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**Assignment # 1**

**Relational vs. NoSQL Databases**

**What Are Relationships in Relational Databases?**

Relationships define how tables are connected. These connections help organize the data and make it easier to retrieve related information.

One record on a table is linked to one record in another. A Users table and a User Profile table where each user has one profile. Many records in one table can link to many records in another. A Students table and a Courses table where students can take many courses, and each course can have many students.

**What are the advantages of relational databases?**

Everything is neatly organized into tables with a fixed layout, which keeps the data consistent and easy to manage. These databases make sure all data changes are safe and reliable. ACID ensures changes are fully completed or not done at all.

**What are the advantages of NoSQL databases?**

Relational databases allow for complex searches using SQL. NoSQL databases don’t need a fixed layout, so they can store different data types without a set format. NoSQL can expand easily by adding more servers, which is great for handling large amounts of data. NoSQL is perfect for apps that quickly process lots of data, like social media sites or real-time updates.

**What are the disadvantages of relational databases?**

Modifying the structure of data in relational databases can also be time-consuming and complex, particularly as the database grows. Additionally, relational databases are not ideal for storing media files like images, videos, or other types of unstructured data.

**What are the disadvantages of NoSQL databases?**

Many NoSQL databases don’t fully follow ACID rules, which means data might not be as safe, especially during complex transactions. NoSQL databases usually don’t have the same powerful options as relational databases. Complex searches can be harder to do. Without strict relationships, NoSQL databases might have duplicated data, which can make it harder to maintain

**Identify at least two features of MySQL and two features of MongoDB, and describe what they are and how they are used.**

MySQL ensures all data changes are reliable and secure. This is especially useful for applications like banking, where accuracy is essential. MySQL can combine data from multiple tables using SQL queries. They are great for generating reports, such as combining customer and order data for analysis.

MongoDB stores data as flexible, JSON-like documents rather than fixed tables. Perfect for apps that need to store different data types that might change over time, like content management systems. MongoDB can spread data across multiple servers to handle large amounts of data. Ideal for apps that need to grow quickly and manage large datasets, like social media platforms or big data systems.

References:

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Schaefer, Lauren. “What is NoSQL.” MongoDB. 2025. <https://www.mongodb.com/resources/basics/databases/nosql-explained>