A Very Fast Introduction to DL, DML & DCL
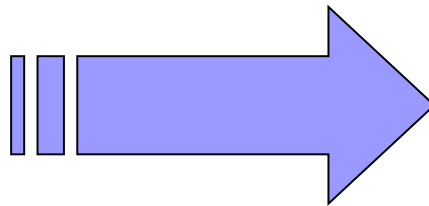
Faculty of Computer Science, BUAP

David Pinto, PhD

March, 2009

Data Definition Language (DDL)

- CREATE
- DROP
- ALTER

User,
Database,
Table,
Index

```
CREATE TABLE employees (
        id INTEGER PRIMARY KEY,
        first_name CHAR(50) NULL,
        last_name CHAR(75) NOT NULL,
        dateofbirth DATE NULL
);
```

```
DROP TABLE employees;
```

```
ALTER TABLE sink ADD bubbles INTEGER;
ALTER TABLE sink DROP COLUMN bubbles;
```

Create Table Syntax

CREATE [TEMPORARY] TABLE [IF NOT EXISTS] tbl_name [(*definition_create*,...)] [*options_table*] [*sentence_select*]

CREATE [TEMPORARY] TABLE [IF NOT EXISTS] tbl_name [(] LIKE old_*tbl_name* [)];

Definition_create
  columns_definition
  | [CONSTRAINT [*symbol*]] PRIMARY KEY (*index_column_name*,...)
  | KEY [*index_name*] (nombre_col_index,...)
  | INDEX [*index_name*] (*index_col_name*,...)
  | [CONSTRAINT [*symbol*]] UNIQUE [INDEX] [*index_name*] [*index_type*] (nombre_col_index,...)
  | [FULLTEXT|SPATIAL] [INDEX] [nombre_index] (nombre_col_index,...)
  | [CONSTRAINT [símbolo]] FOREIGN KEY [nombre_index] (nombre_col_index,...) [definición_referencia] |
  CHECK (expr)

columns_definition
  column_name type [NOT NULL | NULL] [DEFAULT *default_value*] [AUTO_INCREMENT] [[PRIMARY] KEY]
  [COMMENT '*string*'] [*reference_definition*]

reference_definition
  REFERENCES *table_name* [(*index_col_name*,...)] [MATCH FULL | MATCH PARTIAL | MATCH SIMPLE] [ON
  DELETE *reference_options*] [ON UPDATE *reference_options*]

reference_options
  RESTRICT | CASCADE | SET NULL | NO ACTION | SET DEFAULT

MySQL column types

TINYINT[(*length*)] [UNSIGNED] [ZEROFILL]
| SMALLINT[(*length*)] [UNSIGNED] [ZEROFILL]
| MEDIUMINT[(*length*)] [UNSIGNED] [ZEROFILL]
| INT[(*length*)] [UNSIGNED] [ZEROFILL]
| INTEGER[(*length*)] [UNSIGNED] [ZEROFILL]
| BIGINT[(*length*)] [UNSIGNED] [ZEROFILL]
| REAL[(*length,decimals*)] [UNSIGNED] [ZEROFILL]
| DOUBLE[(*length,decimals*)] [UNSIGNED] [ZEROFILL]
| FLOAT[(*length,decimals*)] [UNSIGNED] [ZEROFILL]
| DECIMAL(*length,decimals*) [UNSIGNED] [ZEROFILL]
| NUMERIC(*length,decimals*) [UNSIGNED] [ZEROFILL]
| DATE | TIME | TIMESTAMP | DATETIME
| CHAR(*length*) [BINARY | ASCII | UNICODE]
| VARCHAR(*length*) [BINARY]

| TINYBLOB
| BLOB
| MEDIUMBLOB
| LONGBLOB
| TINYTEXT
| TEXT
| MEDIUMTEXT
| LONGTEXT
| ENUM(value1,value2,value3,...)
 SET(value1,value2,value3,...)
| *spatial_type*

DDL syntax in MySQL

```
create table parent (
    id varchar(30),
    PRIMARY KEY (id)
) engine=innodb;
```

```
create table child (
    child_desc int(3),
    parentid varchar(30) NOT NULL REFERENCES parent(id)
) engine=innodb;
```
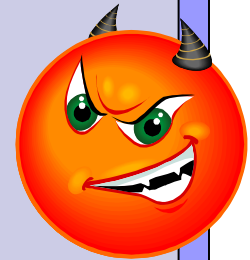
```
create table child (
    child_desc int(3),
    parentid varchar(30) NOT NULL default '',
    foreign key (parentid) references parent(id) on update cascade
) engine=innodb;
```

Secure transaction tables with locking service at level of rows and foreign keys.

Data Control Language (DCL)

- Syntax in MySQL:
  - start transaction | begin [work]
  - commit [work]
  - rollback [work]
  - set autocommit={0 | 1}

begin
  $command_1$
  $command_2$
  :
  $command_n$
commit | rollback

"Okay, she's got her card in, now shut it down."

Data Manipulation Language (DML)

- **SQL (Structured Query Language)**
  - ☐ SELECT $column_1$, [$column_2$,…] FROM *table_name* WHERE *condition*

- **Insert**
  - ☐ INSERT INTO *table_name* ($column_1$, [$column_2$,...]) VALUES ($value_1$, [$value_2$,...])

  - ☐ INSERT INTO *table_name* [($column_1$, [$column_2$,...])]
    SELECT $column_1$, [$column_2$,…] FROM *table_name* WHERE *condition*

- **Delete**
  - ☐ DELETE FROM *table_name* [WHERE *condition*]

- **Update**
  - ☐ UPDATE *table_name* SET $column_1$ = $value_1$[, $column_2$ = $value_2$,...] [WHERE "$column_N$ = $value_N$]

Select syntax in MySQL

```
SELECT
    [ALL | DISTINCT | DISTINCTROW]

    [HIGH_PRIORITY]
    [STRAIGHT_JOIN]
    [SQL_SMALL_RESULT]
    [SQL_BIG_RESULT]
    [SQL_BUFFER_RESULT]
    [SQL_CACHE | SQL_NO_CACHE]
    [SQL_CALC_FOUND_ROWS]

    select_expr,...
    [INTO OUTFILE 'file_name' export_options] | INTO DUMPFILE 'file_name']
    [FROM table_references
        [WHERE where_definition]
        [GROUP BY {col_name | expr | position} [ASC | DESC], ... [WITH ROLLUP]]
        [HAVING where_definition]
        [ORDER BY {col_name | expr | position} [ASC | DESC] ,...]
        [LIMIT {[offset,] row_count | row_count OFFSET offset}]
        [PROCEDURE procedure_name(argument_list)]
        [FOR UPDATE | LOCK IN SHARE MODE]
    ]
```

Exercise 1: Creating a database and a user…

user@server:~> mysql –u root –p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 104
Server version: 5.0.51a SUSE MySQL RPM

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql> show databases;
mysql> create database prueba;
Mysql> use prueba;
mysql> create user 'user1'@'localhost' identified by 'user1';
mysql> grant all on prueba.* to user1;
mysql> show databases;
mysql> exit;

Exercise 2: Logging into MySQL and creating tables…

```
user@server:~> mysql –u user1 –p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 104
Server version: 5.0.51a SUSE MySQL RPM

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql> show databases;
mysql> use prueba;
mysql> show tables;
mysql> create table parent (id varchar(30), PRIMARY KEY (id) ) engine=innodb;
mysql> show tables;
mysql> desc parent;
mysql> create table child (child_desc int(3), parentid varchar(30) NOT NULL
    default '', foreign key (parentid) references parent(id) on update cascade )
    engine=innodb;
mysql> show tables;
mysql> desc child;
```

Exercise 3a: Transaction control…

- Logging as user$_k$ by using two different terminals
- Initiate a transaction
- Introduce data in one table using terminal 1
- Check table content in terminal 1 and 2
- Commit the transaction in terminal 1
- Check table content in terminal 2

Exercise 3b: Transaction control…

- Logging as user $_k$ by using two different terminals
- Initiate a transaction
- Delete all data of table A using terminal 1
- Check table content in terminal 1 and 2
- Rollback the transaction in terminal 1
- Check table content in terminal 1

Exercise 4. Create your own data definition in MySQL

- Use the table definitions of your course project.

- Populate tables with sample data

Links

- ## DDL, DML and DCL syntax for MySQL
  - http://mysql.conclase.net/curso/index.php?tab=Sentencias

- ## MySQL Website
  - http://www.mysql.com/

- ## MySQL certification
  - http://www.mysql.com/training/