Database Management System
Lecture: 8
SQL-99: Schema Definition, Constraints

Schema:

An SQL schema is used to group together tables and other constraints that belong to the same database application.

An SQL schema is identified by a schema name and authorization number to indicate the user or account who owns the schema.

Schema is similar to directory in an operating system. However, instead of files a schema contains a collection of tables and can also contain other database objects like constraints, views, domains etc.

A schema is created using the CREATE SCHEMA command

e.g.:

CREATE SCHEMA COMPANY AUTHORIZATION ADEVEN

Constraints in SQL:

The basic constraints that can be specified in SQL as part of table creation include key and referential integrity constraints as well as restrictions on attribute domains and NULLs and constraints on individual tuples within a relation.

Specifying attribute constraints and attribute defaults:

Three types of attribute constraints are:

- **Required Data:** a constraint NOT NULL may be specified if NULL is not permitted for a particular attribute
  e.g. Dname VARCHAR(10) NOT NULL,
- **Default Values:** It is possible to define a default value for an attribute by appending the DEFAULT <value> to an attribute definition.
  e.g. Dno INT NOT NULL DEFAULT 1,
- **Domain Values Constraints:** restrict attribute values using CHECK following an attribute or domain definition.
  e.g. Dnumber INT NOT NULL CHECK(Dnumber>0 AND Dnumber<12),

Specifying Key and Referential Integrity Constraints:

- **Primary Key:**
  - A primary key is the column or columns that contain values that uniquely identify each row in a table. There can be only one Primary Key in a table. Also the primary key cannot have the same values repeating for any row. Every value of the Primary Key has to be different with no repetitions.
  - The PRIMARY KEY clause specifies one or more attributes that make up the primary key of a relation. If a primary key has a single attribute, the clause can follow the attribute directly.
  - One table can have only one primary key constraint.
  - Primary key in a table is specified as follows:
    PRIMARY KEY (List of attributes as the primary key)
    UNIQUE(List of attributes as the secondary key)
  - The **UNIQUE** clause specifies alternate (secondary) keys.

- **Referential Integrity:**
  - Referential integrity refers to the relationship between tables. Because each table in a database must have a primary key, this primary key can appear in other tables because of its relationship to data within those tables.
  - When a primary key from one table appears in another table, it is called a foreign key.
  - Foreign keys join tables and establish dependencies between tables. Tables can form a hierarchy of dependencies in such a way that if you change or delete a row in one table, you destroy the meaning of rows in other tables.
  - When you delete a row that contains a primary key or update it with a different primary key, you destroy the meaning of any rows that contain that value as a foreign key.
  - Referential integrity is the logical dependency of a foreign key on a primary key.

- The Referential Integrity constraint is specified between two relations or tables and used to maintain the consistency among the tuples in two relations.
- Referential integrity is specified via the FOREIGN KEY clause.
  FOREIGN KEY (List of attributes in the foreign key) **REFERENCES** Referenced_Relation_Name(primary key attribute list)