



Database Management System

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Abstract:

Database Management System is general purpose application software which is most commonly used nowadays because of the fruitful results provided by it in different application areas. Database as its name suggest is an organised or systematic collection of data from which data can be retrieved and recalled as and when required. It acts as a repository or a storehouse of data and is always required by all the important organisations for having proper information and also to keep a track of different operations taking place in it. It provides a back end support and facilitates the proper functioning of the progressive organisations. Database can have number of tables present inside it which are the collection of rows and columns available to store the data. The data can be retrieved from a single table or the multiple tables depending on the user or the organisation's requirement.

Keywords: Database, application software, data, table

I. INTRODUCTION:

We are living in an era of science and technology. The advent of computers have really revolutionised the world due to its versatility and reliability. In the present scenario we cannot even think about managing our data and information without using computers. The advancement in the field of technology has opened new avenues as far as managing data and information is concerned. DBMS is actually a collection of inter-related data and set of programs to store, access and manage that data in a simple and effective way. Database Management System provides us the way to manage our data in an organised way so that it can be used effectively. It provides an effective interface between the computer system and the end users. There are many softwares falling in this category like MS-Access, MySQL, Oracle etc. These softwares facilitate storage, updation, deletion, editing etc. and are simple and easy to use.

II. TERMINOLOGY:

A variety of terms are included in DBMS as its scope and application area is really vast. It is very essential to understand the important and common terms used with Database management System. They are as follows:

Data: Raw facts and figures provided to the computer system for processing.

Information: Processed or organised data which is meaningful and can be effectively used.

Database: An organised or systematic collection of data. A database can have a number of tables or relations to store the data. This data can be retrieved, modified or deleted as per the user requirement.

Relation: A table that is a collection of rows and columns in a database is called relation. The grid of rows and columns is used to store the data.

Tuple: A row in a table is called a tuple. It represents a complete record that is a collection of data.

Attribute: A column in a relation is called an attribute. It consists of similar type of data for all the records.

Degree: The number of attributes or the columns in a relation is called its degree e.g. if a table is having 6 columns, the degree is said to be 6.

Cardinality: The number of tuples or the rows in a relation is called its cardinality e.g. if a relation is having 8 rows, the cardinality is said to be 8 for this relation

III. DIFFERENCE BETWEEN DBMS AND RDBMS:

RDBMS stands for Relational Database management system. It is an advanced version of DBMS where the data can be extracted from more than one table at a time. It establishes the relationship in between the tables with the help of join queries. All the new softwares like MS-Access, MySQL, Oracle fall under this category.

IV. KEYS USED IN DBMS:

The attributes (columns) of a table are called keys. These keys are defined on the basis of their utility and are used for the proper functionality of a database. They are as follows:

1. Primary Key: The attribute or a set of attributes that uniquely identifies a tuple (record or a row). This attribute should have unique values and no null (blank) values should be there.

2. Candidate Key: All the attributes which are capable of becoming primary key are called candidate keys. It is always a set of 2 or more attributes.

3. Alternate Key: The candidate key other than the primary key is called the alternate key for that particular table.

4. Foreign Key: A non key attribute whose values can be drawn from the primary key of any other table. This attribute

cannot accept the values directly as they are referenced with the primary key of the main table.

V. ADVANTAGES:

Database Management System has found its use in almost all the application areas because of the advantages provided by them. These advantages are:

1. Reduces Data Redundancy: Proper management of databases reduces data redundancy (duplication) to a great extent.

2. Control data inconsistency: Databases act as a data reservoir for the organisations on which the organisations can rely on. Database management system controls data inconsistency and help in maintaining data consistency.

3. Provide data security: Security of data is a major concern with all the organisations. In DBMS, the data can be made secure by granting or revoking the privileges to the users as and when required.

4. Maintain data Integrity: DBMS maintains proper data integrity i.e. any operations performed on data including the updations, editing etc. should not compromise with the data integrity in any case.

5. Facilitates Data Sharing: The basic purpose of DBMS is to store data in an organised way and share it effectively with the users.

6. Enforce Standards: Proper standards can be maintained by utilising DBMS in an effective way.

VI. APPLICATION AREAS:

DBMS is used in almost all the areas but some of the important areas where it is significantly used are as follows:

1. Education Sector: It is commonly used in schools, colleges and other educational institutions for storing the important data and delivering it on demand.

2. Banks: Banks require lots of data regarding the daily transactions and their up gradations. To work with this data DBMS is widely used and provide fruitful results.

3. Airways: Databases are required to maintain and manage the data related to flights, passengers, seats etc.

4. Libraries: Some libraries which manage a large number of books can get help from the databases to keep a track of the daily transactions. It can have the details of all the clients, all the books and their transactions.

5. Hospitals: Hospitals need a complete and organised data regarding all the doctors as well as patients. DBMS facilitate in creating and managing databases which helps in getting the required data as and when required.

6. Inventory: Stock maintenance is one of the crucial areas of all the big and progressive organisations. Huge stocks can be maintained as well as updated easily and quickly by using DBMS.

VII. LEVELS OF DATABASE IMPLEMENTATION (DATA VIEWS):

There are three different views as far as database implementation is considered. These are:

1. External Level: It is also called the user level. It deals with how data is dealt or viewed by the individual users. A single database can have many external views. It provides highest level of abstraction (providing only the required details and hiding unnecessary details).

2. Conceptual Level: This level describes what data is actually stored in a database. It is also called the logical level as it describes the database in terms of simple data structures. It is not concerned with the end users. Instead it is required by the Database administrator and the application developers.

3. Internal Level: It describes how the data is actually stored. Also called the physical level as it deals with the internal layout and the arrangement of data inside a DBMS and so it provides the lowest level of data abstraction.

VIII. LANGUAGE USED WITH DBMS:

As DBMS is an application software that acts as an interface between the application and the end user, a proper computer language is required to maintain this interface.

SQL (Structured Query Language) is used to work with the different RDBMS available today. It provides different types of statements for performing different tasks on the database.

IX. TYPES OF SQL STATEMENTS:

The main categories of SQL statements are as follows:

1. DDL (Data Definition Language) Statements:

They deals with the creation, updation and deletion of the database objects. The commands coming under this category are Create table, Alter table, Drop Table.

2. DML (Data Manipulation Language) Statements:

They deals with the different processing operations performed on the database. The commands in this category are Insert, Update, Delete and Select.

3. TCL (Transaction Control Language) :

Transaction is a complete logical unit of work that succeed or fail in its entirety. The commands dealing with the transactions are called TCL commands. E.g. Commit, Rollback, Savepoint.

X. CONCLUSION AND SUGGESTION:

The basic purpose of education is to facilitate an all round development of an individual. As the scope of education is rapidly increasing, more and more technologies are included in this field. DBMS is such technology which can do wonders in the field of education and research if it is implemented and utilised wisely. Any technology or computer software can be used only if the administrator is well versed and far sighted in his approach. So we can use it in the best possible way where we can get maximum output from minimum input.

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