



DATABASE PROGRAMMING

Instructions

- Complete all tasks below.
- **TOPIC:** REAL-WORLD APPLICATION DEVELOPMENT

QUESTION

1. Designing a Database Schema

- Describe how to design a database schema for a simple e-commerce application. What tables would you create and what relationships would you define?

2. Writing CRUD Operations

- Write SQL statements for a full set of CRUD (Create, Read, Update, Delete) operations for a `products` table in an e-commerce database.

3. Implementing User Authentication

- Explain how to implement user authentication in a web application using MySQL. Include methods for securely storing passwords.

4. Building RESTful APIs

- Describe how you would use MySQL as a backend database for a RESTful API. What endpoints would you create, and how would they interact with the database?

5. Handling Transactions

- In the context of an e-commerce application, explain how to manage transactions when processing an order that involves multiple updates to different tables.

6. Using Joins in Queries

- Provide an SQL query that retrieves all orders along with user details from a `users` and `orders` table with appropriate JOINS.

7. Implementing Search Functionality

- Explain how to implement a search feature in an application that allows users to find products by name or category. Include considerations for performance with large datasets.

8. Data Integrity and Constraints

- Discuss how to enforce data integrity in your database schema. What types of constraints would you use (e.g., foreign keys, unique constraints)?

9. Handling Concurrency

- Describe how you would handle concurrency in a web application that allows multiple users to update the same data simultaneously. What strategies would you implement?

10. Backup and Disaster Recovery

- Explain the backup strategies you would use for a production MySQL database in an application. How would you ensure minimal downtime during recovery?

11. Optimizing Queries for Performance

- Provide an example of a slow query and suggest ways to optimize it for better performance. What tools would you use to analyze query performance?

12. Implementing Pagination

- Write an SQL query that implements pagination for a list of products, showing 10 products per page based on the given page number.

13. Using Functions and Stored Procedures

- Explain how you would use stored procedures and user-defined functions to encapsulate business logic within your MySQL database.

14. Logging and Auditing Changes

- Discuss how to implement logging and auditing in your application's MySQL database to track changes and updates to sensitive data.

15. Deploying the Application

- Describe the steps to deploy a web application that uses MySQL as its database. What considerations should be taken into account for security and performance?

END