SQL TUTORIAL: How we modify a Table Structure?

CREATING TABLES: Brief explanation

The basic forms where data is stored in a database are tables. Tables are divided into rows and columns, each row represents a unit of data (record) and a column is an attribute of that unit (fields).

(1) Fig. 1. CLIENTS Table structure

SQL provides the user with a command giving the flexible way to fit the needs to store the user’s data; the tables are created using the CREATE TABLE (ref-1) statement. As we show next:

Example 1: For example, we need to create a table that stores the client’s information, to manage the accounts for each client.

(2) The SQL syntax for this is:

CREATE TABLE clients
    (Account_no varchar(12),
    Lastname varchar(25),
    Firstname varchar(20),
    Open_date date,
    Balance number(10));
The result is this:

<table>
<thead>
<tr>
<th>Account_no</th>
<th>Last name</th>
<th>First name</th>
<th>Open_date</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

The complete structure of a table is formed by field names, field types (ref-1), also the key fields (indexes) to access or sort the records in the table.

(3) You can specify primary keys by adding the words PRIMAY KEY after the data type.

```
CREATE TABLE clients
    (Account_no varchar(12) PRIMARY KEY,
    Lastname varchar(25),
    Firstname varchar(20),
    Open_date date,
    Balance number(10));
```

**Modifying Table Structure: Syntax**

After a table is created using the CREATE TABLE statement, the table structure can be modified using the ALTER TABLE statement (ref-3).

Statement syntax:

```
ALTER TABLE <table name>
    {ADD {COLUMN <field name> <field type>[<size>] [NOT NULL]
        [CONSTRAIN <index>] | [CONSTRAIN <multi field index>] |
        DROP {COLUMN <field name> | CONSTRAINT <index name>}}
```

**Modifying Table Structure: Adding a new column (field)**

ALTER TABLE is used to add or drop a column inside the table structure.

*Example 2: Suppose that you need to add a new filed CREDIT to the table CLIENTS, How can this be done?*

(4) Here is the correct syntax to do this:

```
ALTER TABLE clients
    ADD COLUMN credit number(16);
```
The result is this:

<table>
<thead>
<tr>
<th>Account_no.</th>
<th>Last name</th>
<th>First name</th>
<th>Open_date</th>
<th>Balance</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

For the added column you must specify the data type or `<field type>`, SQL provides various data types (ref-4).

The statement optional value for a column can be to use the NOT NULL clause, as follows:

(5) Specifying a not null column:

```
ALTER TABLE clients
    ADD COLUMN credit number(16) NOT NULL;
```

This will tell that this field can't be NULL or empty when the user inputs its data, this can be helpful on the case that this field is used as a Primary Key to create indexes.

**Modifying Table Structure: Dropping columns**

Now what if we don't need a field in a table anymore?... the way to drop a column is shown next.

<table>
<thead>
<tr>
<th>Account_no.</th>
<th>Last name</th>
<th>First name</th>
<th>Open_date</th>
<th>Balance</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

(6). Syntax:

```
ALTER TABLE clients
    DROP COLUMN balance;
```
The result:

<table>
<thead>
<tr>
<th>Account_no.</th>
<th>Last name</th>
<th>First name</th>
<th>Open_date</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

The CONSTRAINT clause is used to add/drop indexes for the table as an example you can add a column and specify the constrain as follows:

```
ALTER TABLE clients
    ADD CONSTRAINT account_no PRIMARY KEY account_no;
```

This will specify Account number as the Primary Key for the CLIENTS table.

On-line References:

SQL Course
http://www.w3schools.com/sql/default.asp

ALTER TABLE statement
http://jeff-lab.queensu.ca/stat/sas/sasman/sashtml/proc/zertable.htm

Data Types in SQL