

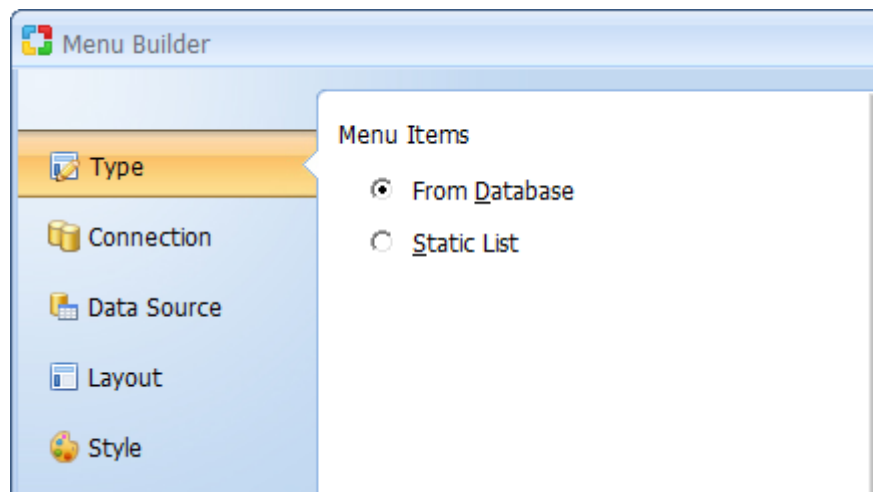
Interfaces in DBMS

A database management system (DBMS) interface is a user interface which allows for the ability to input queries to a database without using the query language itself.

User-friendly interfaces provide by DBMS may include the following:

1. Menu-Based Interfaces for Web Clients or Browsing –

These interfaces present the user with lists of options (called menus) that lead the user through the formation of a request.



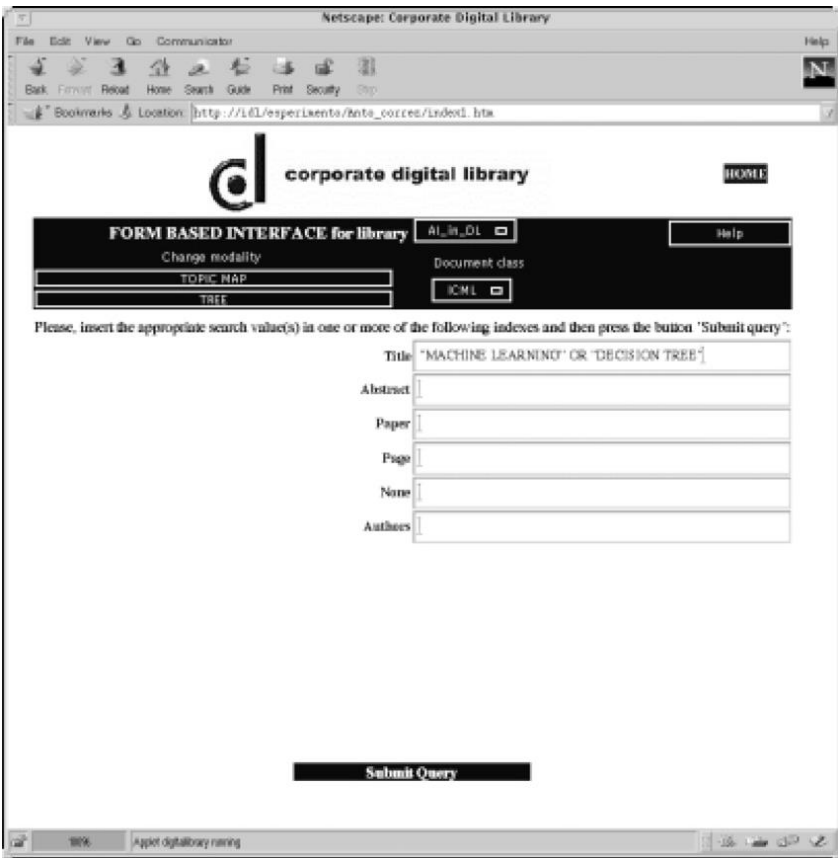
The basic advantage of using menus is that it removes the tension of remembering specific commands and syntax of any query language, rather than query is basically composed step by step by collecting or picking options from a menu that is basically shown by the system.

2. Forms-Based Interfaces –

A forms-based interface displays a form to each user.

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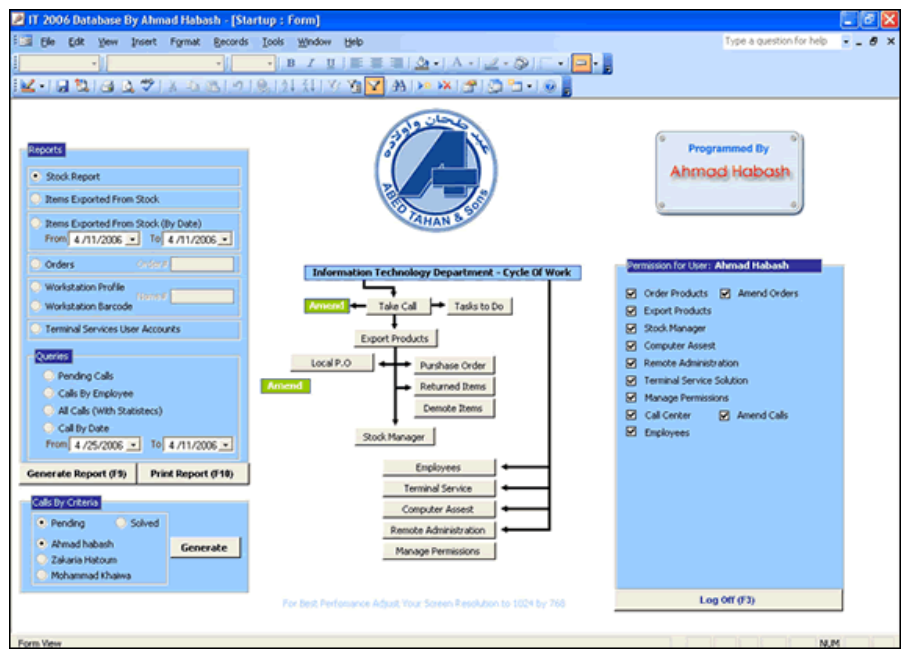
Users can fill out all of the form entries to insert a new data, or they can fill out only certain entries, in which case the DBMS will redeem same type of data for other remaining entries.



3. Graphical User Interface –

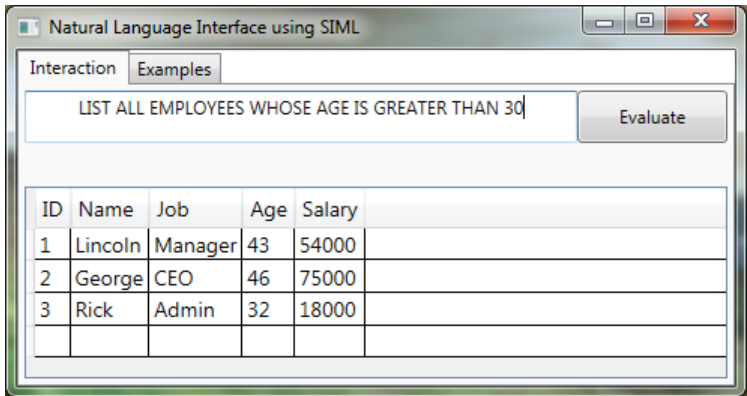
A GUI typically displays a schema to the user in diagrammatic form. The user then can specify a query by manipulating the diagram. In many cases, GUI’s utilize both menus and forms by using a pointing device such as mouse, to pick certain part of the displayed schema diagram.

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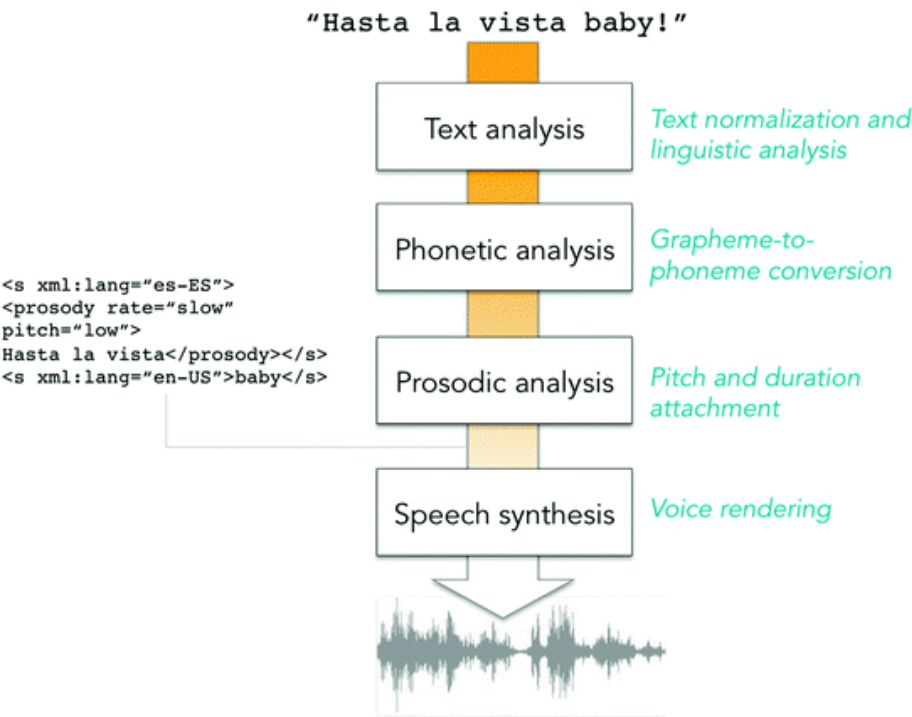
4. Natural language Interfaces –

The natural language interface refers to the words in its schema as well as to the set of standard words in a dictionary to interpret the request. If the interpretation is successful, the interface generates a high-level query corresponding to the natural language and submits it to the DBMS for processing, otherwise a dialogue is started with the user to clarify any provided condition or request.



5. Speech Input and Output –

The interface is using s speech input that is detected using a predefined words and used to set up the parameters that are supplied to the queries. It is becoming commonplace applications with limited vocabularies such as inquiries for telephone directory, flight arrival/departure, and bank account information are allowed speech for input and output to enable ordinary folks to access this information.



6. Interfaces for DBA –

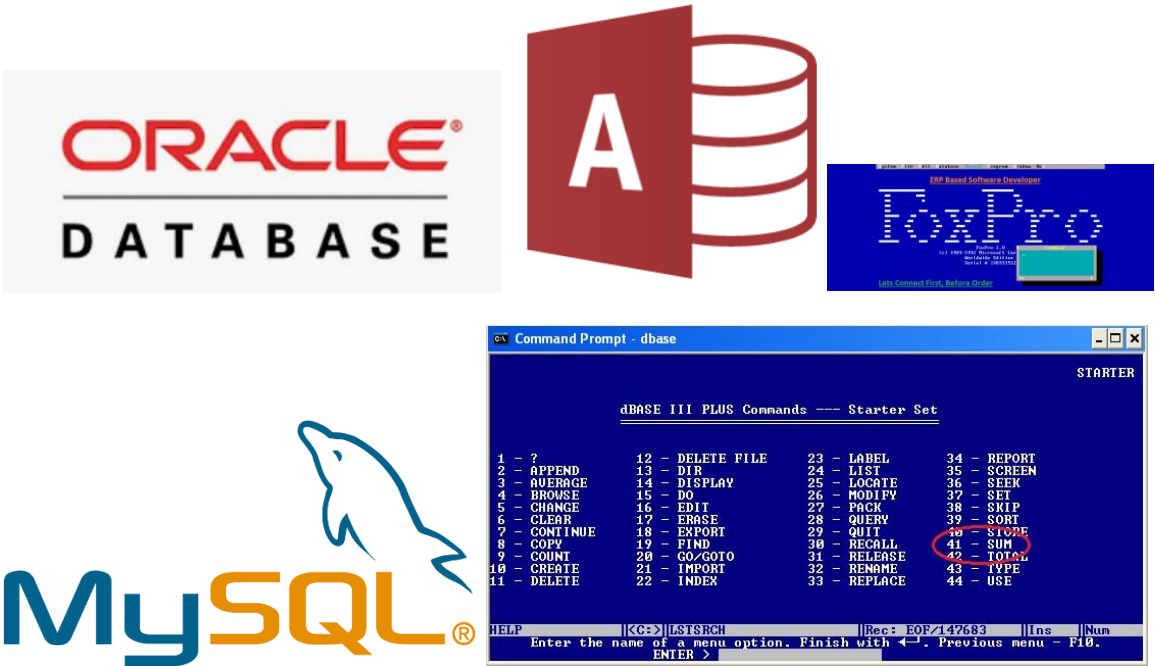
Most database system contains privileged commands that can be used only by the DBA's staff.

These include commands for creating accounts, setting system parameters, granting account authorization, changing a schema, reorganizing the storage structures of a databases.

Database Languages

A DBMS must provide appropriate languages and interfaces for each category of users to express database queries and updates. Database Languages are used to create and maintain database on computer.

There are large numbers of database languages like Oracle, MySQL, MS Access, dBase, FoxPro etc.



SQL statements commonly used in Oracle and MS Access can be categorized as:

- data definition language (DDL)
- data control language (DCL) and,
- data manipulation language (DML).



## Data Definition Language (DDL)

It is a language that allows the users to define data and their relationship to other types of data. It is mainly used to create files, databases, data dictionary and tables within databases.

It is also used to specify the structure of each table, set of associated values with each attribute, integrity constraints, security and authorization information for each table and physical storage structure of each table on disk.

The following table gives an overview about usage of DDL statements in SQL

S.No	Need and Usage	The SQL DDL statement
1	Create schema objects	CREATE
2	Alter schema objects	ALTER
3	Delete schema objects	DROP
4	Reneme schema objects	RENAME

## Data Manipulation Language (DML)

It is a language that provides a set of operations to support the basic data manipulation operations on the data held in the databases. It allows users to insert, update, delete and retrieve data from the database. The part of DML that involves data retrieval is called a query language.

The following table gives an overview about the usage of DML statements in SQL:

S. No	Need and Usage	The SQL DML statement
1	Remove rows from tables or views	DELETE
2	Add new rows of data into table or view	INSERT
3	Retrieve data from one or more tables	SELECT
4	change column values in existing rows of a table or view	UPDATE



**Data Control Language (DCL)**

DCL statements control access to data and the database using statements such as GRANT and REVOKE.

A privilege can either be granted to a User with the help of **GRANT statement**.

The privileges assigned can be **SELECT, ALTER, DELETE, EXECUTE, INSERT, INDEX** etc. In addition to granting of privileges, you can also revoke (taken back) it by using REVOKE command.

The following table gives an overview about the usage of DCL statements in SQL:

S. No.	Need And Usage	Age
1	Grant and take away privileges and roles	Grant Revoke
2	Add a comment to the data dictionary	Comment

**Database Architectures**

There are following three levels or layers of DBMS architecture:

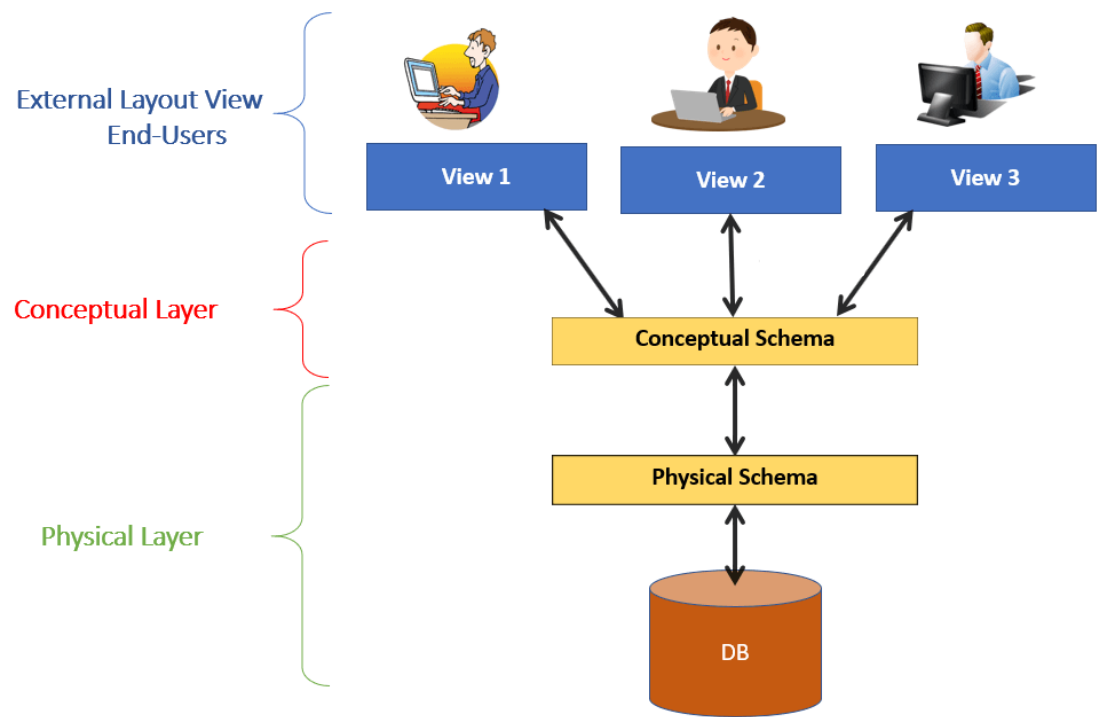
- External Level
  - It is the users’ view of the database.
  - Individual users are given different views according to the user’s requirement.
  - A view involves only those portions of a database which are of concern to a user.
- Conceptual Level
  - It is the community view of the database.
  - This level describes what data is stored in the database and the relationships among the data.

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- The middle level in the three level architecture is the conceptual level.
- This level contains the logical structure of the entire database as seen by the DBA.

3. Internal Level

- It is the physical representation of the database on the computer.
- This level describes how the data is stored in the database.
- It covers the data structures and file organizations used to store data on storage devices.



**Objective of the Three Level Architecture**

The objective of the three level architecture is to separate each user's view of the database from the Way the database is physically represented.



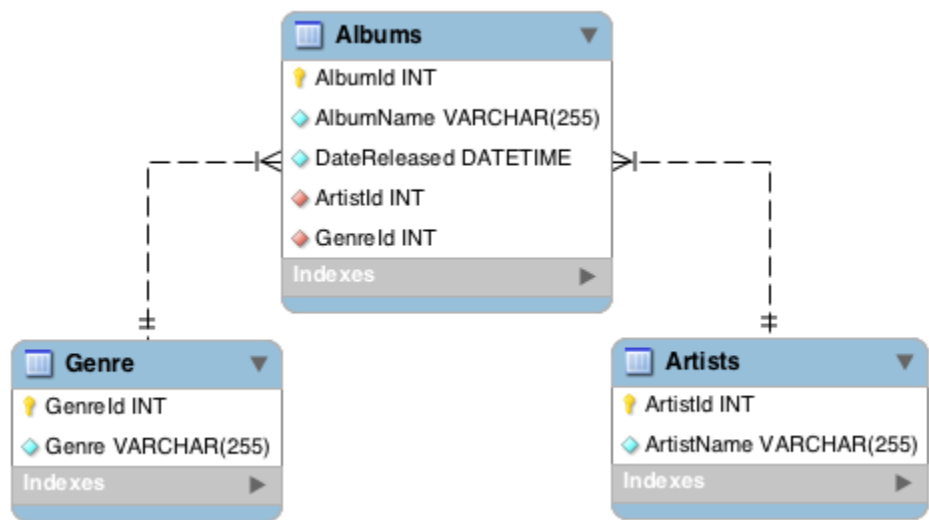
There are several reasons why this separation is desirable:

- Each user should be able to change the way he or she views the data, and this change should not affect other users.
- Users should not have to deal directly with physical database storage details, such as indexing or hashing. In other words, a user's interaction with the database should be independent of storage considerations.
- The Database Administrator (DBA) should be able to change the database storage structures without affecting the user's views.
- The internal structure of the database should be unaffected by changes to the physical aspects of storage, such as the changeover to a new storage device.
- The DBA should be able to change the conceptual structure of the database without affecting all users.

**Schema**

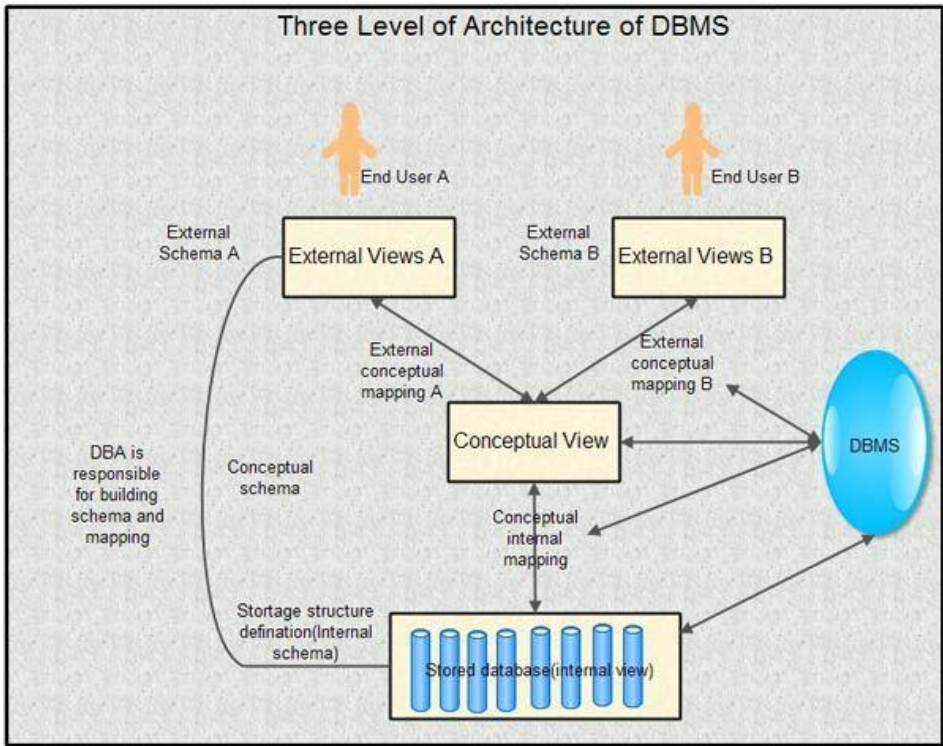
It is important to note that the data in the database changes frequently, while the plans or schemes remain the same over long periods of time. The database plans consist of types of entities that a database deals with, the relationship among these entities and the ways in which the entities and relationships are expressed from one level of abstraction to the next level for the users' view.

- It is the plan or scheme of the database.
- Schema gives the names of the entities and attributes.
- It specifies the relationship among them.
- It is a framework into which the values of the data items (or fields) are fitted.



Types of Schema

There are three different types of schema in the database corresponding to each data view of database. In other words, the data views at each of three levels are described by schema.



**Example:** To understand the difference between the three levels, consider again the database schema that describes College Database system. If User1 is a Library clerk, the external view would contain only the student and book information. If User2 is an account office clerk then he/she may be interested in students detail and fee detail. Shows specific information actually available at each level regarding a particular user.

