پوهنتون کابل

پوهنځی کمپیوترساینس

دیپارتمنت سیستم های معلوماتی

Structured Query Language (SQL) Fundamentals

Lecture 04

تهیه کننده	:	پوهنیار محمد شعیب "زرین خیل"
سال	:	1389

Structured Query Language (SQL) 04

By: M Shuaib Zarinkhail   2010

Some Questions ...

▸ Why do we have databases?

▸ What are databases?

▸ How do we use databases?

Working with Data

- To extract data from a database we use a data access language
- In the late 70s and early 80s, each DB manufacturer used their own query language
- The 3 main companies/products were:
  - Oracle (Relational Software)
  - INGRES (Relational Technology)
  - IBM (System/R)

SQL Development

- 1986, SQL-86, first published by ANSI (American National Standards Institute)
- 1987, SQL-87, ratified by ISO (International Standardization Organization)
- 1989, SQL-89, minor revision
- 1992, SQL92 or SQL2, major revision republished

SQL – 1999

- 1999, SQL3, The following features are added:
  - Regular expression matching
  - Recursive queries
  - Triggers
    - Procedural auto / exe code
    - Support for procedural and control flow statements
  - Non-scalar types
  - Some object-oriented features

SQL – 2003

- 2003, SQL-2003, The following features are added:
  - XML related functions
  - Window functions
  - Standardized sequences
  - Columns with auto-generated values
    - e.g. "Identity Columns"

SQL Versions (Summary)

▸ Since 1986, ANSI has released the following standards:
  ◦ 1986   SQL–86
  ◦ 1987   SQL–87
  ◦ 1989   SQL–89
  ◦ 1992   SQL–92 (SQL2)
  ◦ 1999   SQL–99
  ◦ 2003   SQL–03

SQL (DBMSs)

▸ Today, SQL2 is used by many commercial DBMS products:

- DB2
- Oracle
- Sybase
- MS Access
- dBase

- MySQL Server
- Ingress
- MS SQL Server
- NonStop SQL

- PostgreSQL

MySQL Releases

- The current production release series is MySQL 5.x
  ◦ One of the latest production is MySQL 5.1.30, released in November 2008
- An earliest production release series is MySQL 5.0
  ◦ MySQL 5.0.15, released in October 2005
- New features are being added to the MySQL 6.0 release series

The Most Requested Features and Their Additions in MySQL Releases

Feature	My SQL	Feature	My SQL
Unions	4.0	Triggers	5.0 5.1
Subqueries	4.1	Event Scheduler	5.1
R-Trees	4.1	Partitioning	5.1
Stored-Procedures	5.0	Pluggable Storage Engine API	5.1
Views	5.0	Plugin API	5.1
Cursors	5.0	Row Based Replication	5.1
XA Transactions	5.0	Server Log Tables	5.1

Choosing MySQL DBMS to Install

‣ The first decision to make is whether you want to use a production

  ◦ Stable release
  or
  ◦ A development release

Choosing MySQL DBMS to Install

In the MySQL development process, multiple release series exist:

- MySQL 6.0 is the current development release series
- MySQL 5.1 is the current General Availability (Production) release series
  - New releases are issued for bugfixes only
  - No new features are being added that could effect stability

Choosing MySQL DBMS to Install

MySQL 5.0 is the previous stable (production-quality) release series

▸ MySQL 4.1, 4.0, and 3.23 are old stable (production-quality) release series

◦ MySQL 4.1 is now at the end of the product lifecycle

SQL

- As data is stored in a DB
- You have to retrieve data from a DB

- To do so:
  ◦ You have to **query** data from the DB
  ◦ This is possible by SQL

SQL

- is a sublanguage
- is a text-oriented language
- has less than 100 keywords
- has approximately 30 English commands [164]
- can be used in a text-based window
  ◦ e.g. Command prompt

Query

▸ What is query?

▸ Query is a simple question to:
  ◦ Request data from a DB (data subset)
  ◦ Retrieve data from a DB (data subset)
  ◦ Simply ask a DB

▸ Additionally to:
  ◦ Find special groups & categories of data
  ◦ Sort data while querying
  ◦ Restructure DB tables

Query

- Queries always come with two results:

2. Correct
   - As user wants, s/he finds the data

3. Incorrect
   - Unwanted results
   - Surprises users

Query

- The basic format of many SQL statements (Queries) will be what we just used:
  - →SELECT attributes

    FROM TableName

    WHERE condition;
- But there are many variations (syntactically) on this format as well as different types of SQL statements

SQL

▸ Three types of SQL statements:
  ◦ Data Definition Language (DDL)
    • using for creating and defining metadata
  ◦ Data Manipulation Language (DML)
    • using for manipulating (deleting, inserting, updating, retrieving) userdata
  ◦ Data Control Language (DCL)
    • using for controlling the data in a DB (DB Administrator)

What we will cover

SQL basic commands to:
- Install SQL
- Start SQL
- View, create and drop databases
- View, create, alter and drop tables
- View, create, alter and drop views
- View, create, alter and drop relationships between tables and other database structures

What we will cover

SQL commands to:

‣ Add data to database tables
‣ Update data within database tables
‣ Delete data from database tables

What we will cover

SQL SELECT statement and its different usages to:
- Access one table
  - Using simple queries
- Access many tables, queries and subqueries
  - Using subqueries
  - Using JOINs

References:

- [164] Claire Kenny and Claus Pahl. *Automated tutoring for a database skills training environment*. In Proceedings of SIGCSE'05, pages 59–62, St. Louis, Missouri, USA. February 2005.