Databases Theoretical Assignments

1. Compare SQL and NoSQL Databases

|  |  |  |
| --- | --- | --- |
| Feature | SQL Databases (Relational) | NoSQL Databases (Non-Relational) |
| Data Model | Tables (rows and columns) | Document, Key-Value, Column-Family, Graph |
| Schema | Fixed schema; structured data | Dynamic schema; semi-structured or unstructured |
| Scalability | Vertical scaling (scale-up) | Horizontal scaling (scale-out) |
| Query Language | SQL (Structured Query Language) | Varies: JSON-like queries, proprietary APIs |
| Examples | MySQL, PostgreSQL, Oracle, SQL Server | MongoDB, Cassandra, Redis, Couchbase |
| ACID Compliance | Strong ACID support | Varies; often eventually consistent (CAP trade-off) |
| Joins | Supports joins | Limited or no support for joins |
| Use Case Suitability | Complex queries, transactions, reporting | Real-time big data, flexible schema, IoT , content management |
| Data Integrity | High (via constraints, normalization) | Application-level enforcement |