Databases Practical Task

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1. Explain the difference between data and information.

Data is simple numbers or other types of text collected but lacking context or labels. Information is data put into context with enough details for us to understand exactly what it is about.

2. What is metadata?

Metadata is additional data collected about the original data that you are interested in. It can include any descriptive data that puts the original data in context.

3. What is a DBMS, and what are its advantages?

A DBMS is a database management system. It is usually a closely related set of programs to retrieve and update data in storage. A DBMS allows people to work with the data in a more accessible, user-friendly way. It also ensures controlled access as necessary for security purposes.

4. Compare and contrast operational databases with analytical databases, and provide an example of each.

Operational databases have business or other institutional operations functions. These working databases can have very large collections of customer details, financial transactions data or stock inventory data updated as needed. Operational databases are typically identifiable by their relationship to transactions; higher, more generalised query demand; and more straightforward functions. An example of an operational database is the client claims data held by an insurance company.

Analytical databases are used for special analysis and decision-making purposes, such as in business intelligence. The data is generally historical and aggregate so that businesses can identify and assess change and track performance. Analytical databases are typically identifiable by their relationship to decision-making; lower, more specific query demand; and more complex functions. An example of an analytical database is a data warehouse designed with some automated analysis for specific business needs, such as fraud risk detection in an insurance company.

5. Explain the types of data and use cases where NoSQL databases are most effective.

NoSQL databases, i.e., 'Not only SQL', are non-relational databases that do not have as strict a structure as tabular-only entry databases. They are thus designed for unstructured or semi-structured data. MongoDB (2025) states that NoSQL databases include document, key-value store, and graph databases. This shows that databases filled with documents, dictionary-structured data, and graphical data are use cases for NoSQL.

6. Which DBMS does not require server configuration, and what are the advantages of using it?

SQLite is such a 'serverless' database, but this does not mean it has no server, as backup is always required. It means that the client company or user does not manage or set up their own server. They make use of a provider-managed server. This means less work and responsibility for the client. Serverless databases also demand less internal resources and are simpler to set up.

7. Explain ACID properties in the context of a DBMS.

Atomicity, consistency, isolation, and durability are four desirable traits of a DBMS, and they are referred to collectively as ACID. Atomicity means that the original data is stored in a form that cannot be divided further into smaller units. For example, a table cell would usually contain a value without its unit of measurement. So, R100 would be stored separately in the database as 100 in a single cell with an indication of the currency elsewhere, such as in a table header.

Consistency means the database is reliable and updated any time it needs to be without errors or at least with the ability to identify errors quickly. Isolation is the feature that ensures changes, such as transactions happening at the same time or related to the same data, do not interfere with each other. That data is not lost when something goes wrong with the system, such as a power outage, is called durability.

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