## **Alterations**

In this lesson we discuss how to modify various database structures once they are created.

## **Alterations**

MySQL allows us to change our mind about the entities we create and alter them. We can rename tables, add, remove, or rename columns, change type of an existing column, etc.

## **Example Syntax**

```
ALTER TABLE table
```

CHANGE **oldColumnName newColumnName <datatype>** <**restrictions>**;

Connect to the terminal below by clicking in the widget. Once connected, the command line prompt will show up. Enter or copy and paste the command ./DataJek/Lessons/17lesson.sh and wait for the MySQL prompt to start-up.

```
-- The lesson queries are reproduced below for convenient copy/paste into the terminal.

-- Query 1
ALTER TABLE Actors CHANGE FirstName First_Name varchar(120);

-- Query 2
ALTER TABLE Actors MODIFY First_Name varchar(20) DEFAULT "Anonymous";

-- Query 3
ALTER TABLE Actors CHANGE First_Name First_Name varchar(20) DEFAULT "Anonymous";
```

```
ALTER TABLE Actors MODIFY First_Name INT;

-- Query 5
ALTER TABLE Actors MODIFY First_Name varchar(300);

-- Query 6
ALTER TABLE Actors ADD MiddleName varchar(100);

-- Query 7
ALTER TABLE Actors DROP MiddleName;

-- Query 8
ALTER TABLE Actors ADD MiddleName varchar(100) FIRST;

-- Query 9
ALTER TABLE Actors ADD MiddleName varchar(100) AFTER DoB;

--Query 10
ALTER TABLE Actors DROP MiddleName, ADD Middle_Name varchar(100);
```

Terminal



1. Let's say we want to rename the column **FirstName** to **First\_Name** for the Actors table. We can do so as follows:

ALTER TABLE Actors CHANGE FirstName First\_Name varchar(120);

```
mysql> DESC Actors;
Field
              LType
                                          | Null | Key | Default | Extra
                                          | NO | PRI | NULL | | auto_increment
| YES | NULL |
             [ tml(11)
I Id.
FirstNone
I YES |
                                                    NULL
NULL
                                                    MILL
| NetWorthIrWillions | decimal(10.0)
                                          I YES |
                                                  NULL
7 rows in set (0.90 sec)
mysql> ALTER TABLE Actors (HANGE FirstWare First_Mare varchar(120);
Query OK. & rows affected (0.00 sec)
Records: 0 Duplicates: 0 Warnings: 0
mysql> DESC Actors;
Field
              1 Type
                                          | Null | Key | Default | Extra
              | int(11)
I Id.
                                          I NO PRE NUIT
                                                         | auto_increment
I YES | NULL
                                          I YES
                                                    NULL
              date
                                                    MULL
NULL
                                                    MILL
| NetWorthInWillions | decimal(10.0)
                                          I YES
                                                    MULL
7 rows in set (0.01 sec)
```

We not only change the column name but we also change the

column length from 20 to 120. If we only wanted to rename the column, we would still need to re-specify the type of the column as well as any other clauses that were specified the first time.

2. We can use the **MODIFY** keyword if we wish to alter the type or the clauses for a column. For instance, we can specify the default value for the column **First\_Name** to be the string "Anonymous" as follows:

```
ALTER TABLE Actors MODIFY First_Name varchar(20) DEFAULT "Anonymo us";
```

```
| Nutt | Key | Default | Extra
                 I Type
| Field
                                                                     Lante_increment
l firet%are
                 -varyher(28)
                                                           1 800
1 Secondary
                 variable (28)
                                                            NULL
                                                  YES
                Luste
I DoB
                                                            MALL
MULL
                                                            I Milt
| NetWorthInWilliams | decimal(18.6)
                                                 YES |
                                                            MULL
 tows in set (8.88 set)
ayayis A TER TARIE A biox CHANCE FirstName First_have souther (128):
flary fix. 9 rows offerted (8.88 sec)
Records: 8 Duplicates, 3 Wornings: 0
rysq.> DESC Actors:
                                                 | Mill | Tey | Default | Lates
l ield
            Lippe
NULL
                                                          MULL
MULL
                                                            1 NOLE
| hetWorthin%:llions | decimal(18.8)
                                                 1 YES
 rose in ser (8.61 xer)
ayaqis ALTER TABLE Actors MODIFY First Name concrum(20) DEFALLI "Anenyaqus":
fluory fix. 11 reas affected (0.32 sec)
Records: 11 Ouplicates: 0 Wormings: 8
rysq.> 0.50 Actors;
                                                 | Kull | Gey | Websult | | stru
I Field
               LType
1 HO | PRT | NULL
                                                          Ananymous I
                                                 YES:
                                                            MULL
                                                 YES
                                                            I NULE
              Lenur( Vale','Terale','Transgender';  | YLs  |
Lenur( Varened','divorced','Single')  | YLS  |
1 Gender
                                                            NULL
| Mari tal Status
| KetWorthTry Tlions | decimal('8,8)
 Come E sec (8.68 sec)
```

We can also use the **CHANGE** statement but that will require us to specify the same column name twice as we aren't renaming the column.

```
ALTER TABLE Actors CHANGE First_Name First_Name varchar(20) DEFAU LT "Anonymous";
```

3. We have to be cautious when trying to change the type of an existing column. For instance, if we try to change the first name column from type varchar to int, we'll run into an error (as shown below) because the conversion is nonsensical.

```
ALTER TABLE Actors MODIFY First_Name INT;
```

```
mysql> ALTER TABLE Actors MODIFY First_Name INT;
ERROR 1366 (HY000): Incorrect integer value: 'Brad' for column 'First_Name' at row 1
```

On the contrary, we can easily convert the type of a column that doesn't result in data loss. For instance, we can change the column first name to have a varchar length of 300 as shown below:

## ALTER TABLE Actors MODIFY First\_Name varchar(300);

```
nysgl> DESC Actors;
                                                        | Null | Key | Default | Extra
I Field
I Td
                     int(11)
                                                        I NO I PRT I NULL
                                                                              | auto_increment |
                                                        I YES I
l First Name
                   | vanchar(120)
                   1 SecondName
                                                                    INULL
                                                                    1 NULL
                                                                    I NULL
I Gender
| MaritalStatus
                 L enum('Married','Divorced','Single')
                                                       I YES I
                                                                    I NULL
| NetWorthInMillions | decimal(10,0)
                                                        I YES I
7 raws in set (0.05 sec)
mysql> ALTER TABLE Actors MODIFY First Name varchar(300);
Query OK, 11 rows affected (0.03 sec)
Records: 11 Dunlicates: 0 Warnings: 0
mysgl> DESC Actors;
I Field

    Type

                                                        | Null | Key | Default | Extra
                    | int(11)
                                                        I NO I PRI I NULL
                                                                              | auto_increment |
l First Name
                    Livanchan(300)
                                                                    INULL
                                                        I YES I
I SecondName
                   l vanchan(20)
                                                                    INULL
1 DoR
                                                        LYES
                                                                    LINULE
                   1 date
                   L enun('Mate','Femate','Transgender')
I Gender
                                                       I YES
                                                                    I NULL
                  | enum('Married','Divorced','Single'
| MoritalStatus
                                                       I YES
                                                                    INULL
| NetWorthInMillions | decimal(10,0)
                                                        1 YES
                                                                    1 NULL
  rows in set (0.01 sec)
```

4. We can also add a column to an existing table. We can add a new column **MiddleName** to the Actors table using the following query:

```
ALTER TABLE Actors ADD MiddleName varchar(100);
```

```
nysql> DESC Actors;
 Field
                    1 Type
                                                         | Null | Key | Default | Extro
                                                         LING
                    I int(11)
                                                               PRT | NULL
                                                                               Liauto_increment
                   Livarchar(300)
 First Nume
                                                         1 YES 1
                                                                     I NULL
I SecondNane
                                                         I YES
                   Livarchar(20)
                                                                     I NULL
| DoB
                   I date
                                                                     | NULL
                Lenum('Mote','Femate','Transgender') | YES | |
Lenum('Monried','Divorced','Single') | YES | |
                                                                     I NULL
l Gender
| MaritalStatus
                                                                     I NULL
| NetWorthInMillions | decimal(10,2)
                                                                     I NULL
 rows in set (0.00 sec)
mysql> ALTER TABLE Actors ADD MiddleName vanchar(100);
Query OK, 0 rows offected (0.04 sec)
Records: 0 Duplicates: 0 Marnings: 0
mysql> DESC Actors;
l Field
                                                         | Null | Key | Default | Extra
                   + int(11)
                                                                I PRI I NULL
                                                                                 auto_increment
  First_None
                   Livarchar(300)
                                                                     I NULL
                  Livanchar(28)
                                                         LYES

    SecondName

                                                                     I NULL
                  Lidate
                                                         L YES II
                                                                     I NULL
I NULL
                                                                     I NULL
 NetWorthInMillions | decimal(10,8)
                                                                     | NULL
                                                         I YES
| MiddleName
               l varchar(193)
                                                                     I NULL
  rows in set (0.00 sec)
```

5. We can also remove the newly added column using the **DROP** statement as follows:

```
mysql> ALTER TABLE Actors DROP MiddleName;

mysql> ALTER TABLE Actors DROP MiddleName;
Query OK, 0 rows affected (0.05 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

6. We can also control the position of the new column within the table using the **FIRST** or **AFTER** keyword. The following statement adds the middle name as the first column:

```
ALTER TABLE Actors ADD MiddleName varchar(100) FIRST;
```

```
mysql> ALTER TABLE Actors ADD MiddleNone varchar(103) FIRST:
Query QK, 2 raws affected (0.04 sec)
Records: 0 Duplicates 0 Wornings: 0
mysel > CHSE Actors:
                   1 Type
                                                        | Null | Key | Default | Extra
                                                                    I NULL
               | varchar(198)
                   1 int(11)
                                                        NO.
                                                               PRT | NULL
                                                                              I auto_increment
| First Name
                                                        I YES I
                   1 varichar(300)
                                                                    I NULL
I SecondNano
                   1 Vanchar(26)
                                                        1 YES
                                                                     1 NULL
                   1 dote
                                                        I YES
                                                                     NULL
                   | Lenum('Male','Female','Transgender') | YES
1 Gender
                                                                     NULL
| MarticlStatus | Lenun('Married', 'Divorced', 'Single') | YES |
                                                                     LINUEL
| NetMorthInWillians | decimal(10,0)
                                                          YES I
                                                                     NULL
  rows in set (0.20 sec)
```

7. Now we'll drop the middle name column and add it after the date of birth (DoB) column as follows:

```
ALTER TABLE Actors ADD MiddleName varchar(100) AFTER DoB;
```

```
ysglx ALTER TABLE Actors ABD Middlehome Wordhor(100) AFTER DoB:
Query CK, 8 rows affected (3.35 sec)
Records: 8 Duplicates: 8 Warnings: 8
mysgla DESC Actors,
                                                                    | Kull | Key | Default | Extro
| Field
                          Type
I Til
                                                                                               | outo_increment
| First_kome
| Secondkome
| UnB
| Middlekome
                                                                    1 7FS
                         varchar(328)
                                                                                     NULL
                         varchar(28)
                                                                    1 YES
                                                                                      MJLL
                                                                    1 YES
                                                                                     NULL
                        varchar(188)
                                                                    I YES
                                                                                     NULL
 Gender enun('Mole', 'Femole', 'Tronsgender') | YES
MaritalStatus enun('Married', 'Disvocad', 'Single') | YES
                                                                                     MULL
                                                                                      NULL
 NetWorthIrWillions | deciral(18.8)
                                                                                      NULL
   pas in set (0.00 sec)
```

If an index is defined on a column, dropping the column also removes the index, if the index consists of only that one column.

8. We can combine several alterations in a single MySQL statement separated by comma. In fact, combining alterations is much more efficient as it avoids the cost of creating a new table, copying data from the old table to the new, dropping the old table, and renaming the old table to the new table for each alteration. In the example below, we drop the middle name column and recreate it using a slightly different column name, all in a single statement.

```
nyaql> ALTER TABLE Actors DROF WiddleName, ACD Middle_Kame vanchar(180);
Query OK, 8 rows affected (0.14 sec)
Records: 8 Duplicates: 8 Marnings: 0
mysql> DESC Actors;
                       | Type
                                                                    | Null | Key | Default | Extra
                        | int(11)
                                                                              PRI I MULL
                                                                                              I auto_increment
| First_Name
                       Livarchar(398)
                                                                                   1 NULL
                       | varchar(20)
                                                                    LIYES
I SecondNane
                                                                                   LINULE
                                                                     YE5
                                                                                   I NULL
                   | | enum('Mole','Femole','Transgender') |
| enum('Married','Divorced','Single') |
                                                                   I YES
                                                                                  I KULL
l Gender
 MaritalStatus
                                                                      YES
                                                                                   LINULL
 NetWorthInMillions | decimal(10,8)
                                                                     YES
                                                                                   LINULL
 Mtddte_Name
                   | varchar(198)
                                                                                   LINULL
   rows in set (0.00 sec)
```

9. For some alter operations under the hood, MySQL creates a new table with the requested alter changes, copies the data from the old table to the new one, deletes the old table, and then renames the new table to Actors. An alter operation can be expensive if the table needs to be rebuilt.