve data?',
2.00, 1),
('MCQ', 'What does SQL stand for?', 2.00, 1),
('True/False', 'In a relational database, a table can have multiple
primary keys.', 2.00, 1),
('MCQ', 'Which type of join returns all rows from the left table and
matching rows from the right table?', 2.00, 1),
('True/False', 'The SELECT statement is used to modify data in a table.',
2.00, 1),
('MCQ', 'Which of the following is not a valid data type in SQL?', 2.00,
1),
('MCQ', 'What command is used to delete data in SQL?', 2.00, 1),
('True/False', 'A foreign key in a table can have duplicate values.',
2.00, 1),
('MCQ', 'Which of the following clauses is used to filter records in a
query?', 2.00, 1),
('True/False', 'SQL is case-insensitive when writing commands.', 2.00, 1),
('MCQ', 'Which SQL function is used to count the number of rows in a
table?', 2.00, 1),
('MCQ', 'What is the purpose of the GROUP BY clause in SQL?', 2.00, 1),
('True/False', 'In SQL, the HAVING clause is used to filter groups of
data.', 2.00, 1),
('MCQ', 'Which of the following SQL commands is used to create a table?',
2.00, 1),
('MCQ', 'Which type of relationship does a foreign key represent?', 2.00,
1),
('True/False', 'In SQL, indexes can improve query performance.', 2.00, 1),
('MCQ', 'What does the DISTINCT keyword do in an SQL query?', 2.00, 1),
('True/False', 'SQL commands can be case-sensitive depending on the
database system.', 2.00, 1),
('MCQ', 'Which of the following is an aggregate function in SQL?', 2.00,
1),
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('MCQ', 'What is the default sorting order when using the ORDER BY clause
in SQL?', 2.00, 1),
('True/False', 'You can have multiple foreign keys in a table that refer
to the same primary key in another table.', 2.00, 1),
('MCQ', 'What does the SQL UPDATE statement do?', 2.00, 1),
('MCQ', 'Which SQL command is used to remove a table from a database?',
2.00, 1),
('True/False', 'The SQL DELETE command can be used to remove records from
a table.', 2.00, 1),
('MCQ', 'What is a subquery in SQL?', 2.00, 1),
('True/False', 'You can only use the COUNT function with numeric columns
in SQL.', 2.00, 1),
('MCQ', 'What does the SQL keyword LIKE do?', 2.00, 1),
('True/False', 'A table can have only one primary key, but it can have
multiple unique keys.', 2.00, 1),
('MCQ', 'Which of the following is an example of a DDL statement in SQL?',
2.00, 1),
('MCQ', 'What is the purpose of the INSERT INTO statement in SQL?', 2.00,
1),
('True/False', 'The INNER JOIN keyword is used to combine rows from two or
more tables based on a related column between them.', 2.00, 1),
('MCQ', 'Which of the following SQL commands is used to add a column to a
table?', 2.00, 1),
('True/False', 'The WHERE clause can be used to update records in SQL.',
2.00, 1),
('MCQ', 'Which of the following functions is used to get the largest value
in a column in SQL?', 2.00, 1),
('MCQ', 'Which SQL clause is used to filter rows in a result set?', 2.00,
1),
('True/False', 'You can use a LEFT JOIN to include all rows from the right
table and matching rows from the left table.', 2.00, 1),
('MCQ', 'Which of the following is an example of a non-clustered index?',
2.00, 1),
('True/False', 'In SQL, a self join is used to join a table with itself.',
2.00, 1),
('MCQ', 'What does SQL stand for?', 2.00, 1),
('MCQ', 'Which of the following is a SQL command used to change the
structure of a table?', 2.00, 1),
('True/False', 'A foreign key constraint ensures that data in a table is
consistent with the data in another table.', 2.00, 1),
('MCQ', 'What is the purpose of a transaction in SQL?', 2.00, 1),
('True/False', 'The ALTER command is used to delete data from a table.',
2.00, 1),
('MCQ', 'Which SQL function is used to find the average value of a
column?', 2.00, 1),
('True/False', 'A table can have only one primary key, but it can have
multiple unique constraints.', 2.00, 1),
('MCQ', 'What is normalization in the context of database design?', 2.00,
1),
('True/False', 'In SQL, a composite key is a primary key that consists of
more than one column.', 2.00, 1),
('MCQ', 'Which SQL command is used to retrieve data from a table?', 2.00,
1),
```

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('True/False', 'A NULL value in SQL is the same as an empty string.',
2.00, 1),
('MCQ', 'Which of the following SQL commands is used to modify an existing
column in a table?', 2.00, 1),
('MCQ', 'Which of the following is an example of a relational database
management system (RDBMS)?', 2.00, 1),
('True/False', 'A trigger in SQL is used to automatically perform a
specified action when certain events occur.', 2.00, 1),
('MCQ', 'Which of the following is an example of a database constraint?',
2.00, 1),
('True/False', 'The SQL UNION operator is used to combine results from two
queries into a single result set.', 2.00, 1),
('MCQ', 'What type of index is created automatically when a primary key is
defined?', 2.00, 1),
('True/False', 'You can use an alias in SQL to temporarily rename a table
or column.', 2.00, 1),
('MCQ', 'What is the difference between a primary key and a unique key?',
2.00, 1),
('MCQ', 'What is a view in SQL?', 2.00, 1),
('True/False', 'The SQL TRUNCATE command is faster than DELETE for
removing all rows in a table.', 2.00, 1),
('MCQ', 'Which SQL statement is used to remove a column from a table?',
2.00, 1),
('MCQ', 'Which SQL command is used to add a new row to a table?', 2.00,
1),
('True/False', 'SQL commands are case-sensitive by default.', 2.00, 1),
('MCQ', 'What does the SQL keyword BETWEEN do?', 2.00, 1),
('True/False', 'The SQL SELECT statement can be used with aggregate
functions.', 2.00, 1),
('MCQ', 'Which SQL command is used to rename a table?', 2.00, 1),
('MCQ', 'What does the SQL LEFT JOIN keyword do?', 2.00, 1),
('True/False', 'The HAVING clause is used to filter rows before grouping
in SQL.', 2.00, 1),
('MCQ', 'Which SQL clause is used to sort the result set?', 2.00, 1),
('True/False', 'The SQL UPDATE command can modify multiple columns in a
single query.', 2.00, 1),
('MCQ', 'Which of the following is the correct syntax to add a column to a
table in SQL?', 2.00, 1),
('Text', 'Explain the difference between a primary key and a foreign key
in relational databases.', 6.00, 1),
('Text', 'Describe the normalization process in database design.', 6.00,
1),
('Text', 'What is the purpose of an index in a database?', 6.00, 1),
('Text', 'Explain the concept of database integrity and its importance.',
6.00, 1),
('Text', 'What is a SQL injection attack and how can it be prevented?',
6.00, 1),
('Text', 'Describe the ACID properties in a transactional database.',
6.00, 1),
('Text', 'Explain the differences between DELETE and TRUNCATE in SQL.',
6.00, 1),
('Text', 'What is the role of a data dictionary in a database management
system?', 6.00, 1),
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('Text', 'Describe the process of database denormalization and why it
might be used.', 6.00, 1),
('Text', 'Explain the different types of joins available in SQL and when
to use them.', 6.00, 1),
('Text', 'What is the significance of database transactions and how do
they ensure data consistency?', 6.00, 1),
('Text', 'Discuss the advantages and disadvantages of using a surrogate
key in database design.', 6.00, 1),
('Text', 'Describe the role of a database administrator in managing a
relational database system.', 6.00, 1),
('Text', 'What is the difference between clustered and non-clustered
indexes in SQL?', 6.00, 1),
('Text', 'What are the advantages and limitations of using views in SQL?',
6.00, 1),
('Text', 'Explain the concept of referential integrity and how it is
enforced in SQL databases.', 6.00, 1),
('Text', 'What are triggers in SQL and when should they be used?', 6.00,
1),
('Text', 'What is the purpose of a stored procedure in SQL and how does it
improve performance?', 6.00, 1),
('Text', 'Explain the differences between a table and a temporary table in
SQL.', 6.00, 1),
('Text', 'What is a schema in a relational database, and why is it
important?', 6.00, 1),
('Text', 'Describe the concept of database sharding and when it might be
used.', 6.00, 1),
('Text', 'Explain the concept of entity-relationship modeling and how it
relates to database design.', 6.00, 1),
('Text', 'What are foreign key constraints and how do they maintain data
integrity in a relational database?', 6.00, 1),
('Text', 'Discuss the importance of database backups and the different
types of backup strategies.', 6.00, 1),
('Text', 'What is the difference between normalization and
denormalization, and when should each be used?', 6.00, 1),
('Text', 'How does SQL handle NULL values and what challenges do they
present in database queries?', 6.00, 1),
('Text', 'Explain how the CASE statement is used in SQL queries and
provide an example.', 6.00, 1),
('Text', 'Discuss the impact of indexing on database performance and when
indexes should be used.', 6.00, 1),
('Text', 'What is the role of data replication in database management, and
how does it improve system reliability?', 6.00, 1),
('Text', 'What is the role of a database index in query optimization, and
how does it improve performance?', 6.00, 1);
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--ANSWERS
insert into MCQ_Question (questionID, option1, option2, option3, option4,
correctAnswer)
values
(1, 'SELECT', 'INSERT', 'DELETE', 'UPDATE', 'option1'),
(2, 'Structured Query Language', 'Simple Query Language', 'Standard Query
Language', 'Sequential Query Language', 'option1'),
(4, 'INNER JOIN', 'LEFT JOIN', 'RIGHT JOIN', 'FULL JOIN', 'option2'),
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(6, 'VARCHAR', 'INT', 'STRING', 'NUMERIC', 'option3'),
(7, 'DELETE', 'REMOVE', 'DROP', 'TRUNCATE', 'option1'),
(9, 'WHERE', 'ORDER BY', 'GROUP BY', 'HAVING', 'option1'),
(11, 'SUM', 'COUNT', 'AVERAGE', 'MAX', 'option2'),
(12, 'To group rows', 'To filter rows', 'To aggregate data', 'To order
rows', 'option1'),
(14, 'CREATE TABLE', 'INSERT INTO', 'DROP TABLE', 'SELECT', 'option1'),
(15, '1-to-1', '1-to-Many', 'Many-to-Many', 'Self-Join', 'option2'),
(17, 'Removes duplicates', 'Filters rows', 'Joins tables', 'Sorts data',
'option1'),
(19, 'SUM', 'AVG', 'MIN', 'MAX', 'option2'),
(20, 'Ascending', 'Descending', 'Alphabetical', 'Random', 'option1'),
(22, 'Update rows', 'Delete table', 'Add records', 'Modify table',
'option1'),
(23, 'DELETE', 'DROP', 'TRUNCATE', 'ALL', 'option2'),
(25, 'A query inside a query', 'A JOIN', 'A nested query', 'A condition',
'option1'),
(27, 'Pattern matching', 'Data aggregation', 'Sorting', 'Filtering',
'option1'),
(29, 'DDL', 'DML', 'TCL', 'DCL', 'option1'),
(30, 'Add records', 'Remove duplicates', 'Update data', 'Insert data',
'option1'),
(32, 'ALTER TABLE', 'ADD COLUMN', 'UPDATE COLUMN', 'MODIFY COLUMN',
'option2'),
(34, 'MAX', 'AVG', 'SUM', 'MIN', 'option1'),
(35, 'WHERE', 'GROUP BY', 'ORDER BY', 'HAVING', 'option1'),
(37, 'Clustered index', 'Non-clustered index', 'Unique index', 'Composite
index', 'option2'),
(39, 'Structured Query Language', 'Simple Query Language', 'Standard Query
Language', 'Sequential Query Language', 'option1'),
(40, 'ALTER TABLE', 'ADD COLUMN', 'DROP COLUMN', 'MODIFY COLUMN',
'option3'),
(42, 'Maintain integrity', 'Ensure atomicity', 'Rollback changes', 'All of
the above', 'option4'),
(44, 'MAX', 'COUNT', 'SUM', 'AVG', 'option4'),
(46, 'Data optimization', 'Table design', 'Avoiding redundancy',
'Normalization', 'option3'),
(48, 'SELECT', 'INSERT', 'DELETE', 'UPDATE', 'option1'),
(50, 'ALTER TABLE', 'ADD COLUMN', 'MODIFY COLUMN', 'DROP COLUMN',
'option3'),
(51, 'MySQL', 'SQL Server', 'PostgreSQL', 'All of the above', 'option4'),
(53, 'Foreign Key', 'Primary Key', 'Unique Key', 'All of the above',
'option4'),
(55, 'Clustered index', 'Non-clustered index', 'Unique index', 'Primary
key index', 'option1'),
(57, 'Primary Key', 'Unique Key', 'Clustered Key', 'All of the above',
'option2'),
(58, 'A stored query', 'A physical table', 'A logical table', 'An index',
'option3'),
(60, 'ALTER TABLE', 'DROP COLUMN', 'MODIFY COLUMN', 'DELETE COLUMN',
'option2'),
(61, 'INSERT INTO', 'ADD ROW', 'CREATE RECORD', 'NEW RECORD', 'option1'),
(63, 'Specify range', 'Sort results', 'Match patterns', 'Filter rows',
'option1'),
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(65, 'ALTER TABLE', 'RENAME TABLE', 'MODIFY NAME', 'CHANGE TABLE',
'option2'),
(66, 'Combine rows', 'Match rows', 'Filter rows', 'All rows from left',
'option4'),
(68, 'WHERE', 'SORT BY', 'ORDER BY', 'GROUP BY', 'option3'),
(70, 'ALTER TABLE ADD COLUMN', 'ADD COLUMN TABLE', 'INSERT INTO COLUMN',
'CREATE COLUMN', 'option1');----------------------------------------------
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insert into TrueFalse_Question (questionID, correctAnswer)
values
(3, 0),
(5, 0),
(8, 1),
(10, 1),
(13, 1),
(16, 1),
(18, 1),
(21, 1),
(24, 1),
(26, 0),
(28, 1),
(31, 1),
(33, 0),
(36, 0),
(38, 1),
(41, 1),
(43, 0),
(45, 1),
(47, 1),
(49, 0),
(52, 1),
(54, 1),
(56, 1),
(59, 1),
(62, 0),
(64, 1),
(67, 0),
(69, 1);

insert into TextQuestion (questionID, bestAnswer)
values
(71, 'A primary key uniquely identifies each record in a database table,
while a foreign key is a column or set of columns used to establish a link
between the data in two tables.'),
(72, 'Normalization is the process of organizing a database to reduce
redundancy and dependency by dividing large tables into smaller ones and
defining relationships among them.'),
(73, 'An index in a database improves the speed of data retrieval
operations, at the cost of additional space and maintenance during
updates, inserts, or deletes.'),
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(74, 'Database integrity refers to the accuracy and consistency of data. It is important because it ensures data is reliable, valid, and correct, preventing errors or corruption.'),
(75, 'SQL injection is a type of attack where malicious SQL code is inserted into a query, potentially allowing unauthorized access or manipulation of the database. It can be prevented by using parameterized queries and input validation.'),
(76, 'ACID properties stand for Atomicity, Consistency, Isolation, and Durability, ensuring that database transactions are processed reliably and in a secure manner.'),
(77, 'DELETE removes records from a table permanently, while TRUNCATE removes all rows but does not log individual row deletions and is faster.'),
(78, 'A data dictionary is a centralized repository that stores metadata about the database structure, such as tables, columns, and data types, helping ensure consistency and integrity.'),
(79, 'Denormalization involves combining tables or adding redundant data to improve read performance, though it may lead to data anomalies and higher storage costs.'),
(80, 'Different types of joins in SQL include INNER JOIN (returns matching records from both tables), LEFT JOIN (returns all records from the left table), RIGHT JOIN, and FULL JOIN.'),
(81, 'Database transactions ensure data consistency by grouping multiple operations together as a single unit of work, ensuring that changes are committed or rolled back together.'),
(82, 'A surrogate key is an artificially created key, often a sequential number, used in place of natural keys. Advantages include simplicity and stability, but it can be less intuitive than natural keys.'),
(83, 'A database administrator (DBA) is responsible for managing and maintaining a database system, ensuring its performance, security, and availability, and overseeing backup and recovery procedures.'),
(84, 'A clustered index determines the physical order of data in a table, while a non-clustered index is a separate structure that references the table.'),
(85, 'Views are virtual tables that simplify complex queries and provide a layer of abstraction. However, they can sometimes reduce performance and may not be updatable in all cases.'),
(86, 'Referential integrity ensures that relationships between tables remain consistent by enforcing foreign key constraints, ensuring no orphan records are created.'),
(87, 'Triggers are special types of stored procedures that automatically execute when certain events occur in a table, such as insert, update, or delete actions.'),
(88, 'A stored procedure is a precompiled set of SQL statements that can be executed with a single call, improving performance by reducing parsing time and providing security and code reusability.'),
(89, 'A table stores permanent data, while a temporary table is used to store data for the duration of a session or query execution and is dropped automatically when the session ends.'),
(90, 'A schema defines the structure of a database, including tables, views, and indexes. It is important for organizing and managing the database objects.'),

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(91, 'Database sharding involves splitting data across multiple servers to
improve scalability and performance, often used in large-scale systems
with high data throughput.'),
(92, 'Entity-relationship modeling is a technique used to design and
visualize the structure of a database by defining entities, attributes,
and relationships between them.'),
(93, 'Foreign key constraints ensure that a foreign key in one table
matches a primary key or unique key in another table, maintaining data
integrity between related tables.'),
(94, 'Database backups are essential for data recovery in case of failure.
Strategies include full backups, incremental backups, and differential
backups.'),
(95, 'Normalization reduces redundancy by organizing data into smaller
tables, while denormalization combines data to improve read performance.
Each has its place depending on the system's needs.'),
(96, 'SQL handles NULL values by representing missing or undefined data.
NULL values can present challenges in queries, requiring special handling
with IS NULL or COALESCE functions.'),
(97, 'The CASE statement in SQL allows conditional logic within a query,
enabling different outputs based on specific conditions. Example: SELECT
CASE WHEN age >= 18 THEN "Adult" ELSE "Minor" END FROM users;'),
(98, 'Indexing improves query performance by reducing the number of rows
the database has to scan. Indexes should be used for frequently queried
columns, but they come at the cost of additional storage and slower
writes.'),
(99, 'Data replication involves copying data across multiple systems to
improve availability and reliability, often used in distributed databases
to prevent downtime.'),
(100, 'A database index speeds up query performance by providing quick
access to rows based on column values. It works by creating a sorted data
structure that can be searched more efficiently than the entire table.');
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--Software Engineering
insert into question (questionType, questionText, degree, courseID)
values
('MCQ', 'Which of the following is a type of software testing?', 2.00, 2),
('MCQ', 'What does UML stand for?', 2.00, 2),
('True/False', 'In the Waterfall model, the testing phase occurs before
the design phase.', 2.00, 2),
('MCQ', 'Which of the following is an example of an object-oriented
programming language?', 2.00, 2),
('True/False', 'Agile methodology encourages frequent changes to project
requirements.', 2.00, 2),
('MCQ', 'Which phase in the software development life cycle involves
gathering requirements from stakeholders?', 2.00, 2),
('MCQ', 'Which software development model uses iterative and incremental
development?', 2.00, 2),
('True/False', 'In the V-Model, each development phase has a corresponding
testing phase.', 2.00, 2),
('MCQ', 'Which of the following is a disadvantage of the Waterfall
model?', 2.00, 2),
('True/False', 'The SCRUM methodology is based on fixed-length sprints.',
2.00, 2),
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('MCQ', 'Which of the following is not a phase in the software development life cycle?', 2.00, 2),
('MCQ', 'Which software engineering methodology is most suitable for projects with changing requirements?', 2.00, 2),
('True/False', 'A prototype model allows customers to interact with an early version of the software.', 2.00, 2),
('MCQ', 'What is the purpose of version control in software engineering?', 2.00, 2),
('MCQ', 'Which of the following is a popular version control system?', 2.00, 2),
('True/False', 'Unit testing is typically performed by the developers.', 2.00, 2),
('MCQ', 'What is the main goal of refactoring in software development?', 2.00, 2),
('MCQ', 'Which design pattern ensures that a class has only one instance?', 2.00, 2),
('True/False', 'Regression testing is done to check if new changes break existing functionality.', 2.00, 2),
('MCQ', 'Which of the following is an example of functional testing?', 2.00, 2),
('MCQ', 'Which design pattern allows you to create new objects without specifying the exact class of object to create?', 2.00, 2),
('True/False', 'Continuous integration involves automatically building and testing software as changes are made to the codebase.', 2.00, 2),
('MCQ', 'What is the main purpose of a software requirements specification document?', 2.00, 2),
('MCQ', 'Which type of software maintenance focuses on improving performance or maintainability?', 2.00, 2),
('True/False', 'Integration testing checks the behavior of the system as a whole by testing modules in isolation.', 2.00, 2),
('MCQ', 'Which of the following is an example of non-functional testing?', 2.00, 2),
('MCQ', 'Which software engineering methodology emphasizes customer collaboration over contract negotiation?', 2.00, 2),
('True/False', 'The Agile Manifesto promotes responding to change over following a plan.', 2.00, 2),
('MCQ', 'What is the first step in the software testing process?', 2.00, 2),
('MCQ', 'Which of the following best describes the concept of "technical debt" in software development?', 2.00, 2),
('True/False', 'Acceptance testing is performed by the software development team before releasing the product to the customer.', 2.00, 2),
('MCQ', 'Which design pattern is used to create a family of related or dependent objects without specifying their concrete classes?', 2.00, 2),
('MCQ', 'Which of the following is a goal of software design?', 2.00, 2),
('True/False', 'The Spiral model combines iterative development with systematic aspects of the waterfall model.', 2.00, 2),
('MCQ', 'What is the main purpose of a software architecture design?', 2.00, 2),
('MCQ', 'Which of the following is a key advantage of the Agile methodology?', 2.00, 2),
('True/False', 'The software development life cycle (SDLC) is linear and strictly sequential.', 2.00, 2),

('MCQ', 'What is the primary focus of the testing phase in the SDLC?', 2.00, 2),
('MCQ', 'Which of the following tools is primarily used for project management in Agile methodologies?', 2.00, 2),
('True/False', 'Static analysis is used to check the code for errors without executing the program.', 2.00, 2),
('MCQ', 'Which of the following is a characteristic of the RAD (Rapid Application Development) model?', 2.00, 2),
('True/False', 'The waterfall model is best suited for projects with well-defined requirements.', 2.00, 2),
('MCQ', 'Which of the following is an example of a software design principle?', 2.00, 2),
('MCQ', 'What is the purpose of a software architecture review?', 2.00, 2),
('True/False', 'In software engineering, refactoring refers to the process of rewriting the entire codebase to improve its structure.', 2.00, 2),
('MCQ', 'What is the difference between functional and non-functional requirements?', 2.00, 2),
('MCQ', 'Which of the following best describes a software "bug"?', 2.00, 2),
('True/False', 'Beta testing is the final phase of testing before the product is released to the public.', 2.00, 2),
('MCQ', 'Which of the following is an example of a database design pattern?', 2.00, 2),
('True/False', 'Smoke testing is done to verify if the system’s basic functionality is working as expected.', 2.00, 2),
('MCQ', 'Which of the following is a common metric used in software engineering to measure code quality?', 2.00, 2),
('True/False', 'System testing is performed after unit testing and before integration testing.', 2.00, 2),
('MCQ', 'Which of the following is not a key activity in the requirements engineering process?', 2.00, 2),
('MCQ', 'What is the key benefit of using design patterns in software development?', 2.00, 2),
('MCQ', 'What is the purpose of a code review in software development?', 2.00, 2),
('MCQ', 'Which of the following is a characteristic of object-oriented programming?', 2.00, 2),
('True/False', 'In Agile development, changes to the project requirements are usually avoided during the development cycle.', 2.00, 2),
('MCQ', 'What is the primary objective of system testing?', 2.00, 2),
('True/False', 'Test-driven development (TDD) requires writing tests before writing the actual code.', 2.00, 2),
('MCQ', 'Which of the following is an example of a non-functional requirement?', 2.00, 2),
('MCQ', 'What is the purpose of a requirements traceability matrix?', 2.00, 2),
('True/False', 'The Agile methodology requires detailed upfront planning for the entire project.', 2.00, 2),
('MCQ', 'Which of the following is a key characteristic of continuous integration?', 2.00, 2),
('MCQ', 'What is the goal of load testing in software engineering?', 2.00, 2),

('True/False', 'Usability testing is performed to determine how easy and user-friendly the software is to use.', 2.00, 2),
('MCQ', 'Which of the following is a benefit of using pair programming in Agile development?', 2.00, 2),
('MCQ', 'Which software testing technique is used to determine if new changes affect existing functionality?', 2.00, 2),
('True/False', 'In the Agile methodology, the customer is involved throughout the development process.', 2.00, 2),
('MCQ', 'Which of the following is the main objective of risk-based testing?', 2.00, 2),
('MCQ', 'What is the primary focus of acceptance testing in software development?', 2.00, 2),
('Text', 'Explain the difference between functional and non-functional requirements in software engineering.', 6.00, 2),
('Text', 'Describe the Agile Manifesto and its core values and principles.', 6.00, 2),
('Text', 'What is the Waterfall model, and in which scenarios is it suitable for software development?', 6.00, 2),
('Text', 'Explain the importance of version control in a collaborative software development environment.', 6.00, 2),
('Text', 'What are the main differences between the Waterfall and Agile methodologies?', 6.00, 2),
('Text', 'Describe the concept of Continuous Integration (CI) and Continuous Deployment (CD) in software engineering.', 6.00, 2),
('Text', 'Explain the significance of software requirements gathering and the challenges faced during this phase.', 6.00, 2),
('Text', 'What are some common software testing techniques, and how do they contribute to quality assurance?', 6.00, 2),
('Text', 'Discuss the role of documentation in the software development life cycle.', 6.00, 2),
('Text', 'Describe the concept of "technical debt" and how it can affect software projects.', 6.00, 2),
('Text', 'What are design patterns in software engineering, and how do they improve software design?', 6.00, 2),
('Text', 'Explain the difference between functional testing and non-functional testing.', 6.00, 2),
('Text', 'What is the purpose of a software architecture design, and how does it impact the development process?', 6.00, 2),
('Text', 'Describe the key components of the Spiral model of software development.', 6.00, 2),
('Text', 'What are some challenges of implementing Agile methodology in large-scale software projects?', 6.00, 2),
('Text', 'Explain the differences between integration testing, system testing, and acceptance testing.', 6.00, 2),
('Text', 'What is the role of a software architect in a development team?', 6.00, 2),
('Text', 'What is software refactoring, and why is it important in the software maintenance phase?', 6.00, 2),
('Text', 'Describe the importance of risk management in software project management.', 6.00, 2),
('Text', 'What is the role of stakeholders in the software development process?', 6.00, 2),
('Text', 'What are some common issues faced in project scope management during software development?', 6.00, 2),

```
('Text', 'What is the significance of system testing and its role in
ensuring software functionality?', 6.00, 2),
('Text', 'Discuss the relationship between user experience (UX) design and
software development.', 6.00, 2),
('Text', 'What are the advantages and disadvantages of using the RAD
(Rapid Application Development) model?', 6.00, 2),
('Text', 'Describe the different types of software testing techniques and
when to use each one.', 6.00, 2),
('Text', 'Explain the concept of "user stories" in Agile and their role in
defining requirements.', 6.00, 2),
('Text', 'Discuss the purpose of software prototyping and its benefits and
limitations in software development.', 6.00, 2),
('Text', 'What is the role of feedback loops in Agile software
development?', 6.00, 2),
('Text', 'Explain the concept of "agile scaling" and the challenges of
applying Agile to large projects.', 6.00, 2),
('Text', 'What is the significance of user acceptance testing (UAT) in the
software development process?', 6.00, 2);
-------------------------------------------------------------------------
------------------------------------------------------------
--ANSWERS
insert into MCQ_Question (questionID, option1, option2, option3, option4,
correctAnswer)
values
(101, 'Unit Testing', 'Integration Testing', 'System Testing', 'All of the
above', 'option4'),
(102, 'Unified Modeling Language', 'Universal Modeling Language', 'Unified
Methodology Language', 'Universal Methodology Language', 'option1'),
(104, 'Python', 'C', 'Java', 'HTML', 'option3'),
(106, 'Requirement Analysis', 'Design', 'Implementation', 'Testing',
'option1'),
(107, 'Waterfall Model', 'Agile Model', 'RAD Model', 'Prototype Model',
'option2'),
(109, 'High flexibility', 'Sequential process', 'High customer
collaboration', 'Frequent delivery', 'option2'),
(111, 'Requirement Analysis', 'Design', 'Deployment', 'Documentation',
'option4'),
(112, 'Waterfall', 'Agile', 'RAD', 'Spiral', 'option2'),
(114, 'To manage source code', 'To document requirements', 'To track
bugs', 'To automate testing', 'option1'),
(115, 'Git', 'JIRA', 'Trello', 'Eclipse', 'option1'),
(117, 'Optimize performance', 'Improve readability', 'Add new features',
'Fix bugs', 'option2'),
(118, 'Factory', 'Singleton', 'Observer', 'Decorator', 'option2'),
(120, 'Unit Testing', 'System Testing', 'User Acceptance Testing', 'All of
the above', 'option4'),
(121, 'Factory Pattern', 'Abstract Factory Pattern', 'Singleton Pattern',
'Observer Pattern', 'option2'),
(123, 'To define user interfaces', 'To specify requirements', 'To create
designs', 'To plan testing', 'option2'),
(124, 'Corrective Maintenance', 'Adaptive Maintenance', 'Perfective
Maintenance', 'Preventive Maintenance', 'option3'),
(126, 'Performance Testing', 'Regression Testing', 'Unit Testing',
'Integration Testing', 'option1'),
```

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(127, 'Waterfall', 'Agile', 'RAD', 'V-Model', 'option2'),
(129, 'Test Case Design', 'Test Planning', 'Test Execution', 'Requirement
Analysis', 'option4'),
(130, 'Outstanding work', 'Unpaid technical tasks', 'Incomplete design',
'Accumulated refactoring needs', 'option4'),
(132, 'Abstract Factory', 'Builder', 'Prototype', 'Adapter', 'option1'),
(133, 'Fulfill requirements', 'Optimize performance', 'Improve
maintainability', 'All of the above', 'option4'),
(135, 'Implement functionality', 'Define high-level structure', 'Write
source code', 'Deploy software', 'option2'),
(136, 'Fixed planning', 'Detailed documentation', 'Quick delivery',
'Limited feedback', 'option3'),
(138, 'To design software', 'To fix issues', 'To ensure quality', 'To
deploy code', 'option3'),
(139, 'GitHub', 'JIRA', 'Trello', 'Visual Studio', 'option2'),
(141, 'Iterative development', 'Strict phases', 'Customer-less process',
'Lengthy design phase', 'option1'),
(143, 'Open/Closed Principle', 'Optimization Principle', 'Test-Driven
Development', 'Refactoring Principle', 'option1'),
(144, 'To improve usability', 'To identify defects', 'To ensure
consistency', 'To plan deployment', 'option3'),
(146, 'Functional requirements define behavior, non-functional define
quality', 'Non-functional are not required', 'Functional are optional',
'Both are the same', 'option1'),
(147, 'Feature enhancement', 'Code error', 'Module update', 'System
upgrade', 'option2'),
(149, 'Star Schema', 'Singleton', 'Observer', 'Factory', 'option1'),
(151, 'Code coverage', 'Error rate', 'Testing cost', 'Deployment speed',
'option1'),
(153, 'Elicitation', 'Documentation', 'Validation', 'Prototyping',
'option4'),
(154, 'Reusability', 'Documentation', 'Improved collaboration',
'Automation', 'option1'),
(155, 'To fix bugs', 'To refactor code', 'To identify issues', 'To track
changes', 'option3'),
(156, 'Encapsulation', 'Procedural flow', 'Static variables', 'Low
cohesion', 'option1'),
(158, 'Ensure subsystem integration', 'Improve usability', 'Fix code
errors', 'Plan deployments', 'option1'),
(160, 'Performance requirement', 'User login', 'Transaction handling',
'Payment gateway integration', 'option1'),
(161, 'Track changes', 'Link requirements to deliverables', 'Automate
testing', 'Design deployment process', 'option2'),
(163, 'Deploy on production', 'Automate bug tracking', 'Frequent code
integration', 'Test customer feedback', 'option3'),
(164, 'Identify bottlenecks', 'Test new features', 'Ensure system
integrity', 'Track defects', 'option1'),
(166, 'Improved communication', 'Faster delivery', 'Reduced errors', 'All
of the above', 'option4'),
(167, 'Integration Testing', 'Regression Testing', 'Unit Testing', 'System
Testing', 'option2'),
(169, 'Identify performance issues', 'Focus on critical areas', 'Validate
customer requirements', 'Plan deployments', 'option2'),
```

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(170, 'Verify system meets requirements', 'Identify bottlenecks', 'Fix
bugs', 'Improve usability', 'option1');

insert into TrueFalse_Question (questionID, correctAnswer)
values
(103, 0),
(105, 1),
(108, 1),
(110, 1),
(113, 1),
(116, 1),
(119, 1),
(122, 1),
(125, 0),
(128, 1),
(131, 0),
(134, 1),
(137, 0),
(140, 1),
(142, 1),
(145, 0),
(148, 1),
(150, 1),
(152, 0),
(157, 0),
(159, 1),
(162, 0),
(165, 1),
(168, 1);

insert into TextQuestion (questionID, bestAnswer)
values
(171, 'Functional requirements describe the specific behavior or functions
of a system, such as user actions or interactions. Non-functional
requirements describe how the system performs, such as reliability,
performance, and scalability.'),
(172, 'The Agile Manifesto emphasizes four core values: individuals and
interactions over processes and tools, working software over comprehensive
documentation, customer collaboration over contract negotiation, and
responding to change over following a plan.'),
(173, 'The Waterfall model is a linear and sequential approach to software
development, where each phase must be completed before moving to the next.
It is suitable for projects with well-defined requirements and little
scope for changes.'),
(174, 'Version control allows developers to track and manage changes to
source code, facilitating collaboration and enabling easy rollback to
previous versions in case of errors or bugs.'),
(175, 'The Waterfall model is rigid and sequential, while the Agile
methodology is iterative and flexible. Agile promotes continuous
improvement and adaptability to change, whereas Waterfall is more suited
to projects with clear, stable requirements.'),
(176, 'Continuous Integration (CI) is the practice of frequently
integrating code changes into a shared repository, with automated testing
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to detect issues early. Continuous Deployment (CD) automates the release of code changes to production, ensuring fast delivery.'),
(177, 'Software requirements gathering is crucial for understanding the needs and expectations of stakeholders. Challenges include incomplete or ambiguous requirements, miscommunication, and changing needs during the development process.'),
(178, 'Common software testing techniques include unit testing, integration testing, system testing, and user acceptance testing. These techniques help ensure that the software meets functional and non-functional requirements, and performs as expected.'),
(179, 'Documentation plays a key role in the software development life cycle by providing clear guidelines, explanations, and records of decisions, requirements, design, and testing processes for future reference and collaboration.'),
(180, 'Technical debt refers to the cost of reworking a system due to shortcuts or suboptimal solutions. It can slow down future development, increase maintenance costs, and introduce risks if not managed properly.'),
(181, 'Design patterns are reusable solutions to common problems in software design. They improve software design by promoting best practices, enhancing maintainability, and making code easier to understand and extend.'),
(182, 'Functional testing focuses on verifying that the software meets its specified functional requirements, while non-functional testing assesses attributes such as performance, scalability, and security.'),
(183, 'Software architecture design defines the structure of the system, including components and their interactions. It impacts the development process by guiding decisions on scalability, maintainability, and performance.'),
(184, 'The Spiral model combines iterative development with risk management. It consists of four key phases: planning, risk analysis, engineering, and evaluation, with repeated iterations through these phases to refine the system.'),
(185, 'Challenges of implementing Agile in large-scale software projects include managing multiple teams, maintaining consistent communication, handling complex dependencies, and scaling Agile practices across the organization.'),
(186, 'Integration testing verifies the interaction between different system components, system testing validates the entire system’s functionality, and acceptance testing ensures the system meets the user’s requirements and is ready for deployment.'),
(187, 'A software architect is responsible for designing the high-level structure of a software system, making decisions about architecture, technology, and design patterns to ensure scalability, maintainability, and performance.'),
(188, 'Software refactoring involves restructuring existing code to improve its design without changing its functionality. It is important for maintaining code quality, improving performance, and reducing technical debt.'),
(189, 'Risk management in software project management involves identifying, assessing, and mitigating risks that may impact the projects success. It helps in minimizing potential issues and ensuring the project stays on track.'),

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(190, 'Stakeholders are individuals or groups who have an interest in the
software development process. They include customers, developers,
managers, and users, and their input is essential for ensuring the project
meets its objectives.'),
(191, 'Common issues in project scope management include scope creep,
changing requirements, unclear objectives, and misalignment between
stakeholders' expectations and the project's deliverables.'),
(192, 'System testing ensures that the software system functions as a
whole, validating that all components work together as intended. It is
essential for identifying integration issues and confirming that the
system meets requirements.'),
(193, 'User experience (UX) design focuses on the overall experience a
user has while interacting with the software. It is closely related to
software development, as it influences design decisions that enhance
usability and user satisfaction.'),
(194, 'The RAD (Rapid Application Development) model prioritizes rapid
prototyping and iterative development. Advantages include faster delivery
and flexibility, while disadvantages include the potential for poor design
and less robust systems.'),
(195, 'Different software testing techniques include unit testing,
integration testing, system testing, and user acceptance testing. Each
technique serves a different purpose, ensuring that the system functions
correctly at various levels and meets requirements.'),
(196, 'User stories are short, simple descriptions of a feature from the
user's perspective. In Agile, they help define requirements and guide the
development process by focusing on user needs and priorities.'),
(197, 'Software prototyping involves creating an early version of the
software to gather feedback and refine requirements. It provides insight
into user needs but may lead to scope creep or incomplete features if not
managed properly.'),
(198, 'Feedback loops in Agile allow teams to continuously improve their
processes and products by gathering feedback from stakeholders, testing,
and iteration. They help ensure that the software evolves to meet changing
user needs.'),
(199, 'Agile scaling refers to adapting Agile practices to larger, more
complex projects. Challenges include managing coordination across multiple
teams, maintaining consistent communication, and ensuring alignment with
business objectives.'),
(200, 'User acceptance testing (UAT) is crucial for validating that the
software meets the end-users' needs and requirements. It ensures that the
software is ready for deployment and is aligned with the business
goals.');
-------------------------------------------------------------------------
------------------------------------------------------
--Operating Systems
insert into question (questionType, questionText, degree, courseID)
values
('MCQ', 'Which of the following is a function of an operating system?',
2.00, 3),
('MCQ', 'What is the main purpose of a process scheduler in an operating
system?', 2.00, 3),
('True/False', 'In a multiprogramming environment, a single process can be
executed at any given time.', 2.00, 3),
```

('MCQ', 'Which of the following is not a type of operating system?', 2.00, 3),
('True/False', 'Virtual memory allows the execution of processes that may not be completely in RAM.', 2.00, 3),
('MCQ', 'Which of the following is an example of an interrupt?', 2.00, 3),
('MCQ', 'Which scheduling algorithm gives priority to processes that have been in the ready queue the longest?', 2.00, 3),
('True/False', 'The term "context switch" refers to saving the state of a process before switching to another process.', 2.00, 3),
('MCQ', 'Which of the following is the main function of the kernel in an operating system?', 2.00, 3),
('True/False', 'In a single-core processor, multiple processes cannot be executed simultaneously.', 2.00, 3),
('MCQ', 'Which of the following is a component of an operating system?', 2.00, 3),
('MCQ', 'Which of the following is a process synchronization mechanism?', 2.00, 3),
('True/False', 'In a distributed system, all processes are guaranteed to execute on the same machine.', 2.00, 3),
('MCQ', 'What is the main function of a file system in an operating system?', 2.00, 3),
('MCQ', 'Which of the following is a common type of operating system used for managing mobile devices?', 2.00, 3),
('True/False', 'Deadlock occurs when two or more processes are unable to proceed because each is waiting for the other to release a resource.', 2.00, 3),
('MCQ', 'What does the term "multitasking" refer to in an operating system?', 2.00, 3),
('MCQ', 'Which of the following best defines "thrashing" in an operating system?', 2.00, 3),
('True/False', 'In a preemptive multitasking system, the operating system can forcefully take the CPU away from a process.', 2.00, 3),
('MCQ', 'Which of the following is not a type of operating system structure?', 2.00, 3),
('MCQ', 'Which scheduling algorithm selects the process with the smallest burst time first?', 2.00, 3),
('True/False', 'In an operating system, each process has its own address space, memory, and resources.', 2.00, 3),
('MCQ', 'What is the primary purpose of the memory management unit (MMU) in an operating system?', 2.00, 3),
('MCQ', 'Which of the following best defines a system call in an operating system?', 2.00, 3),
('True/False', 'In the round-robin scheduling algorithm, each process is assigned a fixed time slot.', 2.00, 3),
('MCQ', 'Which of the following is a type of semaphore used for synchronization in an operating system?', 2.00, 3),
('MCQ', 'What is a "zombie" process in an operating system?', 2.00, 3),
('True/False', 'The operating system kernel manages both hardware and software resources on a computer system.', 2.00, 3),
('MCQ', 'Which of the following is an advantage of a multi-user operating system?', 2.00, 3),
('MCQ', 'Which of the following is a technique used for virtual memory management?', 2.00, 3),

('True/False', 'In an operating system, a process can enter the terminated state once its execution has finished.', 2.00, 3),
('MCQ', 'What is the purpose of a page table in an operating system?', 2.00, 3),
('MCQ', 'Which of the following is a disadvantage of the First-Come, First-Served (FCFS) scheduling algorithm?', 2.00, 3),
('True/False', 'A deadlock can occur only when all four Coffman conditions are met.', 2.00, 3),
('MCQ', 'What is a virtual machine in the context of operating systems?', 2.00, 3),
('MCQ', 'Which of the following scheduling algorithms does not require process priorities?', 2.00, 3),
('True/False', 'In an operating system, paging is used to break the physical memory into fixed-size blocks.', 2.00, 3),
('MCQ', 'Which of the following best describes a real-time operating system?', 2.00, 3),
('MCQ', 'Which memory allocation technique divides the memory into fixed-size partitions?', 2.00, 3),
('True/False', 'In a system with demand paging, pages are only loaded into memory when they are needed.', 2.00, 3),
('MCQ', 'Which of the following is a characteristic of the Windows operating system?', 2.00, 3),
('MCQ', 'Which of the following algorithms uses a first-come-first-served approach for scheduling processes?', 2.00, 3),
('True/False', 'The process control block (PCB) stores information about the state of a process in an operating system.', 2.00, 3),
('MCQ', 'Which of the following best describes the term "buffering" in an operating system?', 2.00, 3),
('MCQ', 'What is the primary role of the operating system in a computer system?', 2.00, 3),
('True/False', 'Memory fragmentation can be reduced by using a paging memory management system.', 2.00, 3),
('MCQ', 'What is the purpose of the disk scheduling algorithm in an operating system?', 2.00, 3),
('MCQ', 'Which of the following algorithms uses a "shortest job next" approach?', 2.00, 3),
('MCQ', 'Which of the following is a function of an operating system?', 2.00, 3),
('MCQ', 'What is the main purpose of a process scheduler in an operating system?', 2.00, 3),
('True/False', 'In a multiprogramming environment, a single process can be executed at any given time.', 2.00, 3),
('MCQ', 'Which of the following is not a type of operating system?', 2.00, 3),
('True/False', 'Virtual memory allows the execution of processes that may not be completely in RAM.', 2.00, 3),
('MCQ', 'Which of the following is an example of an interrupt?', 2.00, 3),
('MCQ', 'Which scheduling algorithm gives priority to processes that have been in the ready queue the longest?', 2.00, 3),
('True/False', 'The term "context switch" refers to saving the state of a process before switching to another process.', 2.00, 3),
('MCQ', 'Which of the following is the main function of the kernel in an operating system?', 2.00, 3),

('True/False', 'In a single-core processor, multiple processes cannot be executed simultaneously.', 2.00, 3),
('MCQ', 'Which of the following is a component of an operating system?', 2.00, 3),
('MCQ', 'Which of the following is a process synchronization mechanism?', 2.00, 3),
('True/False', 'In a distributed system, all processes are guaranteed to execute on the same machine.', 2.00, 3),
('MCQ', 'What is the main function of a file system in an operating system?', 2.00, 3),
('MCQ', 'Which of the following is a common type of operating system used for managing mobile devices?', 2.00, 3),
('True/False', 'Deadlock occurs when two or more processes are unable to proceed because each is waiting for the other to release a resource.', 2.00, 3),
('MCQ', 'What does the term "multitasking" refer to in an operating system?', 2.00, 3),
('MCQ', 'Which of the following best defines "thrashing" in an operating system?', 2.00, 3),
('True/False', 'In a preemptive multitasking system, the operating system can forcefully take the CPU away from a process.', 2.00, 3),
('MCQ', 'Which of the following is not a type of operating system structure?', 2.00, 3),
('MCQ', 'Which scheduling algorithm selects the process with the smallest burst time first?', 2.00, 3),
('True/False', 'In an operating system, each process has its own address space, memory, and resources.', 2.00, 3),
('Text', 'Explain the concept of a process and describe its life cycle in an operating system.', 6.00, 3),
('Text', 'What is the role of memory management in an operating system? Explain how paging works.', 6.00, 3),
('Text', 'Describe the various types of scheduling algorithms used by operating systems and their advantages and disadvantages.', 6.00, 3),
('Text', 'What are the key differences between a monolithic kernel and a microkernel?', 6.00, 3),
('Text', 'Explain the concept of virtual memory and how it improves the performance of a system.', 6.00, 3),
('Text', 'Discuss the concept of deadlock in an operating system and explain the Coffman conditions for deadlock.', 6.00, 3),
('Text', 'What are the advantages and disadvantages of preemptive multitasking versus cooperative multitasking?', 6.00, 3),
('Text', 'Describe the different types of file systems and explain how the operating system manages file storage.', 6.00, 3),
('Text', 'Explain the role of a process scheduler in managing the execution of processes within an operating system.', 6.00, 3),
('Text', 'Discuss the differences between user-level threads and kernel-level threads.', 6.00, 3),
('Text', 'Describe the main functions of an operating system kernel and how it interacts with hardware and software.', 6.00, 3),
('Text', 'What is a semaphore in the context of operating systems, and how is it used for process synchronization?', 6.00, 3),
('Text', 'What is the role of interrupt handling in an operating system, and how does it affect system performance?', 6.00, 3),

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('Text', 'Discuss the concept of demand paging and how it relates to
virtual memory management.', 6.00, 3),
('Text', 'Describe the difference between internal and external
fragmentation in memory management.', 6.00, 3),
('Text', 'What is the concept of "swapping" in operating systems, and how
does it affect performance?', 6.00, 3),
('Text', 'Explain the differences between a real-time operating system and
a general-purpose operating system.', 6.00, 3),
('Text', 'What is the role of a process control block (PCB) in an
operating system?', 6.00, 3),
('Text', 'Explain how a disk scheduling algorithm improves the efficiency
of input/output operations in an operating system.', 6.00, 3),
('Text', 'What is the difference between a hard real-time and a soft real-
time operating system?', 6.00, 3),
('Text', 'Discuss how operating systems handle multitasking in a multi-
core environment.', 6.00, 3),
('Text', 'What is the purpose of using an atomic operation in an operating
system, and how does it prevent race conditions?', 6.00, 3),
('Text', 'Explain how the operating system handles security and user
authentication.', 6.00, 3),
('Text', 'Describe the role of device drivers in the interaction between
hardware and the operating system.', 6.00, 3),
('Text', 'What are the challenges of implementing an operating system in a
distributed computing environment?', 6.00, 3),
('Text', 'Explain how an operating system manages system resources such as
CPU time, memory, and input/output devices.', 6.00, 3),
('Text', 'Discuss the importance of concurrency in an operating system and
how it is managed by the OS.', 6.00, 3),
('Text', 'What is the role of a user interface in an operating system, and
how does it enhance user experience?', 6.00, 3),
('Text', 'Explain the concept of "context switching" and its importance in
multitasking operating systems.', 6.00, 3),
('Text', 'What is a zombie process, and how is it different from an orphan
process?', 6.00, 3);
-------------------------------------------------------------------------
-------------------------------------------------------
--ANSWERS
insert into MCQ_Question (questionID, option1, option2, option3, option4,
correctAnswer)
values
(201, 'Managing hardware resources', 'Developing applications',
'Performing computations', 'Designing software', 'option1'),
(202, 'Allocate resources', 'Execute processes', 'Manage memory',
'Schedule processes', 'option4'),
(204, 'Real-Time OS', 'Batch OS', 'Distributed OS', 'Embedded Language',
'option4'),
(206, 'Mouse click', 'Keyboard press', 'Printer ready', 'All of the
above', 'option4'),
(207, 'Round Robin', 'First-Come, First-Served', 'Priority Scheduling',
'Aging', 'option2'),
(209, 'Manage hardware resources', 'Provide user interfaces', 'Execute
applications', 'Manage user accounts', 'option1'),
(211, 'Kernel', 'Compiler', 'Interpreter', 'Driver', 'option1'),
(212, 'Mutex', 'Debugger', 'Loader', 'Compiler', 'option1'),
```

```
(214, 'Manage files and directories', 'Encrypt data', 'Optimize
processes', 'Control hardware', 'option1'),
(215, 'Windows OS', 'Linux OS', 'Android OS', 'Mainframe OS', 'option3'),
(217, 'Running multiple processes simultaneously', 'Running processes
sequentially', 'Scheduling long-running processes', 'Executing critical
sections', 'option1'),
(218, 'Efficient resource usage', 'Excessive paging', 'Optimal CPU
scheduling', 'Memory optimization', 'option2'),
(220, 'Monolithic OS', 'Microkernel OS', 'Layered OS', 'User-Level OS',
'option4'),
(221, 'Round Robin', 'Shortest Job Next', 'Priority Scheduling', 'First-
Come, First-Served', 'option2'),
(223, 'Translate virtual addresses', 'Manage CPU scheduling', 'Encrypt
memory', 'Optimize paging', 'option1'),
(224, 'Request from hardware', 'Request from a user', 'Request to the
operating system', 'Request to memory', 'option3'),
(226, 'Binary Semaphore', 'Counting Semaphore', 'Both A and B', 'None of
the above', 'option3'),
(227, 'Process waiting for resources', 'Terminated process with resources
still allocated', 'Idle process', 'Error in execution', 'option2'),
(229, 'Faster execution', 'Resource sharing', 'Enhanced security',
'Reduced complexity', 'option2'),
(230, 'Swapping', 'Paging', 'Segmentation', 'All of the above',
'option4'),
(232, 'Store page numbers', 'Translate logical to physical addresses',
'Allocate memory', 'Manage files', 'option2'),
(233, 'Starvation', 'Complex implementation', 'Unfair scheduling', 'Poor
memory usage', 'option1'),
(235, 'Abstract machine that executes programs', 'Operating system
feature', 'Real hardware environment', 'Hardware optimization tool',
'option1'),
(236, 'Priority Scheduling', 'Shortest Job Next', 'Round Robin', 'Multi-
Level Queue', 'option3'),
(238, 'Handles real-time events', 'Manages large-scale systems',
'Optimizes memory usage', 'Executes batch processes', 'option1'),
(239, 'Dynamic Partitioning', 'Fixed Partitioning', 'Paging',
'Segmentation', 'option2'),
(241, 'Closed source', 'Supports multitasking', 'User-friendly interface',
'All of the above', 'option4'),
(242, 'Round Robin', 'Shortest Job Next', 'First-Come, First-Served',
'Priority Scheduling', 'option3'),
(244, 'Allocating buffers to devices', 'Reading from a buffer', 'Writing
to a buffer', 'Managing buffer overflow', 'option1'),
(245, 'Execute applications', 'Provide hardware abstraction', 'Optimize
system performance', 'Control data flow', 'option2'),
(247, 'Allocate CPU', 'Manage I/O requests', 'Optimize disk access',
'Reduce thrashing', 'option3'),
(248, 'Round Robin', 'Shortest Job Next', 'Priority Scheduling', 'Multi-
Level Queue', 'option2'),
(249, 'File management', 'Debugging', 'Coding', 'Compiling', 'option1'),
(250, 'Allocate resources', 'Schedule processes', 'Manage files',
'Optimize memory', 'option2'),
(252, 'Batch OS', 'Distributed OS', 'Monolithic OS', 'Compiler OS',
'option4'),
```

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(254, 'Mouse click', 'System boot', 'Network packet arrival', 'All of the
above', 'option4'),
(255, 'Shortest Job Next', 'First-Come, First-Served', 'Round Robin',
'Priority Scheduling', 'option2'),
(257, 'Provide user interface', 'Manage resources', 'Optimize memory',
'Control applications', 'option2'),
(259, 'Compiler', 'Kernel', 'Interpreter', 'Debugger', 'option2'),
(260, 'Semaphore', 'Mutex', 'Both A and B', 'None of the above',
'option3'),
(262, 'Manage files and directories', 'Encrypt data', 'Optimize
processes', 'Control hardware', 'option1'),
(263, 'Windows OS', 'Linux OS', 'Android OS', 'Mainframe OS', 'option3'),
(265, 'Running multiple processes simultaneously', 'Running processes
sequentially', 'Scheduling long-running processes', 'Executing critical
sections', 'option1'),
(266, 'Efficient resource usage', 'Excessive paging', 'Optimal CPU
scheduling', 'Memory optimization', 'option2'),
(268, 'Monolithic OS', 'Microkernel OS', 'Layered OS', 'User-Level OS',
'option4'),
(269, 'Round Robin', 'Shortest Job Next', 'Priority Scheduling', 'First-
Come, First-Served', 'option2');----------------------------------------
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insert into TrueFalse_Question (questionID, correctAnswer)
values
(203, 0),
(205, 1),
(208, 1),
(210, 0),
(213, 0),
(216, 1),
(219, 1),
(222, 1),
(225, 1),
(228, 1),
(231, 1),
(234, 1),
(237, 1),
(240, 1),
(243, 1),
(246, 1),
(251, 0),
(253, 1),
(256, 1),
(258, 0),
(261, 0),
(264, 1),
(267, 1),
(270, 1);

insert into TextQuestion (questionID, bestAnswer)
values
```

(271, 'A process is a program in execution, consisting of an address space, data, and control information. Its life cycle includes creation, execution, waiting, and termination phases. A process can transition through these states based on system resources and scheduling.'),
(272, 'Memory management is responsible for allocating and deallocating memory to processes. Paging divides memory into fixed-size blocks and allows processes to be loaded into non-contiguous memory locations, improving memory utilization.'),
(273, 'Scheduling algorithms in operating systems include First-Come-First-Served (FCFS), Shortest Job First (SJF), Round Robin (RR), and Priority Scheduling. Each has advantages and disadvantages in terms of CPU efficiency, process waiting time, and fairness.'),
(274, 'A monolithic kernel is a single, large kernel that manages all system resources, while a microkernel is smaller and only includes essential services, delegating other functionalities to user-level processes. Microkernels offer modularity but can incur performance overhead.'),
(275, 'Virtual memory allows a system to use disk space as an extension of RAM, enabling processes to execute even when there is not enough physical memory. It improves system performance by providing the illusion of a larger memory space.'),
(276, 'Deadlock occurs when two or more processes are stuck in a waiting state, unable to proceed. The Coffman conditions for deadlock include mutual exclusion, hold and wait, no preemption, and circular wait.'),
(277, 'Preemptive multitasking allows the OS to forcibly take control of the CPU from a running process, while cooperative multitasking relies on processes to yield control voluntarily. Preemptive multitasking provides better responsiveness but can lead to more complex scheduling.'),
(278, 'File systems include FAT, NTFS, and ext4, and they manage the storage, retrieval, and organization of files on storage devices. The operating system handles file operations like reading, writing, and managing file permissions.'),
(279, 'The process scheduler manages the execution of processes by selecting which process should run next based on priorities, CPU availability, and other factors. It ensures efficient CPU utilization and fair allocation of resources.'),
(280, 'User-level threads are managed by user-level libraries and are not visible to the kernel, while kernel-level threads are managed by the operating system kernel. Kernel-level threads provide better system resource management and concurrency.'),
(281, 'The operating system kernel manages low-level hardware interactions and provides essential services, such as process management, memory management, and hardware abstraction. It interacts with both hardware and software to ensure system stability.'),
(282, 'A semaphore is a synchronization primitive used to control access to shared resources in a multi-threaded environment. It can be used to prevent race conditions by ensuring that only one process accesses a critical section at a time.'),
(283, 'Interrupt handling allows the OS to respond to external or internal events, such as hardware requests. It improves system performance by ensuring timely responses to events, preventing delays in processing.'),
(284, 'Demand paging loads pages into memory only when they are needed, reducing memory usage and allowing for more efficient memory management in

virtual memory systems. It improves system performance by minimizing unnecessary page loads.'),
(285, 'Internal fragmentation occurs when allocated memory is not fully used, while external fragmentation happens when free memory is scattered in small blocks across the system, making it difficult to allocate larger contiguous blocks.'),
(286, 'Swapping involves moving processes between memory and secondary storage to manage memory efficiently. It can affect performance by introducing latency when swapping processes in and out of memory.'),
(287, 'A real-time operating system (RTOS) ensures that processes are completed within a strict time limit, while a general-purpose operating system does not have such time constraints. RTOS is used in systems where timing is critical, such as embedded systems.'),
(288, 'The Process Control Block (PCB) stores information about the process, such as its state, program counter, and memory allocation. It is essential for process scheduling and context switching in the OS.'),
(289, 'Disk scheduling algorithms, such as FCFS, Shortest Seek Time First (SSTF), and SCAN, optimize the order of disk access requests to reduce the overall seek time and improve I/O performance.'),
(290, 'A hard real-time operating system guarantees that tasks are completed within a strict deadline, while a soft real-time operating system does not guarantee deadlines but tries to meet them. Hard RTOS is critical for systems requiring strict timing.'),
(291, 'In a multi-core environment, operating systems manage multitasking by distributing processes across available cores. This allows for better resource utilization, parallel processing, and improved system performance.'),
(292, 'An atomic operation is a low-level operation that completes without interruption. It prevents race conditions in multi-threaded environments by ensuring that only one thread can execute the operation at a time, preserving data consistency.'),
(293, 'Operating systems handle security and user authentication by using mechanisms such as passwords, encryption, and access control lists (ACLs) to ensure that only authorized users can access system resources.'),
(294, 'Device drivers act as intermediaries between hardware devices and the operating system. They allow the OS to communicate with hardware peripherals, providing a standardized interface for managing input/output devices.'),
(295, 'Challenges of implementing an operating system in a distributed computing environment include managing communication between nodes, ensuring data consistency, and handling fault tolerance across distributed systems.'),
(296, 'The operating system manages system resources such as CPU time, memory, and I/O devices by scheduling processes, allocating memory, and managing data transfers. It ensures efficient resource utilization and prevents resource conflicts.'),
(297, 'Concurrency is the ability of an operating system to handle multiple tasks simultaneously. It is managed by the OS through process scheduling, synchronization, and resource management, ensuring that processes do not interfere with each other.'),
(298, 'The user interface in an operating system allows users to interact with the system through graphical or command-line interfaces. It enhances the user experience by providing intuitive navigation, task management, and system control.'),

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(299, 'Context switching is the process of saving and restoring the state
of a process when switching between tasks. It is crucial in multitasking
operating systems, allowing multiple processes to share CPU time without
interference.'),
(300, 'A zombie process is a process that has completed execution but
still has an entry in the process table, while an orphan process is a
process whose parent has terminated. Zombie processes consume system
resources until they are cleaned up.');
-------------------------------------------------------------------------
------------------------------------------------------------
--Data Structures and Algorithms
insert into question (questionType, questionText, degree, courseID)
values
('MCQ', 'Which of the following is an example of a linear data
structure?', 2.00, 4),
('MCQ', 'Which of the following sorting algorithms has the best time
complexity for worst-case performance?', 2.00, 4),
('True/False', 'A stack follows the Last In, First Out (LIFO) principle.',
2.00, 4),
('MCQ', 'What is the time complexity of accessing an element in an
array?', 2.00, 4),
('True/False', 'In a queue, elements are inserted at the front and removed
from the rear.', 2.00, 4),
('MCQ', 'Which data structure is used for implementing recursion?', 2.00,
4),
('MCQ', 'Which of the following algorithms is based on the divide and
conquer approach?', 2.00, 4),
('True/False', 'In a doubly linked list, each node points only to the next
node.', 2.00, 4),
('MCQ', 'Which of the following is the worst-case time complexity for
quicksort?', 2.00, 4),
('True/False', 'A binary search tree is always balanced.', 2.00, 4),
('MCQ', 'Which of the following is an example of a non-linear data
structure?', 2.00, 4),
('MCQ', 'Which of the following is a characteristic of a circular linked
list?', 2.00, 4),
('True/False', 'A priority queue always pops the element with the highest
priority first.', 2.00, 4),
('MCQ', 'Which of the following is a type of graph traversal?', 2.00, 4),
('MCQ', 'What is the main advantage of a hash table over a linked list?',
2.00, 4),
('True/False', 'In an AVL tree, the heights of two child subtrees of any
node differ by at most 1.', 2.00, 4),
('MCQ', 'Which algorithm is used to find the shortest path in a weighted
graph?', 2.00, 4),
('MCQ', 'Which of the following sorting algorithms is not comparison-
based?', 2.00, 4),
('True/False', 'In a graph, an edge can have multiple weights.', 2.00, 4),
('MCQ', 'Which of the following operations is performed in constant time
in a hash table?', 2.00, 4),
('MCQ', 'Which data structure is commonly used for implementing a breadth-
first search algorithm?', 2.00, 4),
('True/False', 'In a heap, the root node always contains the smallest
element.', 2.00, 4),
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('MCQ', 'Which of the following is not a valid type of binary tree?', 2.00, 4),
('MCQ', 'What is the time complexity of finding an element in a balanced binary search tree?', 2.00, 4),
('True/False', 'A circular queue has a fixed size and wraps around when it reaches the end.', 2.00, 4),
('MCQ', 'Which of the following is used for implementing the depth-first search (DFS) algorithm?', 2.00, 4),
('MCQ', 'Which data structure is most appropriate for implementing a set?', 2.00, 4),
('True/False', 'A linked list has a constant time complexity for inserting elements at the end.', 2.00, 4),
('MCQ', 'Which of the following is a disadvantage of using a doubly linked list?', 2.00, 4),
('MCQ', 'Which of the following algorithms is used to find the minimum spanning tree in a graph?', 2.00, 4),
('True/False', 'In a depth-first search, each node is visited at most once.', 2.00, 4),
('MCQ', 'Which of the following is the best case time complexity for the bubble sort algorithm?', 2.00, 4),
('MCQ', 'Which of the following is the primary disadvantage of using a binary search tree?', 2.00, 4),
('True/False', 'In a graph, an edge can have at most one weight.', 2.00, 4),
('MCQ', 'Which of the following is used to solve the "knapsack problem"?', 2.00, 4),
('MCQ', 'Which of the following is the best sorting algorithm for small datasets?', 2.00, 4),
('True/False', 'A queue follows the First In, First Out (FIFO) principle.', 2.00, 4),
('MCQ', 'Which data structure is used to represent a hierarchical relationship between elements?', 2.00, 4),
('MCQ', 'Which of the following is a disadvantage of the quicksort algorithm?', 2.00, 4),
('True/False', 'A hash table provides constant-time lookups on average for all keys.', 2.00, 4),
('MCQ', 'Which of the following is a characteristic of a min-heap?', 2.00, 4),
('MCQ', 'What is the time complexity of the insertion operation in a binary search tree?', 2.00, 4),
('True/False', 'A graph can have multiple edges between the same two vertices.', 2.00, 4),
('MCQ', 'Which of the following traversal methods is used in a depth-first search?', 2.00, 4),
('MCQ', 'Which of the following is a type of graph traversal?', 2.00, 4),
('True/False', 'A priority queue always pops the element with the highest priority first.', 2.00, 4),
('MCQ', 'Which of the following is the most efficient way to implement a stack?', 2.00, 4),
('MCQ', 'What is the time complexity of the quicksort algorithm in the average case?', 2.00, 4),
('True/False', 'A heap is always a binary tree.', 2.00, 4),
('MCQ', 'Which of the following is a non-comparison based sorting algorithm?', 2.00, 4),

('True/False', 'In a queue, elements are removed in the order they were added.', 2.00, 4),
('MCQ', 'Which data structure is used to implement depth-first search (DFS)?', 2.00, 4),
('MCQ', 'Which of the following is a characteristic of a hash table?', 2.00, 4),
('True/False', 'In a linked list, access to elements is in constant time.', 2.00, 4),
('MCQ', 'What is the space complexity of the quicksort algorithm?', 2.00, 4),
('True/False', 'A singly linked list allows traversal in both directions.', 2.00, 4),
('MCQ', 'Which of the following algorithms is used for searching in an ordered list?', 2.00, 4),
('MCQ', 'Which of the following is true about a doubly linked list?', 2.00, 4),
('True/False', 'A priority queue can have duplicate elements with the same priority.', 2.00, 4),
('MCQ', 'Which of the following is a key advantage of using a hash table?', 2.00, 4),
('MCQ', 'What is the time complexity for inserting an element into a hash table?', 2.00, 4),
('True/False', 'The merge sort algorithm requires O(n log n) space complexity.', 2.00, 4),
('MCQ', 'Which of the following data structures is used for implementing a priority queue?', 2.00, 4),
('MCQ', 'Which of the following traversal methods is used in a breadth-first search (BFS)?', 2.00, 4),
('True/False', 'A stack can be implemented using a linked list.', 2.00, 4),
('MCQ', 'What is the best sorting algorithm for large datasets?', 2.00, 4),
('MCQ', 'Which of the following is a type of sorting algorithm?', 2.00, 4),
('True/False', 'A binary search tree can have at most two children for each node.', 2.00, 4),
('MCQ', 'Which of the following algorithms is used to find the shortest path in an unweighted graph?', 2.00, 4),
('MCQ', 'Which of the following is a common application of a hash table?', 2.00, 4),
('Text', 'Explain the difference between a stack and a queue and provide an example use case for each.', 6.00, 4),
('Text', 'Describe how the quicksort algorithm works and discuss its time complexity in the best, average, and worst cases.', 6.00, 4),
('Text', 'Explain the concept of dynamic programming and provide an example problem that can be solved using this technique.', 6.00, 4),
('Text', 'What are the advantages of using a linked list over an array? Provide examples of real-world problems where linked lists are more efficient.', 6.00, 4),
('Text', 'Discuss the differences between a singly linked list and a doubly linked list and explain the advantages of using a doubly linked list.', 6.00, 4),

('Text', 'Describe the breadth-first search (BFS) algorithm and explain how it can be used to find the shortest path in an unweighted graph.', 6.00, 4),
('Text', 'Explain the concept of hash tables and discuss how they handle collisions.', 6.00, 4),
('Text', 'What are the advantages and disadvantages of the merge sort algorithm?', 6.00, 4),
('Text', 'Describe how the Dijkstra algorithm works and its application in finding the shortest path in a weighted graph.', 6.00, 4),
('Text', 'What are the primary differences between a binary search tree and an AVL tree? Explain how balancing is done in AVL trees.', 6.00, 4),
('Text', 'Explain the concept of a minimum spanning tree and describe how Kruskal’s algorithm works to find it.', 6.00, 4),
('Text', 'Describe the time complexities of the following sorting algorithms: bubble sort, selection sort, and insertion sort.', 6.00, 4),
('Text', 'Discuss the concept of dynamic memory allocation in C/C++ and explain how it differs from static memory allocation.', 6.00, 4),
('Text', 'Explain the concept of a depth-first search (DFS) algorithm and provide an example where DFS is used effectively.', 6.00, 4),
('Text', 'What is the purpose of a priority queue, and how does it differ from a regular queue? Provide an example of its application.', 6.00, 4),
('Text', 'Explain the significance of the time complexity analysis of algorithms and how it can affect the performance of software.', 6.00, 4),
('Text', 'Describe the different types of graphs (directed, undirected, weighted, unweighted) and explain their uses in real-world applications.', 6.00, 4),
('Text', 'What are the advantages of using a heap data structure, and how is it used to implement priority queues?', 6.00, 4),
('Text', 'Explain the concept of a Fibonacci heap and how it improves the performance of graph algorithms.', 6.00, 4),
('Text', 'Discuss the concept of recursion and provide an example of a recursive algorithm used to solve a problem.', 6.00, 4),
('Text', 'What is the difference between internal and external sorting, and when is external sorting required?', 6.00, 4),
('Text', 'Describe the operations that can be performed on a binary tree, and explain how the tree is traversed using preorder, inorder, and postorder.', 6.00, 4),
('Text', 'Explain the difference between depth-first search (DFS) and breadth-first search (BFS) and provide a scenario where each would be used.', 6.00, 4),
('Text', 'What is the significance of balancing binary search trees, and how does the red-black tree algorithm achieve this?', 6.00, 4),
('Text', 'Describe the differences between a graph and a tree and explain how graph traversal algorithms like DFS and BFS differ.', 6.00, 4),
('Text', 'Discuss how the A* algorithm combines the advantages of both Dijkstra’s algorithm and greedy best-first search in solving pathfinding problems.', 6.00, 4),
('Text', 'Explain the concept of topological sorting and discuss its application in task scheduling or dependency resolution problems.', 6.00, 4),
('Text', 'Describe how a hash map works and explain how its time complexity is O(1) on average for insert, delete, and search operations.', 6.00, 4),

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('Text', 'What are the different types of searching algorithms, and how do
their time complexities compare?', 6.00, 4),
('Text', 'Explain the concept of greedy algorithms and provide an example
of a problem solved using a greedy approach.', 6.00, 4);
-------------------------------------------------------------------------
-------------------------------------------------------
--ANSWERS
insert into MCQ_Question (questionID, option1, option2, option3, option4,
correctAnswer)
values
(301, 'Array', 'Graph', 'Tree', 'Hash Table', 'option1'),
(302, 'Bubble Sort', 'Merge Sort', 'Quick Sort', 'Heap Sort', 'option2'),
(304, 'O(1)', 'O(n)', 'O(log n)', 'O(n^2)', 'option1'),
(306, 'Stack', 'Queue', 'Array', 'Graph', 'option1'),
(307, 'Bubble Sort', 'Insertion Sort', 'Merge Sort', 'Selection Sort',
'option3'),
(309, 'O(n log n)', 'O(n)', 'O(n^2)', 'O(1)', 'option3'),
(311, 'Array', 'Linked List', 'Graph', 'Stack', 'option3'),
(312, 'Last node points to the first node', 'Every node has two pointers',
'Nodes are connected randomly', 'Nodes are stored sequentially',
'option1'),
(314, 'Depth-First Search', 'Random Walk', 'Priority Search', 'Breadth-
First Search', 'option4'),
(315, 'Efficient searching', 'Smaller size', 'Simpler implementation',
'Sequential access', 'option1'),
(317, 'Dijkstra's Algorithm', 'Kruskal's Algorithm', 'Prim's Algorithm',
'Floyd-Warshall Algorithm', 'option1'),
(318, 'Quick Sort', 'Merge Sort', 'Counting Sort', 'Bubble Sort',
'option3'),
(320, 'Search', 'Insert', 'Delete', 'All of the above', 'option4'),
(321, 'Queue', 'Stack', 'Array', 'Tree', 'option1'),
(323, 'Full Binary Tree', 'Complete Binary Tree', 'Circular Binary Tree',
'Perfect Binary Tree', 'option3'),
(324, 'O(log n)', 'O(n)', 'O(n^2)', 'O(1)', 'option1'),
(326, 'Queue', 'Stack', 'Graph', 'Tree', 'option2'),
(327, 'Queue', 'Stack', 'Hash Table', 'Array', 'option3'),
(329, 'Increased memory usage', 'Sequential access', 'Simpler
implementation', 'No random access', 'option1'),
(330, 'Dijkstra's Algorithm', 'Kruskal's Algorithm', 'Prim's Algorithm',
'Bellman-Ford Algorithm', 'option2'),
(332, 'O(1)', 'O(n)', 'O(n log n)', 'O(n^2)', 'option2'),
(333, 'Balanced structure', 'Complexity in operations', 'Unbalanced tree
leads to poor performance', 'Limited storage', 'option3'),
(335, 'Greedy Algorithm', 'Dynamic Programming', 'Divide and Conquer',
'Backtracking', 'option2'),
(336, 'Quick Sort', 'Bubble Sort', 'Merge Sort', 'Heap Sort', 'option2'),
(338, 'Array', 'Stack', 'Tree', 'Hash Table', 'option3'),
(339, 'Stable sorting', 'High memory usage', 'Worst-case performance',
'Extra space required', 'option3'),
(341, 'Parent is smaller than children', 'Parent is larger than children',
'Unordered', 'Sequentially stored', 'option1'),
(342, 'O(1)', 'O(log n)', 'O(n)', 'O(n^2)', 'option2'),
(344, 'In-order', 'Pre-order', 'Post-order', 'All of the above',
'option4'),
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(345, 'Depth-First Search', 'Breadth-First Search', 'Both A and B', 'None
of the above', 'option3'),
(347, 'Linked List', 'Array', 'Hash Table', 'Tree', 'option2'),
(348, 'O(n)', 'O(n^2)', 'O(n log n)', 'O(1)', 'option3'),
(350, 'Bubble Sort', 'Insertion Sort', 'Counting Sort', 'Heap Sort',
'option3'),
(352, 'Queue', 'Stack', 'Graph', 'Array', 'option2'),
(353, 'Efficient indexing', 'Constant time operations', 'Uses key-value
pairs', 'All of the above', 'option4'),
(355, 'O(1)', 'O(log n)', 'O(n)', 'O(n log n)', 'option3'),
(357, 'Binary Search', 'Linear Search', 'Depth-First Search', 'Breadth-
First Search', 'option1'),
(358, 'Nodes contain single pointers', 'Nodes are linked in only one
direction', 'Nodes are linked in both directions', 'All of the above',
'option3'),
(360, 'Faster lookups', 'Reduced memory usage', 'Improved sorting',
'Better traversal', 'option1'),
(361, 'O(1)', 'O(n)', 'O(log n)', 'O(n^2)', 'option1'),
(363, 'Heap', 'Stack', 'Queue', 'Graph', 'option1'),
(364, 'Level Order', 'In-order', 'Post-order', 'Pre-order', 'option1'),
(366, 'Quick Sort', 'Merge Sort', 'Heap Sort', 'Bubble Sort', 'option2'),
(367, 'Heap Sort', 'Merge Sort', 'Quick Sort', 'All of the above',
'option4'),
(369, 'Breadth-First Search', 'Depth-First Search', 'Dijkstra's
Algorithm', 'Bellman-Ford Algorithm', 'option1'),
(370, 'Password management', 'Data encryption', 'Efficient searching',
'File compression', 'option3');

insert into TrueFalse_Question (questionID, correctAnswer)
values
(303, 1),
(305, 0),
(308, 0),
(310, 0),
(313, 1),
(316, 1),
(319, 1),
(322, 0),
(325, 1),
(328, 0),
(331, 1),
(334, 0),
(337, 1),
(340, 1),
(343, 1),
(346, 1),
(349, 1),
(351, 1),
(354, 0),
(356, 0),
(359, 1),
(362, 0),
(365, 1),
(368, 1);
```

```
insert into TextQuestion (questionID, bestAnswer)
values
(371, 'A stack is a linear data structure that follows the Last In, First Out (LIFO) principle, where elements are added and removed from the top. A queue follows the First In, First Out (FIFO) principle, where elements are added at the rear and removed from the front. Example use case: A stack can be used for function calls (e.g., recursion), while a queue is used in a print queue system.'),
(372, 'The quicksort algorithm works by selecting a pivot element and partitioning the array into two sub-arrays: elements less than the pivot and elements greater than the pivot. These sub-arrays are recursively sorted. Its time complexity is O(n log n) in the best and average cases, and O(n^2) in the worst case when the pivot selection is poor.'),
(373, 'Dynamic programming is a technique for solving problems by breaking them down into overlapping sub-problems, solving each sub-problem once, and storing the results. Example: The Fibonacci sequence can be solved efficiently using dynamic programming by storing previously calculated values to avoid redundant computations.'),
(374, 'A linked list is more efficient than an array when it comes to inserting and deleting elements, as these operations don’t require shifting elements like in arrays. Example: Linked lists are efficient for applications like managing a dynamic list of items (e.g., a to-do list) where items are frequently added or removed.'),
(375, 'A singly linked list has nodes that point to the next node, while a doubly linked list has nodes that point to both the next and previous nodes. The advantage of a doubly linked list is that it allows for more efficient traversal in both directions and easier deletion of nodes, since each node has access to its predecessor.'),
(376, 'Breadth-First Search (BFS) explores all neighbors of a node before moving on to their neighbors. BFS is used to find the shortest path in an unweighted graph by visiting all nodes level by level from the source node.'),
(377, 'A hash table is a data structure that maps keys to values using a hash function. Collisions are handled by techniques such as chaining (storing multiple values in a list at the same index) or open addressing (finding the next available slot).'),
(378, 'Merge sort is a divide-and-conquer sorting algorithm that divides the array into halves, recursively sorts them, and merges them. It has a time complexity of O(n log n) in all cases, making it efficient but requiring additional space for merging.'),
(379, 'Dijkstra’s algorithm finds the shortest path between two nodes in a weighted graph by iteratively selecting the node with the smallest tentative distance. It is commonly used in routing algorithms for network traffic.'),
(380, 'A binary search tree (BST) is a tree where each node has at most two children, and left child values are smaller than the parent, while right child values are greater. An AVL tree is a self-balancing binary search tree that ensures the height difference between the left and right subtrees is no more than one. Balancing is done by rotations.'),
(381, 'A minimum spanning tree (MST) is a tree that connects all nodes in a weighted graph with the smallest possible total edge weight. Kruskal’s algorithm finds the MST by sorting all edges in increasing order of weight and adding them one by one, ensuring no cycles are formed.'),
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(382, 'Bubble sort, selection sort, and insertion sort all have an average and worst-case time complexity of O(n^2), but bubble sort has the worst performance due to repeated swapping, while insertion sort can be more efficient if the array is nearly sorted.'),
(383, 'Dynamic memory allocation in C/C++ allows memory to be allocated during runtime using functions like malloc, calloc, and realloc. It differs from static memory allocation, where memory is allocated at compile-time and cannot be resized.'),
(384, 'Depth-First Search (DFS) explores as far as possible along each branch before backtracking. DFS is useful for tasks like maze solving and topological sorting in directed acyclic graphs.'),
(385, 'A priority queue is a data structure where each element has a priority, and elements with higher priority are dequeued before those with lower priority, regardless of their insertion order. It is used in applications like scheduling tasks in operating systems.'),
(386, 'Time complexity analysis helps evaluate the efficiency of algorithms by determining the relationship between input size and execution time. It allows developers to choose algorithms that optimize performance, especially with large datasets.'),
(387, 'Graphs can be directed (edges have direction), undirected (edges have no direction), weighted (edges have values), or unweighted (edges have no values). They are used in applications like social networks (undirected) and web navigation (directed).'),
(388, 'A heap is a complete binary tree where each parent node is ordered with respect to its children. It is used in implementing priority queues and efficient algorithms like heap sort. It allows insertion and deletion in O(log n) time.'),
(389, 'A Fibonacci heap is a data structure that improves the performance of algorithms like Dijkstra’s by providing a more efficient way of merging heaps and performing decrease-key operations. It has amortized time complexities of O(1) for insertion and O(log n) for delete-min.'),
(390, 'Recursion is a programming technique where a function calls itself. A common example is the factorial function, where n! = n * (n-1)!. Recursion simplifies problems by breaking them down into smaller sub-problems.'),
(391, 'Internal sorting refers to sorting data that fits into memory, while external sorting is used when data is too large to fit into memory and requires external storage like hard disks. External sorting is necessary for handling large datasets.'),
(392, 'Operations on a binary tree include insertion, deletion, searching, and traversal. Traversal methods include preorder (root, left, right), inorder (left, root, right), and postorder (left, right, root). Each traversal order serves different purposes.'),
(393, 'DFS explores deeply into each branch of a graph, while BFS explores nodes level by level. DFS is used for tasks requiring deep exploration like topological sorting, while BFS is used for shortest path finding in unweighted graphs.'),
(394, 'Balancing binary search trees ensures that the tree remains efficient for search, insert, and delete operations. The red-black tree algorithm achieves balance by enforcing rules on node coloring and performing rotations during insertions and deletions.'),
(395, 'A graph can contain cycles, and its nodes can have multiple parent nodes, while a tree has a hierarchical structure with a single root and no

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cycles. DFS and BFS differ in how they explore these structures, with DFS
exploring deeply and BFS exploring level by level.'),
(396, 'The A* algorithm combines Dijkstra's shortest path algorithm and
greedy best-first search. It uses both the actual cost to reach a node and
the estimated cost to reach the goal, ensuring efficient and optimal
pathfinding.'),
(397, 'Topological sorting is an ordering of vertices in a directed
acyclic graph (DAG) such that for every directed edge u → v, vertex u
comes before v. It is used in tasks like project scheduling where certain
tasks must be completed before others.'),
(398, 'A hash map uses a hash function to map keys to indices in an array,
allowing for constant time (O(1)) access to values. Collisions are handled
by techniques such as chaining or open addressing. Its time complexity is
O(1) on average for insert, delete, and search operations.'),
(399, 'Searching algorithms include linear search (O(n)), binary search
(O(log n)), and hash-based search (O(1) on average). Binary search is more
efficient than linear search for sorted arrays, while hash-based search is
fast for unordered data.'),
(400, 'Greedy algorithms make locally optimal choices at each step with
the hope of finding a global optimum. Example: The coin change problem can
be solved using a greedy approach by always selecting the largest coin
denomination first.');
--------------------------------------------------------------------------
------------------------------------------------------------
--Web Development
insert into question (questionType, questionText, degree, courseID)
values
('MCQ', 'Which of the following is used to style web pages?', 2.00, 5),
('MCQ', 'Which HTML tag is used to define a hyperlink?', 2.00, 5),
('True/False', 'JavaScript is a server-side scripting language.', 2.00,
5),
('MCQ', 'Which of the following is not a valid HTML element?', 2.00, 5),
('True/False', 'CSS allows you to add styles to an HTML document.', 2.00,
5),
('MCQ', 'Which method is used to select an HTML element by its id using
JavaScript?', 2.00, 5),
('MCQ', 'What does the "href" attribute in an anchor tag specify?', 2.00,
5),
('True/False', 'The <div> element is an inline element in HTML.', 2.00,
5),
('MCQ', 'Which of the following is the correct syntax to link an external
CSS file?', 2.00, 5),
('True/False', 'JavaScript is used primarily for styling web pages.',
2.00, 5),
('MCQ', 'Which of the following HTML tags is used to display an image?',
2.00, 5),
('MCQ', 'Which of the following is a valid CSS selector?', 2.00, 5),
('True/False', 'The <form> tag is used to create a form in HTML.', 2.00,
5),
('MCQ', 'Which of the following is used to define the structure of a web
page?', 2.00, 5),
('MCQ', 'What is the purpose of the "alt" attribute in an <img> tag?',
2.00, 5),
('True/False', 'CSS stands for Cascading Style Syntax.', 2.00, 5),
```

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('MCQ', 'Which of the following is used to make a website mobile-
friendly?', 2.00, 5),
('MCQ', 'Which CSS property is used to set the background color of an
element?', 2.00, 5),
('True/False', 'HTML is used to define the structure of web pages, while
CSS is used to style them.', 2.00, 5),
('MCQ', 'Which of the following is not a valid JavaScript data type?',
2.00, 5),
('MCQ', 'What does the "onclick" attribute do in HTML?', 2.00, 5),
('True/False', 'HTML5 supports multimedia elements such as video and
audio.', 2.00, 5),
('MCQ', 'Which of the following is the correct syntax to add a comment in
JavaScript?', 2.00, 5),
('MCQ', 'Which of the following is used to manipulate DOM elements in
JavaScript?', 2.00, 5),
('True/False', 'JavaScript runs only on the client-side.', 2.00, 5),
('MCQ', 'Which HTML tag is used to define the largest heading?', 2.00, 5),
('MCQ', 'Which of the following is used to store form data in web
development?', 2.00, 5),
('True/False', 'The <span> tag is used for grouping inline elements in
HTML.', 2.00, 5),
('MCQ', 'Which of the following is used to create a table in HTML?', 2.00,
5),
('MCQ', 'Which JavaScript function is used to display an alert box?',
2.00, 5),
('True/False', 'CSS is used to manipulate the structure of a web page.',
2.00, 5),
('MCQ', 'Which of the following is not a valid JavaScript operator?',
2.00, 5),
('MCQ', 'Which CSS property is used to control the layout of a web page?',
2.00, 5),
('True/False', 'A script in JavaScript can only be executed after the
entire HTML document has loaded.', 2.00, 5),
('MCQ', 'Which of the following methods is used to change the content of
an HTML element in JavaScript?', 2.00, 5),
('MCQ', 'Which of the following is used to link JavaScript to an HTML
page?', 2.00, 5),
('True/False', 'JavaScript can be used to dynamically change the content
of a web page without refreshing the page.', 2.00, 5),
('MCQ', 'Which HTML attribute is used to specify the source of an image?',
2.00, 5),
('MCQ', 'Which of the following is used to make a page responsive in
HTML5?', 2.00, 5),
('True/False', 'HTML5 supports the <video> element for embedding video
content.', 2.00, 5),
('MCQ', 'Which CSS property is used to change the font size of an
element?', 2.00, 5),
('MCQ', 'Which HTML element is used to create a dropdown list?', 2.00, 5),
('True/False', 'The <a> tag is used for creating links in a web page.',
2.00, 5),
('MCQ', 'Which of the following is used to add an external JavaScript file
to an HTML page?', 2.00, 5),
('MCQ', 'Which CSS property is used to control the spacing between
words?', 2.00, 5),
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('True/False', 'In JavaScript, the document object model (DOM) represents the web page as a tree structure.', 2.00, 5),
('MCQ', 'Which of the following is used to set the height of an HTML element?', 2.00, 5),
('MCQ', 'What is the default value of the position property in CSS?', 2.00, 5),
('True/False', 'JavaScript is a type of markup language used for web development.', 2.00, 5),
('MCQ', 'Which of the following is used to add a comment in CSS?', 2.00, 5),
('MCQ', 'What is the correct way to create a hyperlink in HTML?', 2.00, 5),
('True/False', 'CSS can be used to change the color of text in an HTML document.', 2.00, 5),
('MCQ', 'Which HTML tag is used to define a paragraph?', 2.00, 5),
('True/False', 'JavaScript is not used for creating interactive web pages.', 2.00, 5),
('MCQ', 'Which of the following is used to add a background image to a webpage using CSS?', 2.00, 5),
('MCQ', 'What is the purpose of the "alt" attribute in an <img> tag?', 2.00, 5),
('True/False', 'The <input> tag in HTML is used for creating buttons only.', 2.00, 5),
('MCQ', 'Which of the following is the correct syntax to create a table row in HTML?', 2.00, 5),
('True/False', 'JavaScript allows you to manipulate HTML elements using their IDs.', 2.00, 5),
('MCQ', 'Which of the following is used to display a list in HTML?', 2.00, 5),
('MCQ', 'Which of the following is the correct syntax to create an ordered list in HTML?', 2.00, 5),
('True/False', 'The <canvas> tag is used to display 2D graphics in HTML5.', 2.00, 5),
('MCQ', 'Which CSS property is used to set the font style of an element?', 2.00, 5),
('MCQ', 'Which JavaScript method is used to parse a string into an integer?', 2.00, 5),
('True/False', 'CSS can be used to change the background color of a webpage.', 2.00, 5),
('MCQ', 'Which of the following is used to align text in the center using CSS?', 2.00, 5),
('MCQ', 'Which HTML tag is used to display a horizontal line on a webpage?', 2.00, 5),
('True/False', 'In HTML, the
 tag is used to create a line break.', 2.00, 5),
('MCQ', 'Which of the following is used to set the width of a table cell in HTML?', 2.00, 5),
('MCQ', 'Which HTML tag is used to define a list item in an unordered list?', 2.00, 5),
('Text', 'Explain the difference between inline and block elements in HTML. Provide examples of each.', 6.00, 5),
('Text', 'Describe the box model in CSS and explain how padding, margin, and borders affect the layout of an element.', 6.00, 5),

('Text', 'What is the DOM (Document Object Model) in JavaScript? Explain how it can be manipulated to change the content and structure of a web page.', 6.00, 5),
('Text', 'Explain the concept of responsive web design and how it is implemented using CSS media queries.', 6.00, 5),
('Text', 'What is the purpose of the <form> element in HTML? Explain how forms are used to collect user input and submit data to the server.', 6.00, 5),
('Text', 'Describe how JavaScript can be used to create interactive web pages. Provide an example where JavaScript is used to manipulate the DOM.', 6.00, 5),
('Text', 'Explain the difference between GET and POST methods in HTML forms. When should each method be used?', 6.00, 5),
('Text', 'What is AJAX? Explain how it is used in web development to create asynchronous requests to a server without reloading the page.', 6.00, 5),
('Text', 'What is the role of cookies in web development? Discuss how cookies are used to store user data and preferences on the client side.', 6.00, 5),
('Text', 'Describe the concept of client-side vs. server-side scripting in web development. Provide examples of each.', 6.00, 5),
('Text', 'What is the purpose of the "alt" attribute in HTML, especially in terms of accessibility?', 6.00, 5),
('Text', 'What are the advantages of using CSS Flexbox for layout? Provide an example of a Flexbox-based layout.', 6.00, 5),
('Text', 'Explain the role of JavaScript frameworks such as React, Angular, and Vue in modern web development. How do they differ from each other?', 6.00, 5),
('Text', 'What is the significance of the "meta" tag in HTML? Discuss its various uses, including setting the character encoding and viewport properties.', 6.00, 5),
('Text', 'What is the purpose of the <head> section in an HTML document? Discuss the elements typically included in this section.', 6.00, 5),
('Text', 'Explain the concept of Cross-Origin Resource Sharing (CORS) and how it affects AJAX requests in web development.', 6.00, 5),
('Text', 'What are the main differences between a static website and a dynamic website? Provide examples of each type of website.', 6.00, 5),
('Text', 'Explain how version control systems like Git are used in web development to manage code changes and collaborate with other developers.', 6.00, 5),
('Text', 'What are the benefits and drawbacks of using inline CSS vs. external CSS files? When would you choose one over the other?', 6.00, 5),
('Text', 'Discuss the importance of accessibility in web development. What steps can developers take to make websites more accessible?', 6.00, 5),
('Text', 'What are the main components of a RESTful API? How does it differ from traditional web service protocols like SOAP?', 6.00, 5),
('Text', 'Describe the process of deploying a website. What steps are involved, and what tools are commonly used for deployment?', 6.00, 5),
('Text', 'What is the significance of semantic HTML? Provide examples of semantic elements and explain why they are important for accessibility and SEO.', 6.00, 5),
('Text', 'Explain how web security issues such as Cross-Site Scripting (XSS) and Cross-Site Request Forgery (CSRF) can affect a web application. How can they be mitigated?', 6.00, 5),

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('Text', 'Describe the role of the "viewport" meta tag in mobile web
development. How does it help create responsive layouts for mobile
devices?', 6.00, 5),
('Text', 'What is the difference between server-side rendering and client-
side rendering? When would you use each technique?', 6.00, 5),
('Text', 'Explain the concept of Progressive Web Apps (PWAs) and how they
provide a native app-like experience on the web.', 6.00, 5),
('Text', 'What is the difference between CSS Grid and CSS Flexbox? Provide
examples of when to use each for layout design.', 6.00, 5),
('Text', 'Explain the concept of web accessibility (a11y) and provide
examples of how to make a website accessible to users with disabilities.',
6.00, 5),
('Text', 'Describe how to optimize images for the web. What are the best
practices for improving page load times while maintaining image quality?',
6.00, 5);
-------------------------------------------------------------------------
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--ANSWERS
insert into MCQ_Question (questionID, option1, option2, option3, option4,
correctAnswer)
values
(401, 'HTML', 'CSS', 'JavaScript', 'Python', 'option2'),
(402, '<a>', '<link>', '<href>', '<anchor>', 'option1'),
(404, '<div>', '<span>', '<row>', '<header>', 'option3'),
(406, 'getElementById()', 'querySelector()', 'getElementsByClassName()',
'querySelectorAll()', 'option1'),
(407, 'Specifies the target window for the link', 'Specifies the URL of
the link', 'Specifies the CSS class for the link', 'Specifies the ID of
the link', 'option2'),
(409, '<link rel="stylesheet" href="style.css">', '<css src="style.css">',
'<stylesheet href="style.css">', '<style link="style.css">', 'option1'),
(411, '<image>', '<img>', '<pic>', '<graphic>', 'option2'),
(412, '.className', '#idName', 'tagName', 'All of the above', 'option4'),
(414, 'HTML', 'CSS', 'JavaScript', 'PHP', 'option1'),
(415, 'To style the image', 'To specify a backup image', 'To describe the
image if it cannot be displayed', 'To make the image clickable',
'option3'),
(417, 'Using media queries in CSS', 'Using inline styles', 'Using
JavaScript frameworks', 'Using tables for layout', 'option1'),
(418, 'background-color', 'color', 'background-image', 'bg-color',
'option1'),
(420, 'String', 'Number', 'Boolean', 'Character', 'option4'),
(421, 'Runs JavaScript code when clicked', 'Links to another page',
'Styles an element when clicked', 'Sends data to the server', 'option1'),
(423, '// This is a comment', '/* This is a comment */', '<!-- This is a
comment -->', '# This is a comment', 'option1'),
(424, 'DOMParser', 'document.querySelector', 'JSON.stringify',
'window.onload', 'option2'),
(426, '<h6>', '<h1>', '<header>', '<heading>', 'option2'),
(427, 'LocalStorage', 'Cookies', 'SessionStorage', 'All of the above',
'option4'),
(429, '<div>', '<span>', '<table>', '<form>', 'option3'),
(430, 'prompt()', 'alert()', 'confirm()', 'display()', 'option2'),
(432, '+', '&&', '*', 'then', 'option4'),
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(433, 'display', 'position', 'float', 'All of the above', 'option4'),
(435, 'innerHTML', 'innerText', 'textContent', 'All of the above',
'option4'),
(436, '<script>', '<link>', '<style>', '<js>', 'option1'),
(438, 'href', 'src', 'alt', 'path', 'option2'),
(439, '<meta name="viewport">', '<div class="responsive">', '<img
responsive>', '<link responsive>', 'option1'),
(441, 'font-family', 'font-style', 'font-size', 'text-size', 'option3'),
(442, '<input>', '<select>', '<dropdown>', '<option>', 'option2'),
(444, '<script src="file.js">', '<js file="file.js">', '<include
src="file.js">', '<link rel="javascript" href="file.js">', 'option1'),
(445, 'line-height', 'word-spacing', 'letter-spacing', 'text-align',
'option2'),
(447, 'height', 'max-height', 'size', 'dimension', 'option1'),
(448, 'relative', 'absolute', 'static', 'fixed', 'option3'),
(450, '/* comment */', '// comment', '# comment', '<!-- comment -->',
'option1'),
(451, '<a href="url">Link</a>', '<hyperlink url="url">Link</hyperlink>',
'<link src="url">Link</link>', '<anchor href="url">Link</anchor>',
'option1'),
(453, '<p>', '<div>', '<span>', '<text>', 'option1'),
(455, 'background-image: url("image.jpg");', 'image:
background("image.jpg");', 'set-background("image.jpg");', 'image-src:
url("image.jpg");', 'option1'),
(456, 'To style the image', 'To describe the image', 'To specify the image
format', 'To provide a clickable link', 'option2'),
(458, '<td>', '<th>', '<tr>', '<row>', 'option3'),
(460, '<list>', '<ul>', '<ol>', '<li>', 'option2'),
(461, '<ul>', '<ol>', '<li>', '<dl>', 'option2'),
(463, 'font-style', 'text-style', 'letter-style', 'display', 'option1'),
(464, 'parseInt()', 'toString()', 'split()', 'convert()', 'option1'),
(466, 'text-align: center;', 'align: center;', 'horizontal-align:
center;', 'center-text: true;', 'option1'),
(467, '<hr>', '<br>', '<line>', '<hline>', 'option1'),
(469, 'width', 'cell-width', 'table-cell-width', 'col-width', 'option1'),
(470, '<ul>', '<ol>', '<li>', '<dl>', 'option3');

insert into TrueFalse_Question (questionID, correctAnswer)
values
(403, 0),
(405, 1),
(408, 0),
(410, 0),
(413, 1),
(416, 0),
(419, 1),
(422, 1),
(425, 0),
(428, 1),
(431, 0),
(434, 0),
(437, 1),
(440, 1),
(443, 1),
```

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(446, 1),
(449, 0),
(452, 1),
(454, 0),
(457, 0),
(459, 1),
(462, 1),
(465, 1),
(468, 1);

insert into TextQuestion (questionID, bestAnswer)
values
(471, 'Inline elements only take up as much width as necessary and do not
break the flow of the document. Examples: <span>, <a>. Block elements take
up the full width available and start on a new line. Examples: <div>,
<p>.'),
(472, 'The box model in CSS defines how padding, margin, and borders
affect the layout of an element. Padding is the space between the content
and the border, margin is the space outside the border, and borders are
the outline around the content. These all contribute to the element's
overall size.'),
(473, 'The DOM (Document Object Model) in JavaScript is an interface that
represents the structure of a web page. It allows JavaScript to manipulate
the page's content and structure by adding, deleting, or modifying
elements and attributes. For example,
document.getElementById("myElement").innerText can change the content of
an element.'),
(474, 'Responsive web design ensures that a website's layout adapts to
different screen sizes. This can be achieved using CSS media queries that
apply different styles based on the screen width, height, or other
properties.'),
(475, 'The <form> element in HTML is used to collect user input and submit
it to a server. It can contain various input fields like text boxes,
checkboxes, and buttons. When the form is submitted, the data is sent to
the server for processing.'),
(476, 'JavaScript can be used to create interactive web pages by
manipulating the DOM. For example, using
document.getElementById("myButton").onclick to create a button that
changes text when clicked.'),
(477, 'The GET method is used to retrieve data from the server and should
not have side effects (e.g., submitting data). It is used when retrieving
data without modifying it. The POST method is used to send data to the
server, typically when submitting forms or updating server-side data.'),
(478, 'AJAX (Asynchronous JavaScript and XML) allows for asynchronous
requests to the server without reloading the page. It enables updating
parts of a web page dynamically. Example: Fetching data from a server and
updating the page without a full page refresh.'),
(479, 'Cookies are small pieces of data stored on the client-side. They
are used to store user preferences, session information, or tracking data.
For example, cookies can remember user login status between sessions.'),
(480, 'Client-side scripting refers to code that runs in the browser, such
as JavaScript, while server-side scripting refers to code that runs on the
server, like PHP or Node.js. Examples: JavaScript for interactive
behavior, PHP for server-side logic.'),
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(481, 'The "alt" attribute in HTML provides alternative text for an image if it cannot be displayed. It is important for accessibility, as screen readers can read the alt text to visually impaired users.'),
(482, 'CSS Flexbox allows for flexible, responsive layouts. It enables elements to align and distribute space within a container, even when the container’s size is unknown. Example: A row of items with equal spacing using "display: flex" and "justify-content: space-between."'),
(483, 'JavaScript frameworks like React, Angular, and Vue are used to simplify web development by providing pre-built components and structures. React focuses on building UI components, Angular is a full-fledged MVC framework, and Vue offers a flexible approach to building user interfaces.'),
(484, 'The "meta" tag in HTML provides metadata about the web page, like the character encoding and viewport properties. It is used for improving SEO, defining the document’s character set, and controlling layout on mobile devices.'),
(485, 'The <head> section in an HTML document contains meta-information about the document, such as the title, links to external resources (like stylesheets), and meta tags. It is not visible on the page but important for SEO and web functionality.'),
(486, 'Cross-Origin Resource Sharing (CORS) is a security feature implemented in browsers to restrict web pages from making requests to domains other than their own. It affects AJAX requests by requiring the server to explicitly allow cross-origin requests through specific headers.'),
(487, 'Static websites have fixed content that does not change after the page loads. Examples: Personal blogs or portfolio sites. Dynamic websites generate content based on user interactions or server-side data. Examples: E-commerce websites and social media platforms.'),
(488, 'Version control systems like Git are used to track changes in code, collaborate with developers, and maintain code history. Tools like GitHub and GitLab allow for code sharing, branching, and merging, ensuring that multiple developers can work on the same codebase without conflicts.'),
(489, 'Inline CSS is defined within HTML tags and is useful for small style changes, but it can make the code cluttered. External CSS files are better for maintaining larger projects, as they separate content from styling. Use external CSS for larger projects to ensure maintainability.'),
(490, 'Accessibility in web development ensures that all users, including those with disabilities, can access and use the web. Developers can make websites more accessible by using semantic HTML, providing alternative text for images, and ensuring good contrast and keyboard navigability.'),
(491, 'A RESTful API (Representational State Transfer) uses HTTP requests to perform CRUD (Create, Read, Update, Delete) operations on resources. Unlike SOAP, which uses XML and has more overhead, REST is lightweight and often uses JSON for communication.'),
(492, 'Deploying a website involves steps like choosing a hosting provider, uploading files, configuring domains, and setting up server environments. Common tools for deployment include FTP/SFTP, command-line tools, and platforms like Netlify or Heroku.'),
(493, 'Semantic HTML uses HTML elements that convey meaning rather than just structure, making content more accessible and SEO-friendly. Examples include <article>, <header>, <footer>, and <section>. These elements

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provide context and improve readability for both users and search
engines.'),
(494, 'Cross-Site Scripting (XSS) allows attackers to inject malicious
scripts into web pages, affecting users. Cross-Site Request Forgery (CSRF)
tricks users into making unwanted requests. These can be mitigated by
sanitizing user input, using tokens, and setting proper security
headers.'),
(495, 'The viewport meta tag helps create responsive layouts by
controlling the dimensions and scaling of the web page on mobile devices.
It ensures that the page fits the screen width and prevents users from
zooming in or out unintentionally.'),
(496, 'Server-side rendering generates HTML content on the server and
sends it to the client, improving SEO and initial load time. Client-side
rendering generates HTML content in the browser using JavaScript, making
it more dynamic but slower initially. Use SSR for SEO-heavy apps, CSR for
interactive apps.'),
(497, 'Progressive Web Apps (PWAs) provide a native app-like experience
using web technologies. PWAs can be installed on devices, work offline,
and provide push notifications, offering an enhanced user experience
similar to native mobile apps.'),
(498, 'CSS Grid is a layout system that allows creating complex two-
dimensional layouts with rows and columns. Flexbox is a one-dimensional
layout system, ideal for layouts in a single direction (either row or
column). Use Grid for complex, structured layouts and Flexbox for simpler,
flexible layouts.'),
(499, 'Web accessibility (a11y) ensures that all users, including those
with disabilities, can use websites. Examples include providing alt text
for images, using proper HTML semantics, ensuring color contrast, and
enabling keyboard navigation.'),
(500, 'To optimize images for the web, use file formats like JPEG or WebP
for high-quality images with small file sizes, compress images to reduce
file size without significant quality loss, and use responsive images to
serve different sizes based on device resolution and screen size.');
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--Users Data
insert into users (userName, password, role)
values
('admin_user', 'admin123', 'Admin'),
('John Doe', 'u8k9H5tL', 'Training Manager'),
('Emma Watson', 'a7R6b2U3', 'Training Manager'),
('Michael Smith', 'f9G7p2Vb', 'Instructor'),
('Sophia Johnson', 'k7X2tB3v', 'Instructor'),
('James Williams', 'h9Q3a2Tj', 'Instructor'),
('Olivia Brown', 'r8K5mF2W', 'Instructor'),
('Liam Jones', 'e4S9wR1D', 'Instructor'),
('Ava Miller', 'p5G7dT4U', 'Instructor'),
('Lucas Davis', 'o6W3jP2L', 'Instructor'),
('Isabella Garcia', 'b9F5uQ4Z', 'Instructor'),
('Ethan Martinez', 'm8B3lD5W', 'Instructor'),
('Mia Rodriguez', 'j7K2tV9Y', 'Instructor'),
```

('Liam Anderson', 'y6P8zB1V', 'Student'),
('Olivia Taylor', 's9D7mF3G', 'Student'),
('Noah Wilson', 'w4S2pJ5A', 'Student'),
('Emma Clark', 'b6K3hT9Q', 'Student'),
('James Lewis', 't1C7pR4N', 'Student'),
('Sophia Walker', 'e3L5kJ2Z', 'Student'),
('Benjamin Hall', 'a8R2wD6M', 'Student'),
('Isabella Allen', 'm7G4vY3L', 'Student'),
('Mason Young', 'f6U1sP7X', 'Student'),
('Charlotte King', 'r9T2qF5B', 'Student'),
('Elijah Scott', 'd3W7kN4P', 'Student'),
('Amelia Adams', 'k4H6bG8Z', 'Student'),
('William Nelson', 's9X1pJ7V', 'Student'),
('Lucas Carter', 'h5T3mW2R', 'Student'),
('Harper Mitchell', 'p8Q2sK6F', 'Student'),
('Alexander Perez', 'a1V7lD5B', 'Student'),
('Mia Roberts', 'w4J5gY8Z', 'Student'),
('Jackson Evans', 'g9P2fT1A', 'Student'),
('Avery Green', 'h5L9rB3W', 'Student'),
('Ella Baker', 'f2P8wT7S', 'Student'),
('Sebastian Murphy', 's9W4dY2K', 'Student'),
('Jack Harris', 'g1D3eQ5F', 'Student'),
('Zoe Foster', 'p6B9zN2T', 'Student'),
('Grace Ross', 'h5V4cL3D', 'Student'),
('Oliver Morgan', 'm2Q5nF7J', 'Student'),
('Chloe Cox', 'f9J1dR3V', 'Student'),
('Jackson Bell', 'd8R6yG4K', 'Student'),
('Maya Ward', 'b2S9pL1X', 'Student'),
('Jacob Cooper', 'r4T7gK8P', 'Student'),
('Emily Flores', 'w1G9vT2P', 'Student'),
('Levi Gonzalez', 'q3F6mD5R', 'Student'),
('Aiden Perez', 't5Y8kV3H', 'Student'),
('Lily Morris', 'a9T4jL6Q', 'Student'),
('Carter Price', 'p7N3sF2Y', 'Student'),
('Zachary Hughes', 'k6S9vT1X', 'Student'),
('Eleanor Powell', 'd8Q5nV2Y', 'Student'),
('Amos Ward', 't7L6xB1C', 'Student'),
('Nina Sanders', 'f9P4uD3J', 'Student'),
('Samuel Clark', 'b3X7sQ1N', 'Student'),
('Sophie Russell', 'v2B9rJ8X', 'Student'),
('Daniel Peterson', 'c4M7tW3V', 'Student'),
('Charlotte Carter', 'n2K5dP8A', 'Student'),
('Henry James', 'h4T3rQ9V', 'Student'),
('Natalie Rodriguez', 'a7G9tL1D', 'Student'),
('Mason Garcia', 'v3B2wP7T', 'Student'),
('Samantha Collins', 'j6L4vT2M', 'Student'),
('Ethan Scott', 'b5W2hR9Q', 'Student'),
('Megan Mitchell', 'o1K9vG7T', 'Student'),
('Andrew Taylor', 'f6Y3gP5M', 'Student'),
('Nora Young', 'h4Q5sJ8L', 'Student'),
('Seth Wright', 'b7N3pL6J', 'Student'),
('Anna Bell', 't5M2rD7X', 'Student'),
('Benjamin Davis', 'k1H6sP4Y', 'Student'),
('Eva Thompson', 'f9W2kR3Z', 'Student'),

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('Ryan Lopez', 'j4P6mT7F', 'Student'),
('Ava Walker', 'r8D3yP1B', 'Student'),
('Oscar Harris', 'n7K9vL2Y', 'Student'),
('Nathan Turner', 'o2Q7bV4C', 'Student'),
('Maya Clark', 'w9L3tN1D', 'Student'),
('Grace Mitchell', 'g5D9sY2K', 'Student'),
('Jackie Lopez', 'e3T8rM4F', 'Student');
-----------------------------------------------------

insert into trainingManager (fullName, email, phone, userID)
values
('John Doe', 'johndoe@example.com', '01234567890', 2),
('Emma Watson', 'emmawatson@example.com', '09876543210', 3);
-----------------------------------------------------

insert into instructor (fullName, email, phone, userID)
values
('Michael Smith', 'michael.smith@example.com', '01234567891', 4),
('Sophia Johnson', 'sophia.johnson@example.com', '01234567892', 5),
('James Williams', 'james.williams@example.com', '01234567893', 6),
('Olivia Brown', 'olivia.brown@example.com', '01234567894', 7),
('Liam Jones', 'liam.jones@example.com', '01234567895', 8),
('Ava Miller', 'ava.miller@example.com', '01234567896',9),
('Lucas Davis', 'lucas.davis@example.com', '01234567897', 10),
('Isabella Garcia', 'isabella.garcia@example.com', '01234567898',11),
('Ethan Martinez', 'ethan.martinez@example.com', '01234567899', 12),
('Mia Rodriguez', 'mia.rodriguez@example.com', '01234567900', 13);
-----------------------------------------------------------
insert into student (fullName, email, phone, userID, branchID, trackID,
intakeID, trainingManagerID)
values
('Liam Anderson', 'liam.anderson@example.com', '01012345678', 14, 1, 1, 1,
1),
('Olivia Taylor', 'olivia.taylor@example.com', '01023456789', 15, 1, 1, 1,
1),
('Noah Wilson', 'noah.wilson@example.com', '01034567890', 16, 1, 1, 1, 1),
('Emma Clark', 'emma.clark@example.com', '01045678901', 17, 1, 2, 1, 1),
('James Lewis', 'james.lewis@example.com', '01056789012', 18, 1, 2, 1, 1),
('Sophia Walker', 'sophia.walker@example.com', '01067890123', 19, 1, 2, 1,
1),
('Benjamin Hall', 'benjamin.hall@example.com', '01078901234', 20, 1, 1, 2,
1),
('Isabella Allen', 'isabella.allen@example.com', '01089012345', 21, 1, 1,
2, 1),
('Mason Young', 'mason.young@example.com', '01090123456', 22, 1, 2, 2, 1),
('Charlotte King', 'charlotte.king@example.com', '01001234567', 23, 2, 3,
2, 2),
('Elijah Scott', 'elijah.scott@example.com', '01012345678', 24, 2, 3, 2,
2),
('Amelia Adams', 'amelia.adams@example.com', '01023456789', 25, 2, 3, 2,
2),
('William Nelson', 'william.nelson@example.com', '01034567890', 26, 2, 3,
2, 2),
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('Lucas Carter', 'lucas.carter@example.com', '01045678901', 27, 2, 3, 2,
2),
('Harper Mitchell', 'harper.mitchell@example.com', '01056789012', 28, 2,
3, 2, 2),
('Alexander Perez', 'alexander.perez@example.com', '01067890123', 29, 2,
3, 2, 2),
('Mia Roberts', 'mia.roberts@example.com', '01078901234', 30, 1, 2, 2, 1),
('Jackson Evans', 'jackson.evans@example.com', '01089012345', 31, 1, 2, 2,
1),
('Avery Green', 'avery.green@example.com', '01090123456', 32, 1, 2, 2, 1),
('Ella Baker', 'ella.baker@example.com', '01001234567', 33, 1, 2, 2, 1),
('Sebastian Murphy', 'sebastian.murphy@example.com', '01012345678', 34, 1,
2, 2, 1),
('Jack Harris', 'jack.harris@example.com', '01023456789', 35, 1, 2, 2, 1),
('Zoe Foster', 'zoe.foster@example.com', '01034567890', 36, 2, 4, 2, 2),
('Grace Ross', 'grace.ross@example.com', '01045678901', 37, 2, 4, 2, 2),
('Oliver Morgan', 'oliver.morgan@example.com', '01056789012', 38, 2, 4, 2,
2),
('Chloe Cox', 'chloe.cox@example.com', '01067890123', 39, 2, 4, 2, 2),
('Jackson Bell', 'jackson.bell@example.com', '01078901234', 40, 2, 4, 2,
2),
('Maya Ward', 'maya.ward@example.com', '01089012345', 41, 2, 4, 2, 2),
('Jacob Cooper', 'jacob.cooper@example.com', '01090123456', 42, 2, 4, 2,
2),
('Levi Gonzalez', 'levi.gonzalez@example.com', '01012345678', 44, 1, 2, 2,
1),
('Aiden Perez', 'aiden.perez@example.com', '01023456789', 45, 1, 2, 2, 1),
('Lily Morris', 'lily.morris@example.com', '01034567890', 46, 1, 2, 2, 1),
('Carter Price', 'carter.price@example.com', '01045678901', 47, 1, 2, 2,
1),
('Zachary Hughes', 'zachary.hughes@example.com', '01056789012', 48, 1, 2,
2, 1),
('Eleanor Powell', 'eleanor.powell@example.com', '01067890123', 49, 2, 3,
2, 2),
('Amos Ward', 'amos.ward@example.com', '01078901234', 50, 2, 3, 2, 2),
('Nina Sanders', 'nina.sanders@example.com', '01089012345', 51, 2, 3, 2,
2),
('Samuel Clark', 'samuel.clark@example.com', '01090123456', 52, 2, 3, 2,
2),
('Sophie Russell', 'sophie.russell@example.com', '01001234567', 53, 2, 3,
2, 2),
('Daniel Peterson', 'daniel.peterson@example.com', '01012345678', 54, 2,
3, 2, 2),
('Charlotte Carter', 'charlotte.carter@example.com', '01023456789', 55, 1,
1, 2, 1),
('Henry James', 'henry.james@example.com', '01034567890', 56, 1, 1, 2, 1),
('Natalie Rodriguez', 'natalie.rodriguez@example.com', '01045678901', 57,
1, 1, 2, 1),
('Mason Garcia', 'mason.garcia@example.com', '01056789012', 58, 1, 1, 2,
1),
('Samantha Collins', 'samantha.collins@example.com', '01067890123', 59, 1,
1, 2, 1),
('Ethan Scott', 'ethan.scott@example.com', '01078901234', 60, 2, 4, 2, 2),
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('Megan Mitchell', 'megan.mitchell@example.com', '01089012345', 61, 2, 4,
2, 2),
('Andrew Taylor', 'andrew.taylor@example.com', '01090123456', 62, 2, 4, 2,
2),
('Nora Young', 'nora.young@example.com', '01001234567', 63, 2, 4, 2, 2),
('Seth Wright', 'seth.wright@example.com', '01012345678', 64, 2, 4, 2, 2),
('Anna Bell', 'anna.bell@example.com', '01023456789', 65, 2, 4, 2, 2),
('Benjamin Davis', 'benjamin.davis@example.com', '01034567890', 66, 1, 1,
2, 1),
('Eva Thompson', 'eva.thompson@example.com', '01045678901', 67, 1, 1, 2,
1),
('Ryan Lopez', 'ryan.lopez@example.com', '01056789012', 68, 2, 4, 2, 2),
('Ava Walker', 'ava.walker@example.com', '01067890123', 69, 2, 4, 2, 2),
('Oscar Harris', 'oscar.harris@example.com', '01078901234', 70, 2, 4, 2,
2),
('Nathan Turner', 'nathan.turner@example.com', '01089012345', 71, 2, 4, 2,
2),
('Maya Clark', 'maya.clark@example.com', '01090123456', 72, 2, 4, 2, 2),
('Grace Mitchell', 'grace.mitchell@example.com', '01001234567', 73, 2, 4,
2, 2),
('Jackie Lopez', 'jackie.lopez@example.com', '01012345678', 74, 2, 4, 2,
2);
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insert into branch (branchName, trainingManagerID)
values
('Software Development', 1),
('Network Engineering', 2);

insert into track (trackName, branchID, trainingManagerID)
values
('Web Development', 1, 1),
('Mobile Development', 1, 1),
('Security Networks', 2, 2),
('Cloud Computing', 2, 2);

insert into Intake (intakeYear, trainingManagerID)
values
(2023, 1),
(2024, 2);

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insert into instructorCourse (instructorID, courseID, year)
values
    (1, 1, 2023),
    (2, 2, 2023),
    (3, 3, 2023),
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    (4, 4, 2023),
    (5, 5, 2023),
    (6, 1, 2024),
    (7, 2, 2024),
    (8, 3, 2024),
    (9, 4, 2024),
    (10, 5, 2024),
    (1, 3, 2025),
    (2, 4, 2025),
    (3, 5, 2025),
    (4, 1, 2025),
    (5, 2, 2025);


insert into  Exam (examType, year, startTime, endTime, allowanceOption,
instructorID, courseID, branchID, trackID, intakeID)
values
    ('Exam', 2023, '2023-06-01 10:00:00', '2023-06-01 12:00:00', 'Open
Notes', 1, 1, 1, 1, 1),
    ('Corrective', 2023, '2023-06-15 10:00:00', '2023-06-15 12:00:00',
'Extra Time Allowed', 2, 2, 1, 2, 1),
    ('Exam', 2023, '2023-07-01 09:00:00', '2023-07-01 11:00:00', 'No
Restrictions', 3, 3, 2, 3, 1),
    ('Exam', 2023, '2023-07-15 09:30:00', '2023-07-15 11:30:00', 'Open
Internet', 4, 4, 2, 4, 1),
    ('Corrective', 2023, '2023-08-01 14:00:00', '2023-08-01 16:00:00',
'Extra Time Allowed', 5, 5, 1, 1, 1),

    ('Exam', 2024, '2024-06-01 10:00:00', '2024-06-01 12:00:00', 'No
Restrictions', 6, 1, 1, 1, 2),
    ('Corrective', 2024, '2024-06-15 10:00:00', '2024-06-15 12:00:00',
'Open Notes', 7, 2, 1, 2, 2),
    ('Exam', 2024, '2024-07-01 09:00:00', '2024-07-01 11:00:00', 'No
Restrictions', 8, 3, 2, 3, 2),
    ('Exam', 2024, '2024-07-15 09:30:00', '2024-07-15 11:30:00', 'Open
Internet', 9, 4, 2, 4, 2),
    ('Corrective', 2024, '2024-08-01 14:00:00', '2024-08-01 16:00:00',
'Extra Time Allowed', 10, 5, 1, 1, 2),

    ('Exam', 2025, '2025-06-01 10:00:00', '2025-06-01 12:00:00', 'No
Restrictions', 1, 3, 1, 2, 1),
    ('Corrective', 2025, '2025-06-15 10:00:00', '2025-06-15 12:00:00',
'Open Notes', 2, 4, 2, 3, 1),
    ('Exam', 2025, '2025-07-01 09:00:00', '2025-07-01 11:00:00', 'No
Restrictions', 3, 5, 2, 4, 1),
    ('Exam', 2025, '2025-07-15 09:30:00', '2025-07-15 11:30:00', 'Open
Internet', 4, 1, 1, 1, 1),
    ('Corrective', 2025, '2025-08-01 14:00:00', '2025-08-01 16:00:00',
'Extra Time Allowed', 5, 2, 1, 2, 1);

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