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Database System Concepts and Architecture

Content :-

Database :-Collection of related data is known as Database. Known facts that can be recorded and that have implicit meaning is know as Data.

Some Implicit Property of Database :-

1. A database represents some aspects of the real world ,sometimes called mini-world or the universe of discourse. Changes to the mini-world reflected in the database.
2. It is logically coherent collection of data with some inherent meaning .
3. A database designed ,built and populated with data for a specific purpose. It has an intended group of users and some preconceived applications which these user are interested.

A Database Management System (DBMS) is a collection of a programs that enables users to create and maintain a database. The DBMS is a general purpose software system that facilitates the process of defining , construction ,manipulation and sharing of databases among various users and applications. **Defining** a database involves specifying the data types , structure and constrains of data to be stored in the database. The database definition or descriptive information is also stored in database in form of a database catalogor dictionary ;it is called meta-data.

the process of storing the data on some storage medium that is controlled by the DBMS is known as **Constructing** of database. **Manipulating** a database includes functions such as queering the database to retrieve specific data ,updating the database to reflect the changes in he mini-world and generating reports from the data. **Sharing** a database allows programs and multiple users to access the database simultaneously .

Photo -1

Characteristics Of Database Approach:

1. Self-describing nature of database system
2. Insulation between data and programs, and data abstraction
3. Support of multiple views of data
4. Sharing of data and multiuser transaction processing

Database Administrator (DBA):- TheDBA is responsible for authorized access to the database monitoring and coordinatingits use and acquiring software and hardware resources as needed. The DBA is accountable for problems such as poor system response time or breach of security.

Database Designers :- They are responsible for identifying the data to be stored in the database and for choosing appropriate structure to represent and store the data .

End Users :- End users are the people whose jobs require access to the database for queering ,updating and generating reports. Basically there are 4 type of users :

a. **Casual end users :-**They occasionally access the database ,but they need different information each time .
b. **Naïve or Parametric end users:-**They make up a sizable portion of database and users. Their main job function resolves around constantly querying and updating the database using standard types of queries and updates .

c. **Sophisticated end users:** It include engineers, scientists, business analyses and others who thoroughly familiarize themselves with the facilities of the DBMS in order to implements their applications to meet their complex requirement .

d. **Standalone users :** They maintain personal database using ready-made program package that provide easy-to-use menu-based or graphics-based interface.

Advantages Of Using The DBMS Approach:

1. Controlling Redundancy
2. Restricted Unauthorized Access
3. Providing Persistent Storage For Program Object
4. Providing Backup And Recovery
5. Providing Multi User Interface
6. Representing Complex Relationships Among Data

Data Model :- A collection of concepts that can be used to describe the structure of a database -provide the necessary means to achieve this abstraction.

Database Schema :-It the description of a database .It is specified during the database design and is not expected to change frequently.

Database State :- The data in the database at particular moment is known as database state or snapshot

Instances : Values in the Database is known as instance.

Three Schema Architecture :- The goal of this architecture is to separate the user applications and the physical database .

Photo -2

- The**internal level** has an internal schemas uses a physical data model and the base structure of the database . The internal schema uses a physical data model and describes the complete details of a data storage and access path for the database.
- The **Conceptual level**has a conceptual schemas , which describe the structure of the whole database for community of users. The conceptual schema hides the details of physical storage structure and concentrates on describing entities , data types relationship , user operations and constraints. Usually ,a representational data model is used to describe the conceptual schemas when a data base system is implemented .
- The **external or view level**includes a number of external schema or user views . Each external schema describes the part of the database that particular user group is interested in hides the rest of database from the user group.

The process of transforming requests and results and between level is called mapping. These mappings may be time-consuming, so some DBMS's -especially those that are meant to support small database - do not support external views.

Data Independence:-At one level of a data base system without having to change the schema at the next higher level. We can define two types of data independence :-

1. **Logical Data Independent** :- It is the capacity to change the conceptual schema without having to change external schema to expand the database (by adding a record type or data item), to change constraints or to reduce the database (by removing a record type or data item), to change constraints , or to reduce the database (by removing a record type or data item),In the last case external schemas that refer only to the remaining data should not be affected.

2. **Physical Data Independence** :- It is the capacity to change the internal schema without having to change conceptual . Changes to the external schema may be needed because some physical files were recognized .

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