

SQL Course

Relational DBMS Architecture

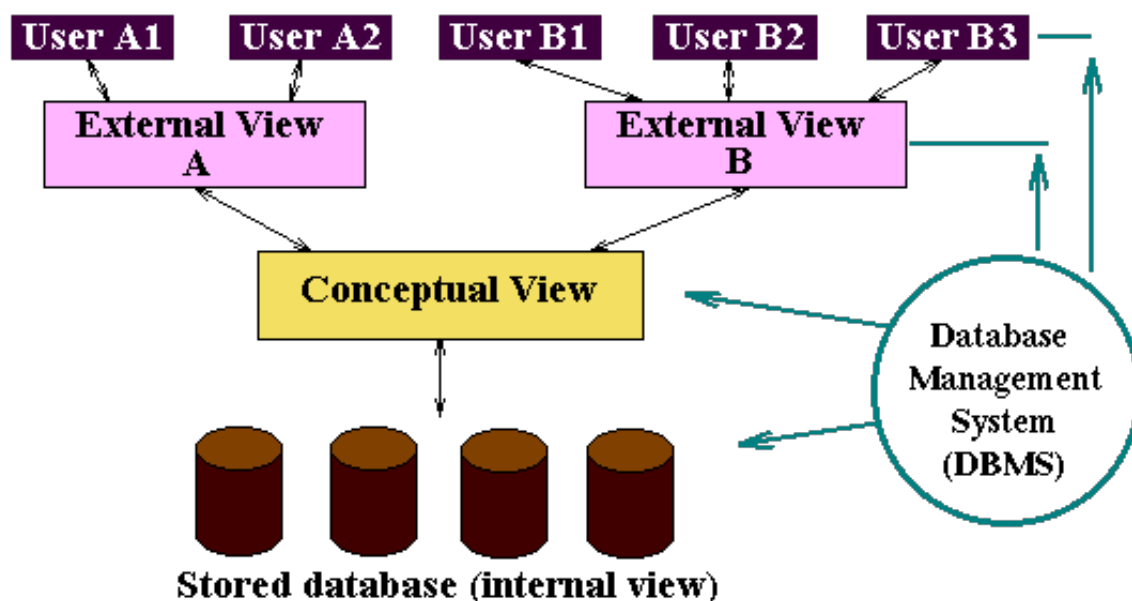
Objectives

- To introduce the basic concepts of what a Query language is.
- To focus particularly on Structured Query Language.
- To give a brief history of SQL.
- To deal with some of the Standards that exist within Query Languages.
- **Simple data structures:** Since the user need only deal with tabular information, the data structures are both simple and intuitive.
- **Simple operators:** All operations are based on tables. Therefore there is much greater uniformity in the operations and their syntax.
- **View mechanism:** The Database administrator can easily allow parts of the database to be presented to different users in different ways without changing the underlying table definitions. For example the finance department of a company may need to see employee financial information where as the personnel department may wish to see similar information but organised in a different way reflecting the use they have for such information. Relational databases allow users to have have different presentations of the database information which suit their different purposes for that information.
- **Standard language support.** The Relational Database Community have defined a standard language for database query and control. This language is therefore common across ALL implementations of relational databases.
- **Data independence:** Information is presented to users in tables. However the underlying storage organisation and database file formats are completely hidden from the user. This allows **physical data independence** where the storage format may be changed without affecting the users view of the information. Likewise, changing the tables (by adding records or attributes) need not affect the users view of the database (**logical data independence**)
- **Dynamic data definition:** Relational query language allows table structures to be modified at run-time which means that the database need not be recompiled or re-booted.
- **Integrated database dictionary:** Relational database automatically maintain information about all information contained in the database. For example it maintains dictionary (catalog) tables which identify what attributes are stored in what tables, what data-types make up each attribute, the sizeof all tables etc.
- **Ease of application development:** Since the user need only concern himself/herself with WHAT information to retrieve (rather than how to perform the retrieval), application development time is considerably reduced as no file and record programming need be written.

- **Distribution support:** Most relational databases now provide distributed access to the database (client server) where the database, although actually stored on a remote machine (server), appears to be locally available.
- **Concurrency Control and Security:** Relational databases provide mechanisms to enforce serialisation of queries and provide authorisation and authentication of the database.

Relational Database Management Systems conform to the 3 - schema architecture which is a layering of different levels of the information in a database:

1. The **External View** is the view presented to the actual user or application programmer. In this view, the information is presented in such a form as to suit the intended use of the information. Each view typically describes the part of the database that a particular user group is interested in and hides the rest of the database from that user group.
2. The **Conceptual Level** contains a description the structure of the whole database for a community of users. This description is called the **Conceptual Schema** of a database and is a global description of the database that hides the details of physical storage structures and concentrates on describing entities, data types, relationships, and constraints.
3. The **Internal Level** contains the **internal schema**. This internal schema describes the physical storage structure of the database. The internal schema uses a physical data model and describes the complete details of data storage and access paths for the database.



RDBMS Architecture