CS210 - Lecture 3

Part 2 - Structured Query Language (SQL)

1 Introduction

SQL is a standard database sublanguage for database systems. MySQL is a free RDBMS.

2 MySQL-Syntax

2.1 The CREATE TABLE statement

To form a table using SQL the user needs to specify the following components:

- The Name of the table
- The name of each field in the table
- The data type of each field
- The maximum length of each field
- The constraints, if any, of each field (Not Null, Unique ….)

These previous items are formulated together in a CREATE TABLE statement having the following basic format:

CREATE TABLE ***TableName*** (***Filed1Name DataType***(***length***) ***Constraints***,

Field2Name DataType(***length***) ***Constraints***,

.

.

.

.....)

2.1.1 Data Types

- **CHARACTER VARYING(N)** or **VARCHAR(N):** a character string of minimum length 1 and maximum length ***N***.
- **INT:** an integer.

2.1.2 Constraints

Not Null

Any column in a table can be specified as being **NOT NULL**. This means that empty values are NOT allowed. The default specification for a column is null. That is, empty values are allowed in a column.

Primary Key

Any column can also be defined as being **Primary Key**.

Exercise 1

Write an SQL statement that creates the following ***Employees*** table considering the following conditions:

- The **EmpNo** field must be the primary key of the table
- The **Job** field must NOT allow empty values.

EmpNo	Job	Salary
101	President	500
104	Programmer	300
103	Designer	350

2.2 The Insert statement

The Insert statement is used to insert one row (one record) into an existing table. The general form of the Insert statement is:

Insert Into ***TableName*** (***col1***, ***col2***, ***col3***, …) Values (***value1***, ***value2***, ***value3***, ….) ;

Notes

- The field values are written inside single apostrophe ' unless the data type of the field is numeric.

Exercise 2

Consider the following table ***Students****0020*

Id	**Major**	**Minor**
12	CS	
87	Stat	CS
46	Math	CS

Write SQL statements that inserts the following two records into the table:

Id	**Major**	**Minor**
54	Math	CS
32	CS	

Assume that the data type of the field **Id** is Int

2.3 The Update statement in SQL

The UPDATE statement is used to update existing record(s) in a table.

The general form of the Update statement is as follows:

UPDATE ***Table_Name*** **SET** *column1=value*1,
column2=value2,... **WHERE** *criteria* ;

Exercise 3

Consider the following table ***Users***:

Id	**LastName**	**FirstName**	**Address**	**City**
X1	Hansen	Ola	Timoteivn 10	Sandnes
P2	Svendson	Tove	Borgvn 23	Sandnes
Y7	Pettersen	Kari	Storgt 20	Stavanger
F5	Nilsen	Johan	Bakken 2	Stavanger
G8	Tjessem	Jakob	Timoteivn 50	Sandnes

Assuming that Id is the primary key of the table, write SQL statement(s) that performs each the following:

Changes the value of **FirstName** to be 'Sam' in the fourth record.

Exercise 3

Consider the following table ***Users***:

Id	LastName	FirstName	Address	City
X1	Hansen	Ola	Timoteivn 10	Sandnes
P2	Svendson	Tove	Borgvn 23	Sandnes
Y7	Pettersen	Kari	Storgt 20	Stavanger
F5	Nilsen	Johan	Bakken 2	Stavanger
G8	Tjessem	Jakob	Timoteivn 50	Sandnes

Assuming that Id is the primary key of the table, write SQL statement(s) that performs each the following:

Changes the value of **Address** to be 'Saint 22' in the first and third records.

Exercise 3

Consider the following table ***Users***:

Id	LastName	FirstName	Address	City
X1	Hansen	Ola	Timoteivn 10	Sandnes
P2	Svendson	Tove	Borgvn 23	Sandnes
Y7	Pettersen	Kari	Storgt 20	Stavanger
F5	Nilsen	Johan	Bakken 2	Stavanger
G8	Tjessem	Jakob	Timoteivn 50	Sandnes

Assuming that Id is the primary key of the table, write SQL statement(s) that performs each the following:

Changes the value of *City* from 'Sandnes' to 'Paris' for all persons whose city is 'Sandnes'.

2.4 The Delete statement

The Delete statement is used to delete record(s) from an existing table. The Delete statement has two forms as shown below:

Form	**Effect**
Delete From ***TableName*** Where ***criteria***	Deletes all records that satisfy the given criteria.
Delete From ***TableName***	Deletes all records in the table (leaves the table empty)

Exercise 4

Consider the following table ***Users***:

Id	**LastName**	**FirstName**	**Address**	**City**
X1	Hansen	Ola	Timoteivn 10	Sandnes
P2	Svendson	Tove	Borgvn 23	Sandnes
Y7	Pettersen	Kari	Storgt 20	Stavanger
F5	Nilsen	Johan	Bakken 2	Stavanger
G8	Tjessem	Jakob	Timoteivn 50	Sandnes

Write SQL statement(s) that performs each the following:

1. Delete the last record
2. Delete all users whose city is ' Stavanger'

2.5 The Select statement

The SELECT statement is used to select data from table(s). The result is stored in a result table, called the ***result-set***.

The general forms of the Select statement is:

Select * **From** *TableName*

Select * **From** *TableName* **Where** *Criteria*

Select *col1, col2, ...* **From** *TableName*

Select *col1, col2, ...* **From** *TableName* **Where** *Criteria*

Exercise 5

Consider the following table Users:

Id	FName	LName	Address	City
1	H	O	T	B
2	S	Y	B	Q
3	P	K	W	T
4	N	J	L	Q
5	T	V	R	A

Find the output of each of the following SQL statements:

1. **Select** * **From** Users;

Exercise 5

Consider the following table Users:

Id	FName	LName	Address	City
1	H	O	T	B
2	S	Y	B	Q
3	P	K	W	T
4	N	J	L	Q
5	T	V	R	A

Find the output of each of the following SQL statements:

2. **Select** * **From** Users **Where** Id =3 OR Id = 5;

Exercise 5

Consider the following table Users:

Id	FName	LName	Address	City
1	H	O	T	B
2	S	Y	B	Q
3	P	K	W	T
4	N	J	L	Q
5	T	V	R	A

Find the output of each of the following SQL statements:

Select LName, FName **From** Users;

Exercise 5

Consider the following table Users:

Id	FName	LName	Address	City
1	H	O	T	B
2	S	Y	B	Q
3	P	K	W	T
4	N	J	L	Q
5	T	V	R	A

Find the output of each of the following SQL statements:

Select Id, FName, Address **From** Users Where City = 'Q';

2.5.1 The Distinct clause in the Select statement

Use the Distinct clause to remove duplicates from the result of the Select statement.

Exercise 6

Consider the following table Users:

Id	FName	LName	Address	City
1	H	O	T	B
2	S	Y	B	Q
3	P	K	W	T
4	N	J	L	Q
5	T	V	R	A

Find the outputs of the following two SQL statements?

1. Select City From Users;
2. Select Distinct City From Users;

2.5.2 The 'IN' clause

The 'IN' clause can be used in a Select statement to create criteria, the general form for using the 'IN' clause is:

fieldName IN (*value1*, *value2*, *value3* …)

Which is equivalent to:

fieldName = value1 OR *fieldName = value2* OR *fieldName = value3* …

Exercise 7

Consider the following table Users:

Id	FName	LName	Address	City
1	H	O	T	B
2	S	Y	B	Q
3	P	K	W	T
4	N	J	L	Q
5	T	V	R	A

Find the output of the following SQL statement:

SELECT Id, FName FROM Users Where City IN ('B', 'Q');