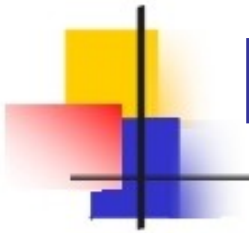
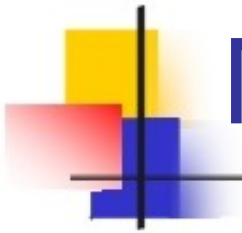
MYSQL introduction

Composer: Nhu Nguyen



MYSQL

- MySQL is a relational database management system.
- MySQL software is Open Source.
- MySQL Database Server is very fast, reliable, and easy to use.
- The MySQL Database Software is a client/server system.

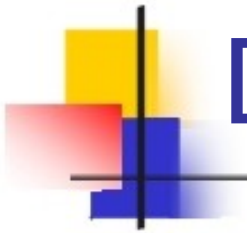


MYSQL Installation

d.Download: http://dev.mysql.com/downloads/

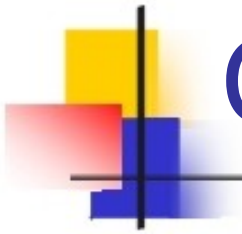
Install MySQL in `c:\mysql`

- MySQL can be installed as a service (Win 2000/XP)
- Can make icons on the desktop for starting and stopping the server.
- Setting a root password:
  - UPDATE user SET Password=PASSWORD('xxxx') WHERE User='root';
  - flush privileges;



Documentation

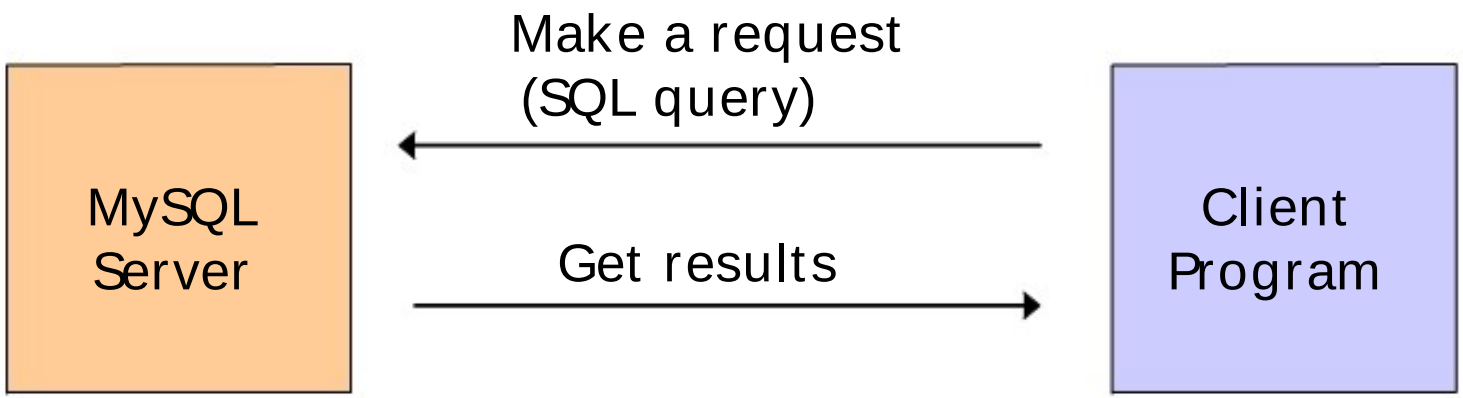
- MySQL comes with a tutorial and complete documentation in a HUGE file:
  - `c:\mysql\Docs\manual.html`
  - Table of contents with links:
    - `c:\mysql\Docs\manual_toc.html`
    - Use this file to locate the link to the topic you are interested in.



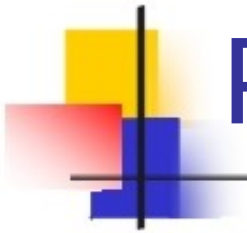
Command Line Client

- The standard command line client is `c:\mysql\bin\mysql.exe`
- The command line client can be used to send commands and SQL queries to the MySQL server
- GUI clients: MyCC, MySql Query Browser, MySql Administrator

Client-Server Interaction

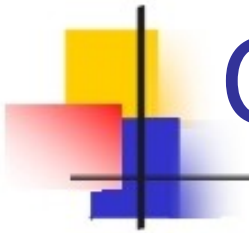


Client program can be a MySQL command line client, GUI client, or a program written in any language such as C, Perl, PHP, Java that has an interface to the MySQL server.



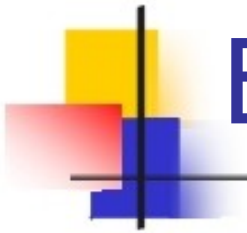
PhpMyAdmin

- Download http://www.phpmyadmin.net/home_page/downloads.php
- config.inc.php
  - $cfg['PmaAbsoluteUri'] = 'http://localhost/users/phpMyAdmin/';
  - $cfg['Servers'][$i]['user']= 'root';
  - $cfg['Servers'][$i]['password']= 'root';



Connecting to the Server

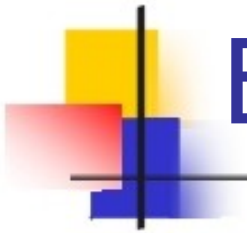
- Use a command prompt that sets the path to `c:\mysql\bin`
- The following command connects to the server:
- `mysql -u root -p`
  - you are prompted for the root password.
  - you can now send comands and SQL statements to the server



Entering commands (1)

- Show all the databases
  - `SHOW DATABASES;`

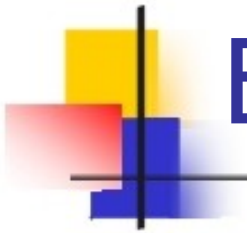
```
mysql> SHOW DATABASES;
+--------------+
| Database     |
+--------------+
| bookstore    |
| employee_db  |
| mysql        |
| student_db   |
| test         |
| web_db       |
+--------------+
```



Entering commands (2)

- Choosing a database and showing its tables
  - ```
    USE test;
    SHOW tables;
    ```

```
mysql> USE test;
Database changed
mysql> SHOW tables;
+----------------+
| Tables_in_test |
+----------------+
| books          |
| name2          |
| names          |
| test           |
+----------------+ 4
rows in set  (0.00 sec)
mysql>
```
```



Entering commands (3)

- Show the structure of a table
  - `DESCRIBE names;`

```
mysql> DESCRIBE names;
+-----------+-------------+------+-----+---------+----------------+
| Field     | Type        | Null | Key | Default | Extra          |
+-----------+-------------+------+-----+---------+----------------+
| id        | int(11)     |      | PRI | NULL    | auto_increment |
| firstName | varchar(20) |      |     |         |                |
| lastName  | varchar(20) |      |     |         |                |
+-----------+-------------+------+-----+---------+----------------+
3 rows in set (0.00 sec)

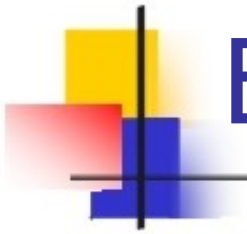
mysql>
```

Entering commands (4)

- Show the rows of a table (all columns)
  - `SELECT * FROM names;`

```
mysql> SELECT * FROM names;
+----+-----------+------------+
| id | firstName | lastName   |
+----+-----------+------------+
|  1 | Fred      | Flintstone |
|  2 | Barney    | Rubble     |
+----+-----------+------------+
2 rows in set (0.00 sec)

mysql>
```



Entering commands (5)

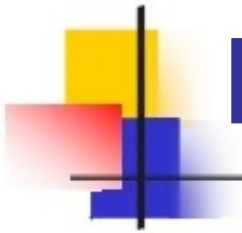
- Inserting a new record
  - `INSERT INTO names (firstName, lastName) VALUES ('Rock','Quarry');`
  - `SELECT * FROM names;`

```
mysql> INSERT INTO names (firstName, lastName) VALUES ('Ralph',
'Quarry'); Query OK, 1 row affected (0.02 sec)
mysql> SELECT * FROM names;
+----+-----------+------------+
| id | firstName | lastName |
+----+-----------+------------+
| 1 | Fred | Flintstone |
| 2 | Barney | Rubble |
| 3 | Ralph | Quarry |
+----+-----------+------------+
3 rows in set (0.00 sec)
mysql>
```

Entering commands (6)

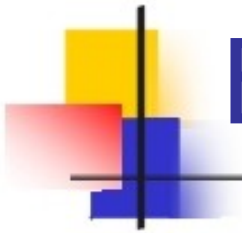
- Updating a record
  - `UPDATE names SET lastName = 'Stone' WHERE id=3;`
  - `SELECT * FROM names;`

```
mysql> UPDATE names SET lastName = 'Stone'
WHERE id=3; Query OK, 1 row affected (0.28 sec)
Rows matched: 1 Changed: 1
Warnings: 0 mysql> SELECT * FROM
names;+----------+-----------+
| id | firstName | lastName |
+----+----------+-----------+
| 1 | Fred | Flintstone |
| 2 | Barney | Rubble |
| 3 | Ralph | Stone |
+----+----------+-----------+
3 rows in set (0.00 sec)
mysql>
```



Logging output

- The commands you type and their ouput can be logged to a file by using the following command inside the MySQL command line client
- `tee log.txt`
- Here log.txt is the name of the file

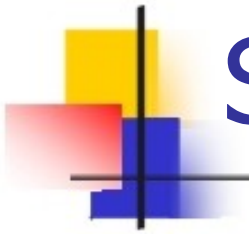


Executing SQL files

- It is usually better to use an editor to write an SQL script and send it to the server.
- A file of SQL commands such as `books.sql` can be executed by the server by using a command such as

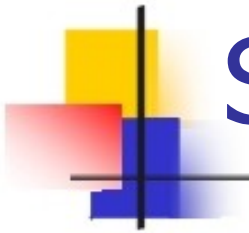
```
C:\mysql\bin\mysql -u root -p < books.sql
```

- This assumes that `books.sql` is in your current directory. Otherwise the complete path to `books.sql` must be supplied



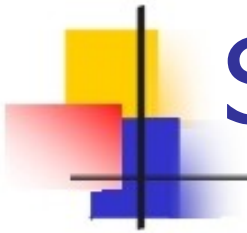
SQL data types (1)

- Numeric data types
  - TINYINT, SMALLINT, MEDIUMINT, INT, BIGINT
  - FLOAT(display_length, decimals)
  - DOUBLE(display_length, decimals)
  - DECIMAL(display_length, decimals)
  - NUMERIC is the same as DECIMAL



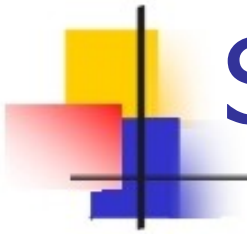
SQL data types (2)

- Date and time types
  - DATE
    - format is YYYY-MM-DD
  - DATETIME
    - format YYYY-MM-DD HH:MM:SS
  - TIMESTAMP
    - format YYYYMMDDHHMMSS
  - TIME
    - format HH:MM:SS
  - YEAR
    - default length is 4



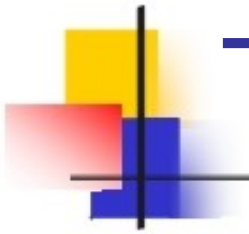
SQL data types (2)

- String types
  - `CHAR`
    - fixed length string, e.g., `CHAR(20)`
  - `VARCHAR`
    - variable length string, e.g., VARCHAR(20)
  - `BLOB, TINYBLOB, MEDIUMBLOB, LONGBLOB`
    - same as `TEXT`, `TINYTEXT` ...
  - `ENUM`
    - list of items from which value is selected



SQL commands SHOW, USE

- SHOW
  - Display databases or tables in current database;
  - Example (command line client):
    - `show databases;`
    - `show tables;`
  - USE
    - Specify which database to use
    - Example
    - `use bookstore;`



The CREATE Command (1)

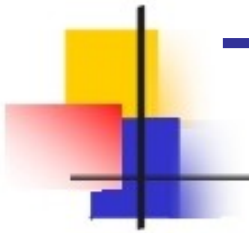
- `CREATE` creates a database table

```
CREATE TABLE table_name
(
   column_name1 column_type1,
   column_name2 column_type2,

   column_nameN column_typeN
);
```

Note: To create a database use the statement

```
CREATE db_name;
```

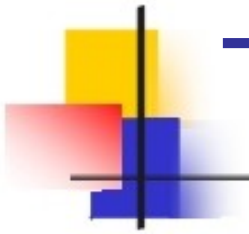


The CREATE Command (2)

- Specifying primary keys

```
CREATE TABLE table_name
(
   column_name1 column_type1 NOT NULL
      DEFAULT '0',
   column_name2 column_type2,

   column_nameN column_typeN,
                  PRIMARY KEY
            (column_name1) );
```

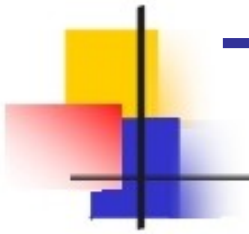


The CREATE Command (3)

- autoincrement primary integer keys

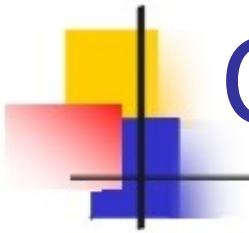
```
CREATE TABLE table_name
(
    column_name1 column_type1 PRIMARY
    KEY NOT NULL DEFAULT '0'
   AUTO_INCREMENT,
   column_name2 column_type2,

   column_nameN column_typeN,
);
```



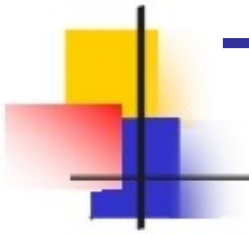
The CREATE Command (4)

- Can also create UNIQUE keys. They are similar to PRIMARY KEYS but can have NULL values.
- Can also create INDEX fields.



Conditional Creation

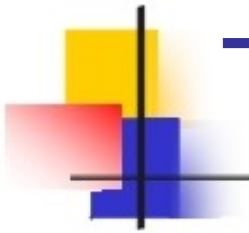
- Conditional database creation
  - `CREATE DATABASE IF NOT EXISTS db_name;`
- Conditional table creation
  - `CREATE TABLE IF NOT EXISTS table_name;`



The DROP Command

- To delete databases and tables use the DROP command
- Examples
  - DROP DATABASE db_name;
  - DROP DATABASE IF EXISTS db_name;
  - DROP TABLE table_name;
  - DROP TABLE IF EXISTS table_name;

Note: Don't confuse `DROP` with `DELETE` which deletes rows of a table.



The INSERT Command

- Inserting rows into a table

```
INSERT INTO table_name
( col_1, col_2,  ..., col_N)
VALUES
   ( val_1, val_2,  ..., val_N);
```

String values are enclosed in single quotes by default but double quotes are also allowed. Literal quotes need to be escaped using \' and \"

The SELECT Command (1)

- Selecting rows from a table
- Simplest form: select all columns

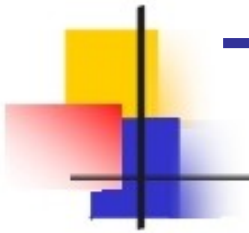
```
SELECT  * FROM table_name;
```

- Select specified columns

```
SELECT column_list FROM table_name;
```

- Conditional selection of rows

```
SELECT column_list FROM table_name
WHERE condition;
```



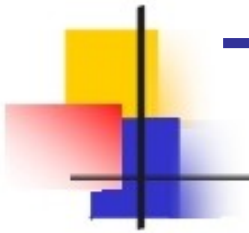
The SELECT Command (2)

- Specifying ascending row ordering

```
SELECT column_list FROM table_name
WHERE condition
ORDER by ASC;
```

- Specifying descending row ordering

```
SELECT column_list FROM table_name
WHERE condition
ORDER by DESC;
```

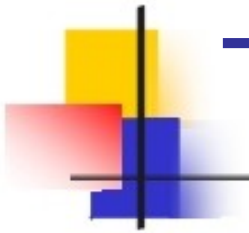


The SELECT Command (3)

- There are many other variations of the select command.
- Example: finding the number of records in a table assuming a primary key called `id`:

```
SELECT COUNT(id) FROM table_name
```

- Can also perform searching using the WHERE option



The UPDATE Command

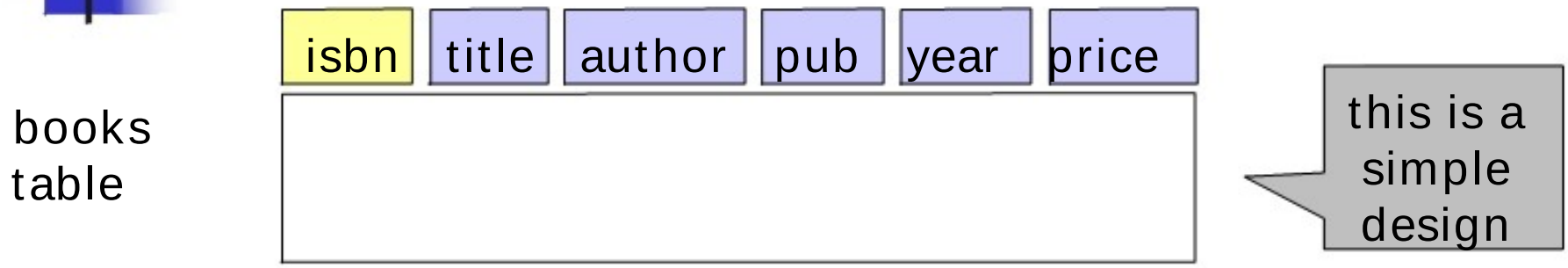
- Used to modify an existing record

```
UPDATE table_name
 SET  col_1     =  'new_value1',  ...,
 col_n  = 'new_value2';
```

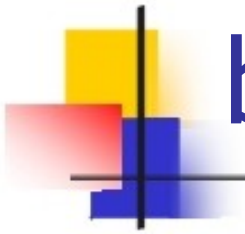
- Conditional update version

```
UPDATE table_name
 SET  col_1     =  'new_value1',  ...,
 col_n       =   'new_value2'   WHERE
 condition;
```

books.sql (1)




```
USE web_db;
CREATE TABLE books  (
    isbn CHAR(15) PRIMARY KEY NOT NULL,
    title VARCHAR(100) NOT NULL, author
    VARCHAR(100) NOT NULL, pub
    VARCHAR(20) NOT NULL, year YEAR NOT
    NULL,
   price DECIMAL(9,2) DEFAULT NULL
);
```

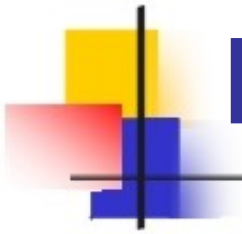


books.sql (2)

```
-- Insert some books into books table

INSERT INTO books VALUES  ('0-672-31784-
   2', 'PHP and MySQL Web Development',
   'Luke Welling, Laura Thomson', 'Sams',
   2001,  74.95
);

INSERT  INTO  books  VALUES   ('1-861003-02-
   1', 'Professional Apache',
   'Peter Wainwright',
  'Wrox Press Ltd',  1999,  74.95
);
```

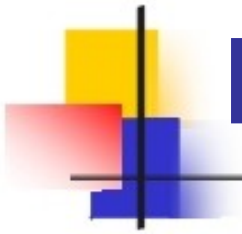


Executing The Script

- within MySQL use a command such as

```
source    c:/users/k46/mysql/books.sql
```

- This adds the books table to the `web_db` database



Limiting number of rows

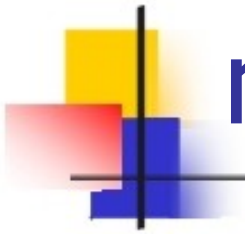
- `LIMIT` can be used to specify the maximum number of rows that are to be returned by a select query. Example
- `SELECT * FROM books LIMIT 3;`
- This query will return only the first 3 rows from the `books` table
- To return 15 rows beginning at row 5 use
- `SELECT * FROM books LIMIT 4, 15;`

marks.sql (1)

marks table

studentID	first_name	last_name	mark

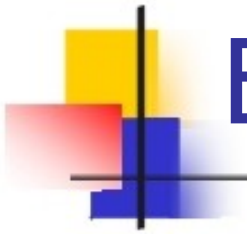
```
USE test;
CREATE TABLE marks  (
   studentID SMALLINT AUTO_INCREMENT NOT NULL,
    first_name VARCHAR(20) NOT NULL,
    last_name VARCHAR(20) NOT NULL,
    mark SMALLINT DEFAULT  0 NOT
    NULL, PRIMARY KEY  (studentID)
);
```



marks.sql (2)

```
-- Insert some rows into marks table

INSERT INTO marks  (first_name,
last_name, mark) VALUES  ('Fred',
'Jones',  78); INSERT INTO marks
(first_name, last_name, mark) VALUES
('Bill', 'James',  67); INSERT INTO marks
 (first_name, last_name, mark) VALUES
('Carol', 'Smith',  82); INSERT INTO
marks  (first_name, last_name, mark)
VALUES  ('Bob', 'Duncan',  60); INSERT
INTO marks  (first_name, last_name, mark)
VALUES  ('Joan', 'Davis',  86);
```

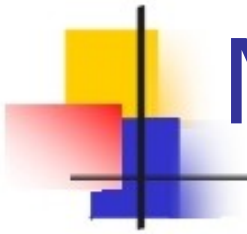


Executing The Script

- within MySQL use a command such as

  - `source c:/... ../marks.sql`

  - This adds the `marks` table to the `test` database



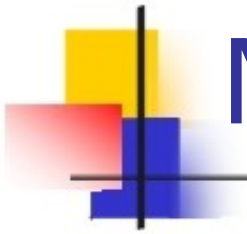
MySQL Functions (1)

- How many rows are there ?

```
SELECT COUNT(*) FROM marks;
```

```
+----------+
| COUNT(*) |
|        5 |
+----------+
1 row in set (0.00 sec)
```

- Can use `COUNT(marks)` instead of `COUNT(*)`

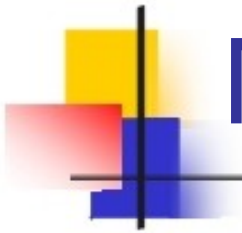


MySQL Functions (2)

- What is the sum of all the marks?

```
SELECT SUM(mark) FROM marks;
```

```
+-----------+
| SUM(mark) |
|
+-----373---+
+-----------+
1 row in set (0.00 sec)
```

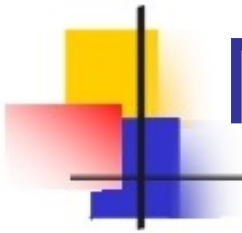


MySQL Functions (3)

- What is the average mark?

```
SELECT AVG(mark) FROM marks;
```

```
+-----------+
| AVG(mark) |
+-----------+
|  74.6000  |
+-----------+
1 row in set (0.00 sec)
```

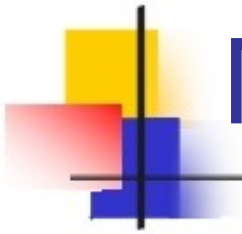


MySQL Functions (4)

- What is the minimum mark?

```
SELECT MIN(mark) FROM marks;
```

```
+-----------+
| MIN(mark) |
+-----------+
|        60 |
+-----------+
1 row in set (0.00 sec)
```



MySQL Functions (5)

- What is the maximum mark?

```
SELECT MAX(mark) FROM marks;
```

```
+-----------+
| MAX(mark) |
+-----------+
|        86 |
+-----------+
1 row in set (0.00 sec)
```

The end