Guide2Code - SQL Roadmap

🟢 Phase 1: Beginner Level

📚 Topics to Learn:

1. Introduction to Databases & SQL (What is SQL? Why use it?)
2. SQL Installation & Setup (MySQL, PostgreSQL, SQLite, MSSQL)
3. Basic SQL Commands (SELECT, INSERT, UPDATE, DELETE)
4. Data Types in SQL (VARCHAR, INT, DATE, FLOAT, BOOLEAN)
5. Filtering & Sorting Data (WHERE, ORDER BY, DISTINCT)
6. Aggregate Functions (COUNT, SUM, AVG, MIN, MAX)
7. GROUP BY & HAVING Clauses
8. Joins in SQL (INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN)
9. Subqueries & Nested Queries
10. Basic Indexing & Performance Optimization

🛠️ Beginner Project Ideas:

- **Student Database Management** – Store and manage student records
- **Library Management System** – Track books, members, and borrowing history
- **Simple Employee Database** – Maintain employee details and salaries
- **Basic Inventory System** – Manage product stocks and sales data
- **Customer Order Management** – Store and analyze customer purchases

🟡 Phase 2: Intermediate Level

📚 Topics to Learn:

1. Advanced SQL Functions (STRING, DATE, Mathematical Functions)
2. Views & Materialized Views
3. Stored Procedures & Functions
4. Triggers & Events in SQL
5. Transactions & ACID Properties (COMMIT, ROLLBACK, SAVEPOINT)
6. Advanced Indexing (B-Trees, Hash Indexes, Full-Text Indexing)
7. Normalization & Denormalization

8. Common Table Expressions (CTEs) & Recursive Queries
9. Handling NULL Values & COALESCE Function
10. Role-Based Access Control & Security in SQL

🛠 **Intermediate Project Ideas:**

- **E-commerce Database** – Store products, customers, and orders
- **Banking System Database** – Track accounts, transactions, and balances
- **Real Estate Listings Database** – Manage properties, buyers, and sales
- **Movie Ticket Booking System** – Track bookings, payments, and seats
- **Healthcare Database** – Store patient records and appointment history

🔴 **Phase 3: Advanced Level**

📚 **Topics to Learn:**

1. Query Optimization & Execution Plans
2. Partitioning & Sharding Techniques
3. NoSQL vs SQL (When to Use What)
4. Data Warehousing & OLAP Concepts
5. SQL for Big Data (Apache Hive, Google BigQuery)
6. Replication & Failover Strategies
7. Advanced Security (Encryption, SQL Injection Prevention)
8. SQL in Cloud Databases (AWS RDS, Google Cloud SQL, Azure SQL)
9. Machine Learning with SQL (Predictive Analytics, Data Mining)
10. Database Migration & Backup Strategies

🛠 **Advanced Project Ideas:**

- **Fraud Detection System** – Analyze transaction patterns to detect fraud
- **Recommendation Engine** – Suggest products based on purchase history
- **Real-Time Stock Market Database** – Store and analyze live stock data
- **IoT Data Management System** – Store sensor data efficiently
- **Multi-Tenant SaaS Database** – Design a database for handling multiple clients