5.1: Structured Query Language (SQL)

IT2306 – Database Systems I

Level I - Semester 2

Detailed Syllabus

5.1 Structured Query Language (SQL):

- Introduction to SQL standards:

  SQL86, SQL89 and SQL92.

What is SQL?

- A relational database language
  - It is not a programming language but a comprehensive database sub-language language for controlling and interacting with a database management system
- NOT a DBMS
- A powerful data manipulation language
  - It has capabilities for:
    - Insertion
    - Update
    - Deletion
    - Query
    - Protection

What is SQL?

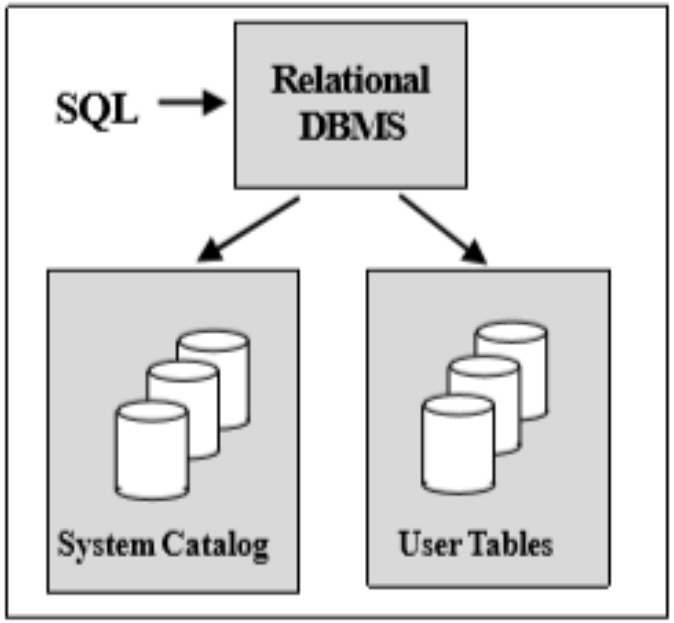
- SQL is a comprehensive database language:
  - Has statements for data definitions, queries, and updates.
  - Hence, it is both a DDL and a DML.
  - In addition, it has facilities for defining views on the database, for specifying security and authorization, for defining integrity constraints, and for specifying transaction controls.
  - It also has rules for embedding SQL statements into a general-purpose programming language such as Java or C/C++.

What is SQL?

- Also designed for end users
- Non-procedural – We have to show ‘what is needed’ and not ‘how’, like in ‘relational algebra’ – Is similar more to ‘relational calculus’
- Used in two ways:
  - Interactive
  - Programmatic: Dynamic / Embedded

Role of SQL

- A database programming language
- A database administration language
- A client/server language
- A distributed database language



Role of SQL

- It is vendor independent.
- If a user was dissatisfied with a particular DBMS he could switch products easily without much overhead, as both would follow the same language standard.
- Client applications relatively portable.
- Programmer skills are portable.
- Supports many different client processes -- end-users, applications, developers, etc.
- Database servers use SQL to request services from each other.

Standard versions of SQL

- SQL-86 or SQL1
- SQL-92 or SQL2
- SQL-99 or SQL3

- Additional updates to the standard are
  - SQL:2003 and SQL:2006, which added XML features among other updates to the language.
  - Another update in 2008 incorporated more object database features into SQL
  - Further update is SQL:2011

Standard versions of SQL

- The later SQL standards (starting with SQL:1999) are divided into a core specification plus specialized extensions.
- The core is supposed to be implemented by all RDBMS vendors that are SQL compliant.
- The extensions can be implemented as optional modules to be purchased independently for specific database applications such as data mining, spatial data, temporal data, data warehousing, online analytical processing (OLAP), multimedia data, and so on.