Benefits of the Database Approach

In this lesson we will discuss the advantages of the database approach.

We'll cover the following

- Benefits of using the database approach
  - 1. Control of data redundancy
  - 2. Data sharing
  - 3. Enforcement of integrity constraints
  - 4. Restriction of unauthorized access
  - 5. Backup and recovery facilities

Benefits of using the database approach

We will now discuss some advantages of using a database system and the capabilities that a good DBMS should possess:

1. Control of data redundancy

In the database approach, ideally, each data item is stored in only one place in the database. This is known as **data normalization**, and it ensures consistency and saves storage space. In some cases, data redundancy still exists to improve system performance but it is kept to a minimum.

2. Data sharing

The integration of all the data for an organization within a database system has many advantages. First, it allows for data sharing among employees and others who have access to the system. Second, it gives users the ability to generate more information from a given amount of data than would be possible without the integration.

3. Enforcement of integrity constraints

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Database management systems must be able to define and enforce certain constraints to ensure that users enter valid information and maintain data integrity. A database constraint is a restriction or rule that dictates what can be entered or edited in a table, such as adding a valid course name in the `Course_Name` column in the COURSE table.

There are many types of database constraints. One of them is data type, which determines the sort of data that can be entered. For example, integers only. Another restraint is **data uniqueness**, which specifies that data item values must be unique, such as every record in the STUDENT table must have a unique value for `ID`.

4. Restriction of unauthorized access

Not all users of a database system will have the same access privileges. For example, one user might have **read-only** access (i.e., the ability to read a file but not make changes), while another might have **read and write privileges** (which is the ability to both read and modify a file). For this reason, a database management system should provide a security subsystem to create and control different types of user accounts and restrict unauthorized access.

5. Backup and recovery facilities

Backup and recovery are methods that allow you to protect your data from loss. The database system provides a facility for backing up and recovering data. If a hard drive fails and the database stored on the hard drive is not accessible, the only way to recover the database is with a backup.

If a computer system fails in the middle of a complex update process, the recovery subsystem is responsible for making sure that the database is restored to its original state.

The next lesson will include a quick quiz to test your knowledge of these fundamentals.