Functional Dependencies

* A constraint between two sets of attributes in a relation from a database.
* A type of constraint based on keys

Superkey

* An attribute or set of attributes that identifies and entity uniquely
* In a table, any column or set of columns whose values can be used to distinguish one row from another
* Functionally determines all the attributes of a relation, since it identifies each entity uniquely

Candidate Key

* A superkey such that no proper subset of its attributes is itself a superkey
* A minimal identifier
* A relation might have several candidate keys

Primary Key

* A candidate key that is used to identify tuples in a relation
* None of the attributes of a primary key may have null values

MySQL

**Triggers**

Definition

* A trigger is a named database object that is associated with a table, and that activates when a particular event occurs for the table.

Create Triggers

CREATE [DEFINER = { ***user*** | CURRENT\_USER }]

TRIGGER ***trigger\_name***

***trigger\_time*** ***trigger\_event***

ON ***tbl\_name*** FOR EACH ROW

***trigger\_body*** ***trigger\_time***: { BEFORE | AFTER }

***trigger\_event***: { INSERT | UPDATE | DELETE }

Triggers with Tables

mysql> **CREATE TABLE account (acct\_num INT, amount**

**DECIMAL(10,2));**

Query OK, 0 rows affected (0.03 sec)

mysql> **CREATE TRIGGER ins\_sum BEFORE INSERT ON account**

-> **FOR EACH ROW SET @sum = @sum + NEW.amount;**

Query OK, 0 rows affected (0.06 sec)

Example

mysql> **CREATE TRIGGER ins\_sum BEFORE INSERT ON account**

-> **FOR EACH ROW SET @sum = @sum + NEW.amount;**

mysql> **SET @sum = 0;**

mysql> **INSERT INTO account**

**VALUES(137,14.98),(141,1937.50),(97,-100.00);**

mysql> **SELECT @sum AS 'Total amount inserted';**

+-----------------------+

| Total amount inserted |

+-----------------------+

| 1852.48 |

+-----------------------+

**Assertions**

There is no syntax in MySQL

**Check Constraints**

Definition

* The CHECK constraint is used to limit the value range that can be placed in a column.
* If you define a CHECK constraint on a single column it allows only certain values for this column.
* If you define a CHECK constraint on a single column it allows only certain values for this column.

CREATE TABLE Persons  
(  
P\_Id int NOT NULL,  
LastName varchar(255) NOT NULL,  
FirstName varchar(255),  
Address varchar(255),  
City varchar(255),  
CONSTRAINT chk\_Person CHECK (P\_Id>0 AND City='Sandnes')  
)

Constraints on my DB

CREATE TABLE Persons  
(  
a\_ID int NOT NULL,  
b\_name varchar(255) NOT NULL,

Units varchar(255) NOT NULL,

Type varchar(255),

b\_score int NOT NULL  
CONSTRAINT chk\_Score CHECK (b\_score>0)  
)

**Stored Procedures**

Definition

* Putting database-intensive operations into stored procedures lets you define an API for your database application.
* You can reuse this API across multiple applications and multiple programming languages.
* This technique avoids duplicating database code, saving time and effort when you make updates due to schema changes, tune the performance of queries, or add new database operations for logging, security, and so on.

Create a stored procedure:

DELIMITER //

CREATE PROCEDURE country\_hos

(IN con CHAR(20))

BEGIN

SELECT Name, HeadOfState FROM Country

WHERE Continent = con;

END //

DELIMITER ;

Test stored procedure:

CALL country\_hos('Europe');

Setting the MySqlCommand object:

string rtn = "country\_hos";

MySqlCommand cmd = new MySqlCommand(rtn, conn);

cmd.CommandType = CommandType.StoredProcedure;

Call the stored procedure

cmd.Parameters.AddWithValue("@con", "Europe");

Stored Procedure for my DB

DELIMITER //

CREATE PROCEDURE affiliate\_athlete

(IN athlete CHAR(20))

BEGIN

SELECT a\_name, affiliate

FROM Athlete

WHERE Region = CentralEast;

END //

DELIMITER ;

**User-defined data types or domains**

There is no syntax in MySQL

**Foreign key constraint qualifiers**

Definition

* Tells your database which attributes are foreign keys and what attributes they are referencing

[CONSTRAINT [***symbol***]] FOREIGN KEY

[***index\_name***] (***index\_col\_name***, ...)

REFERENCES ***tbl\_name*** (***index\_col\_name***,...)

[ON DELETE ***reference\_option***]

[ON UPDATE ***reference\_option***]

***reference\_option***:

RESTRICT | CASCADE | SET NULL | NO ACTION