- ## Chapter 02 : Basic Concepts & Terminology of Databases

2.1   Overview

Q   :   02-01-01   :   Define Field, Record and File ?

Answer :

Field : A field is a unit of data consisting of one or more characters i.e., Roll Number, Student Name, Grade etc.

Record : A collection of related data items treated as a single unit is called a record.

File : A collection of related records treated as a single unit is called a file or a data set.

2.2   Attributes, Rows and Tables

Q   :   02-02-01   :   Define Data Elements, Records, Files or Datasets and Databases ?

Answer :

Data Elements : The fields or data items in databases are termed as data items, items, attributes or columns in database structures.

Records : Records in file management structures are termed as rows or tuples in database structures.

Files or Datasets : Files or Datasets in databases are termed as tables relations or data objects in database structures.

Database : The collection of tables with some traditional files and some other necessary data objects is termed as a database.

2.3   Relation or Table

Q   :   02-03-01   :   Define Relation or Table and describe Entity ?

Answer :

Relation or Table : A two dimensional array or table of data containing descriptive information about an entity. The entity must have a unique identifier, which is composed of a combination of one or more attributes, and each attribute must have one and only one value. It is appropriate to define the word Entity here.

Entity : An entity is any thing about which you want to keep information in the database: Let us consider an example of "Student Information System", which has entities like student, teacher, course list, scholarships, time-tabling. Thus, the entities involved in this case are the same and the entity "student" can be defined in the form of database modeling :

STUDENT (STUDENT_NO, STUDENT_NAME, STUDENT_GENDER_CD, STUDENT_BIRTH_DATE, STUDENT_ADDRESS, STUDENT_TEL_NO)

From the above given definition of entity, we can easily construct a two- dimensional array or a relation by converting all the attributes in the brackets into columns of the array.

Q : 02-03-02 : Describe Properties of Relation ?

Answer :

Properties of Relation : A Relation or a Table which is the basis of a Relational DBMS, by definition must have certain inherent characteristics that form the basic for its underlying strength and flexibility. Because of these features, an application implemented by using such a system is much more flexible and can be easily modified when alterations or enhancements to the underlying data base take place. These characteristics are :

No Duplicate Rows Exist : No two rows can be identical. Why to put two rows (records) for the same entity (i.e. person). It will also violate the definition of what a relation represents, as it says by definition that their must be a unique key for each row in a relation / table.

The Order of Rows is Insignificant : There is no ordering or sequencing of the rows in the tables. The relational implementation of the tables support all required access mechanism i.e., it is not necessary to sequence the rows according to the key field.

The Order of Columns is Insignificant : Again, the order of the columns/attributes in defining a relation/table has no significance. The later insertions of the columns are made at end of the existing columns by the system itself. The system acquires the data (of columns) by their names.

Columns / Attributes are all Elemental or Atomic : All the intersections of Rows and Columns must have a nulls are inserted by the system at the time of column, which should immediately be replaced by zeros / spaces valid values for that particular column.

2.4   Views

Q : 02-04-01 : Describe Views ?

Answer :

Views : Views are created by using SQL, which is a powerful database language, used for data definition and data manipulation purposes. The purpose of using views is purely to keep the data safe and secure from un-authorized and illegal users. The views provide the descriptions of relations that are not stored, but constructed as needed from stored relations. To create a view, normally the following CREATE SQL command is used :

```
CREATE VIEW          STUDENT_VIEW_01 AS
SELECT               STUDENT_NO, STUDENT_NAME,
STUDENT_ADDRESS
FROM                 STUDENT
WHERE                STUDENT_GENDER_CD = "M";
```

This will create a view from the STUDENT table for only male students, which can be used by the users according to the authorization given to them, leaving the original table aside, safe and secure.

2.5   Indexes

Q : 02-05-01 : Describe Indexes ?

Answer :

Indexes : It is another table created by the system developer / DBA containing the key attributes of the table for which the Index is created. It has a very vital role in the database management systems, especially in RDBMS. The important associations defined in the system make use of this. It helps the system run smooth and fast.

2.6   Keys

Q   :   02-06-01   :   Define Key ? Describe Types of Keys ?

Answer :

Key : A key is a single or combination of one or more fields and its purpose is to point/retrieve the data rows from the tables, according to the requirement. Keys are defined in the relations / tables to access or sequence the stored data fast and smooth or to create the links between them.

Types of Keys :

Primary Key : In a relation, the attribute (column) or a combination of attributes (columns) that uniquely identifies a row or a record. STUDENT_NO is the attribute that uniquely identifies each student and thus can be used as a Primary key. On the other hand, STUDENT_NAME is normally not unique, so it can not be used as a primary key.

Secondary Key : A secondary key is non-unique field that is used as a secondary(alternate) key. We can scan the records from the table using secondary key.

Candidate Key / Alternate Key : Sometimes, it is unclear which field to select as the primary key. There might exist some additional field (or combination of fields) that also have the uniqueness property. These keys can be termed as Candidate keys or Alternate keys.

Composite / Concatenate Key : These keys consists of two or more data elements or attributes. Invariably, these are the same as Candidate / Alternate keys except that of uniqueness requirement. In order to make it unique, assign STATUS or another attribute.

Sort / Control Key : A Sort / Control key is used to physically sequence the stored date according to our need. Multiple attributes can be used as sort fields.

Foreign Key : A foreign key is an attribute in a table whose values must match a primary key in another table. The table in which the foreign key is found is called as dependent table and to which it refers is called as parent table.

Important Note : Foreign key relationships are the basis for establishing 1:1 or 1:M relationships across the Relations / Tables in a Relational Database Management System (RDBMS).

2.7   The User

Q   :   02-07-01   :   Define User ?

Answer :

User : The user or end-user is simply a person who uses the computers for his specific need. He might have a moderate knowledge of computers, computer science and information technology, and his need to use the computers may be entertainment, education, or professional tasks. He does not need to know the in-depth knowledge of

the computer systems, but instead, he should be aware of the installed software he intends to use.

2.8   The Data Administrator

Q   :   02-08-01   :   Define The Data Administrator ?
Answer :
The Data Administrator : A data administrator (DA) is responsible for the entire data of an organization. He normally develops the overall functional requirements for the databases being used m the office. He shares in developing the logical design for each database. He should control and manage the databases, establish the data standards, supervise the data distribution within the organization and communicate with the users when necessary. He should also participate in developing the data dictionary, prepare documentation and conduct user training where needed. Normally, the Data Administrator serves as a bridge between users and data processing staff.

2.9   The Database Administrator

Q   :   02-09-01   :   Define The Database Administrator ?
Answer :
The Database Administrator (DBA) : A database administrator (DBA) is responsible for the design, implementation, operation, management and maintenance of the database. He / She must be technically expert on the overall intricacies of the database and DBMS. He is supposed to plan, coordinate and carry out a variety of jobs during all phases of the database projects. He must possess the technical skills because he has to work on the complex software and hardware issues involved and to solve the problems of the system and application experts in the organization. He is also responsible to make sure the database access rights, to safeguard its security and to maintain and fine-tune the database functionality.