SQL Basics

Start MySQL Shell

MySQL Shell

The Employees database contain our Employees data. The Employees database schema or EER diagram is as follows:
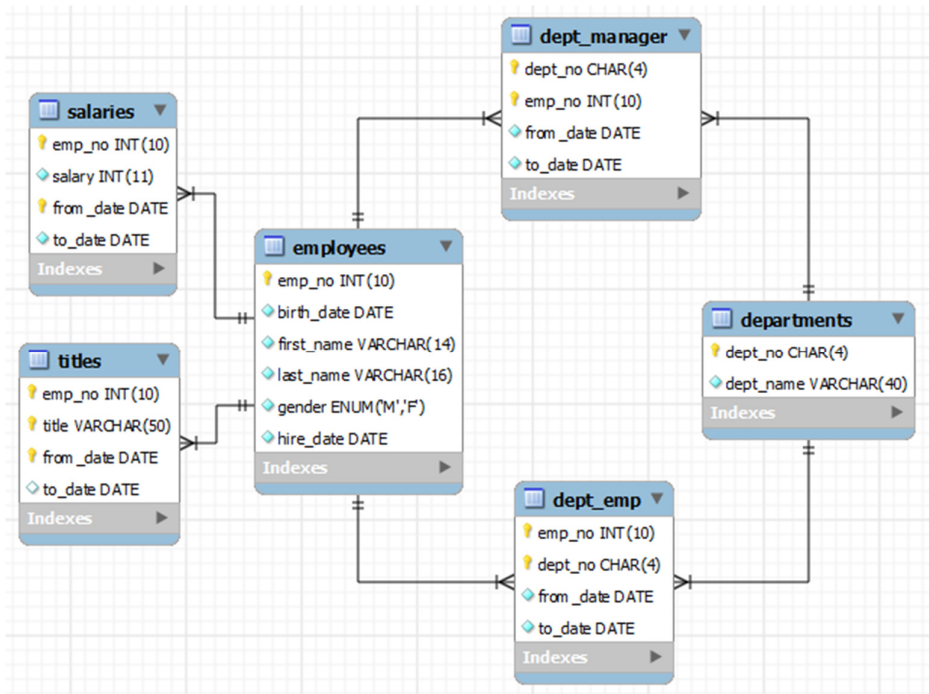
SQL Databases

To create a database:

CREATE DATABASE *databasename*;

To delete a database:

DROP DATABASE *databasename*;

Source: https://www.w3schools.com/sql/sql_where.asp

SQL Create Table
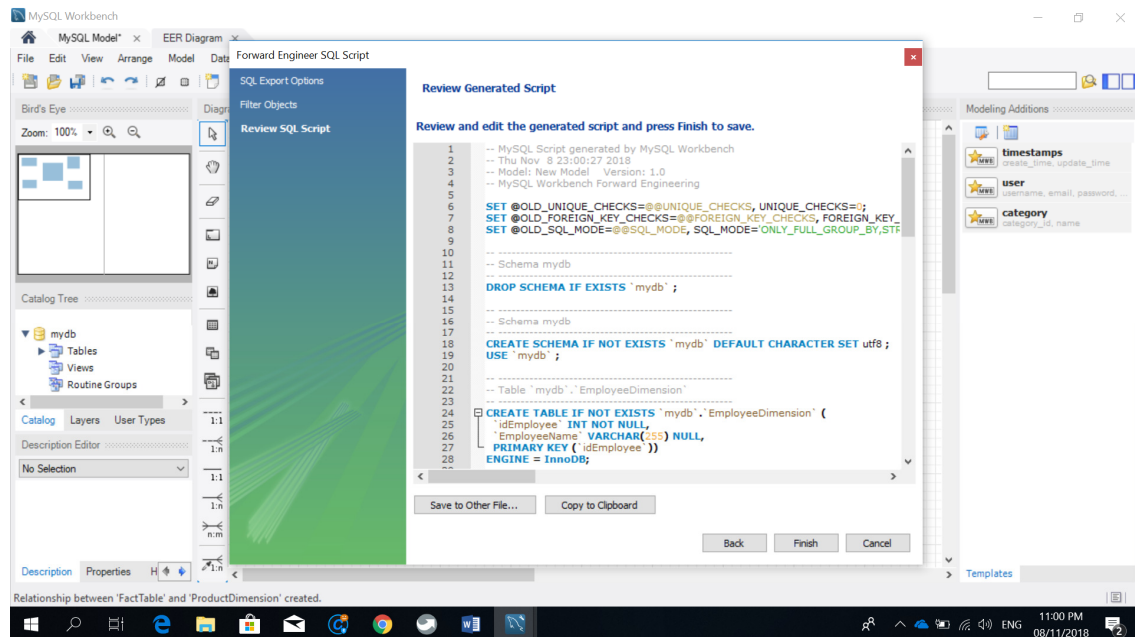
You can use the MySQL Workbench to design the ERD diagram and export the create table SQL scripts.

To delete a table, you can use:

```
DROP TABLE table_name;
```

To alter a table, you can use:

```
ALTER TABLE table_name
ADD column_name datatype;
```
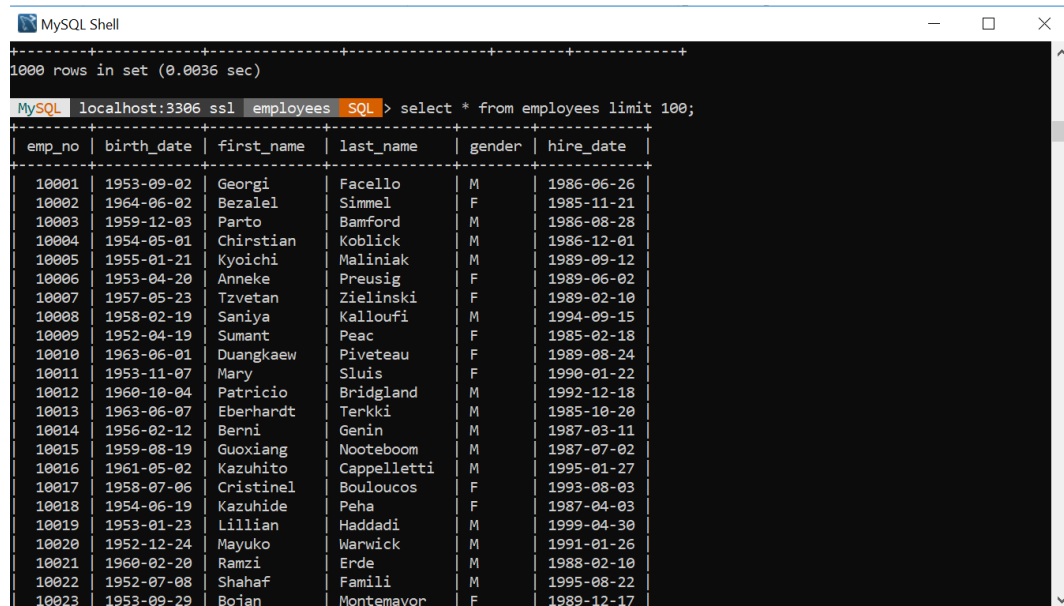
Source: https://www.w3schools.com/sql/sql_where.asp

SQL Select

To show the top 100 content in Employees table:

Select * from employees

limit 100;

To show top 100 content for emp_no, birth_date, first_name, last_name from employees table:

Select emp_no, birth_date, first_name, last_name

from employees

limit 100;

Select Distinct

To show the distinct rows of top 100 content in employees table:

Select distinct *

from employees

limit 100;

To show the distinct values from gender column in employees table:

Select distinct gender from employees;

To show the number of different (distinct) employees' gender:

Select count(distinct gender) from employees;

Where Clause

To show the top 1000 rows of employees with gender "male":

Select * from

employees

where gender='M'

limit 100;

```
MySQL  localhost:3306 ssl  employees  SQL > Select * from employees where gender='M' limit 100;
+--------+------------+------------+------------+--------+------------+
| emp_no | birth_date | first_name | last_name  | gender | hire_date  |
+--------+------------+------------+------------+--------+------------+
| 10001  | 1953-09-02 | Georgi     | Facello    | M      | 1986-06-26 |
| 10003  | 1959-12-03 | Parto      | Bamford    | M      | 1986-08-28 |
| 10004  | 1954-05-01 | Chirstian  | Koblick    | M      | 1986-12-01 |
| 10005  | 1955-01-21 | Kyoichi    | Maliniak   | M      | 1989-09-12 |
| 10008  | 1958-02-19 | Saniya     | Kalloufi   | M      | 1994-09-15 |
| 10012  | 1960-10-04 | Patricio   | Bridgland  | M      | 1992-12-18 |
| 10013  | 1963-06-07 | Eberhardt  | Terkki     | M      | 1985-10-20 |
| 10014  | 1956-02-12 | Berni      | Genin      | M      | 1987-03-11 |
| 10015  | 1959-08-19 | Guoxiang   | Nooteboom  | M      | 1987-07-02 |
| 10016  | 1961-05-02 | Kazuhito   | Cappelletti| M      | 1995-01-27 |
| 10019  | 1953-01-23 | Lillian    | Haddadi    | M      | 1999-04-30 |
| 10020  | 1952-12-24 | Mayuko     | Warwick    | M      | 1991-01-26 |
| 10021  | 1960-02-20 | Ramzi      | Erde       | M      | 1988-02-10 |
| 10022  | 1952-07-08 | Shahaf     | Famili     | M      | 1995-08-22 |
| 10025  | 1958-10-31 | Prasadram  | Heyers     | M      | 1987-08-17 |
| 10026  | 1953-04-03 | Yongqiao   | Berztiss   | M      | 1995-03-20 |
| 10028  | 1963-11-26 | Domenick   | Tempesti   | M      | 1991-10-22 |
| 10029  | 1956-12-13 | Otmar      | Herbst     | M      | 1985-11-20 |
| 10030  | 1958-07-14 | Elvis      | Demeyer    | M      | 1994-02-17 |
| 10031  | 1959-01-27 | Karsten    | Joslin     | M      | 1991-09-01 |
| 10033  | 1956-11-14 | Arif       | Merlo      | M      | 1987-03-18 |
| 10034  | 1962-12-29 | Bader      | Swan       | M      | 1988-09-21 |
| 10035  | 1953-02-08 | Alain      | Chappelet  | M      | 1988-09-05 |
| 10036  | 1959-08-10 | Adamantios | Portugali  | M      | 1992-01-03 |
| 10037  | 1963-07-22 | Pradeep    | Makrucki   | M      | 1990-12-05 |
| 10038  | 1960-07-20 | Huan       | Lortz      | M      | 1989-09-20 |
| 10039  | 1959-10-01 | Alejandro  | Brender    | M      | 1988-01-19 |
| 10043  | 1960-09-19 | Yishay     | Tzvieli    | M      | 1990-10-20 |
| 10045  | 1957-08-14 | Moss       | Shanbhogue | M      | 1989-09-02 |
| 10046  | 1960-07-23 | Lucien     | Rosenbaum  | M      | 1992-06-20 |
| 10047  | 1952-06-29 | Zvonko     | Nyanchama  | M      | 1989-03-31 |
| 10048  | 1963-07-11 | Florian    | Syrotiuk   | M      | 1985-02-24 |
```

Operators in Where clause

Operator	Description
=	Equal
<>	Not equal. **Note:** In some versions of SQL this operator may be written as !=
>	Greater than
<	Less than
>=	Greater than or equal
<=	Less than or equal
BETWEEN	Between a certain range
LIKE	Search for a pattern
IN	To specify multiple possible values for a column

Source: https://www.w3schools.com/sql/sql_where.asp

SQL And, Or, Not

To select the employees whose gender is male and the birth_date is between 1960 to 1980:
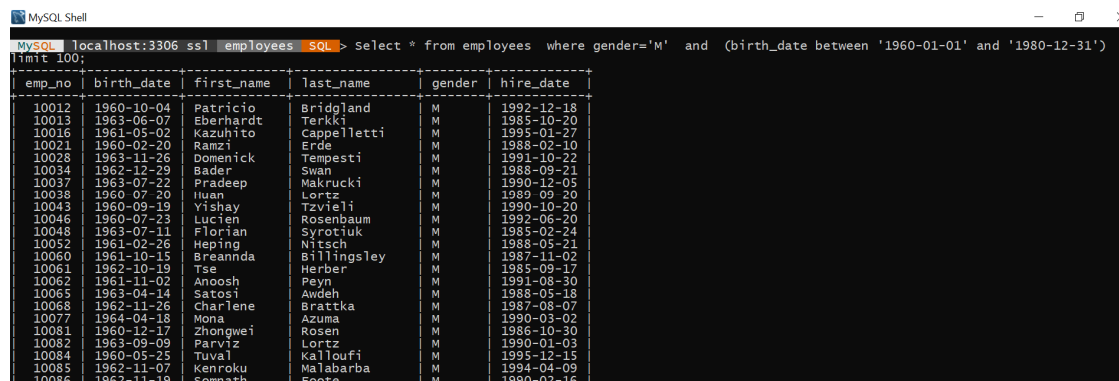
Select * from employees

where gender='M'

and

(birth_date between '1960-01-01' and '1980-12-31')

limit 100;

To select the employees whose gender is male or the birth_date is between 1960 to 1980:
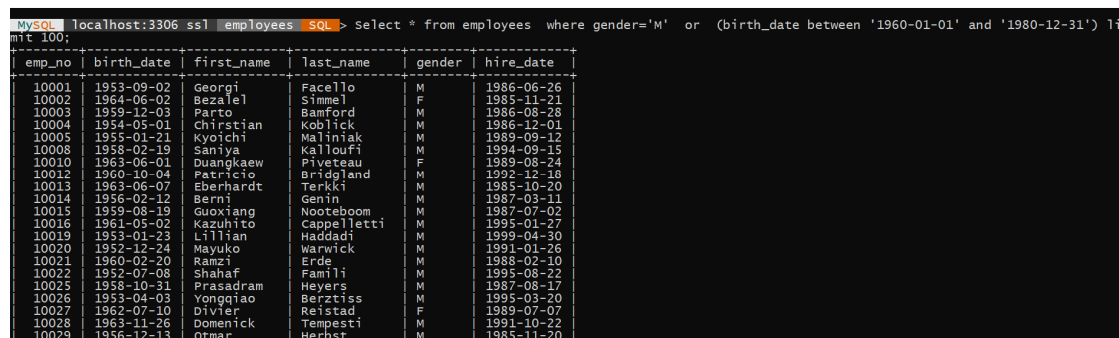
Select * from employees

where gender='M'

or

(birth_date between '1960-01-01' and '1980-12-31')

limit 100;

To select the employees whose gender is not male:

Select * from employees

where not

gender='M'

limit 100;

SQL Order By

To select all employees and sort the birth_date by ascending order:

Select * from employees

order by birth_date

limit 100;

To select all employees and sort the birth_date by descending order:

Select * from employees

order by birth_date desc

limit 100;

SQL Insert

To insert the following data into employees:

Emp_no: 500001

Birth_date: '1964-06-02'

First_name: 'Goh'

Last_name: 'M. H. '

Gender: 'M'

Hire_date: '1987-09-21

Insert into employees

Values(500001, '1964-06-02', 'Goh', "M. H. ', 'M', '1987-09-21');

```
MySQL  localhost:3306 ssl  employees  SQL > insert into employees values(500001, '1964-06-02', 'Goh', 'M. H. ', 'M', '1987-09-21');
Query OK, 1 row affected (0.1323 sec)
```

To view the inserted data:

```
MySQL  localhost:3306 ssl  employees  SQL > select * from employees where emp_no = 500001;
+--------+------------+------------+-----------+--------+------------+
| emp_no | birth_date | first_name | last_name | gender | hire_date  |
+--------+------------+------------+-----------+--------+------------+
| 500001 | 1964-06-02 | Goh        | M. H.     | M      | 1987-09-21 |
+--------+------------+------------+-----------+--------+------------+
1 row in set (0.0006 sec)

MySQL  localhost:3306 ssl  employees  SQL > _
```

We can also use:

Insert into employees (emp_no, birth_date, first_name, last_name, gender, hire_date)

Values(500001, '1964-06-02', 'Goh', "M. H. ', 'M', '1987-09-21');

Note: If we insert the data with all columns values, we do not need to state the column names. If we insert only some columns, we will need to state the column names.

SQL NULL values

To select all employees where the last_name is not null:

Select * from employees

Where last_name is not null

limit 100;

```
 MySQL Shell
+--------+------------+------------+-----------+--------+------------+
| 500001 | 1964-06-02 | Goh        | M. H.     | M      | 1987-09-21 |
+--------+------------+------------+-----------+--------+------------+
1 row in set (0.0006 sec)

MySQL  localhost:3306 ssl  employees  SQL > Select * from employees
                                        -> Where last_name is not null
                                        -> limit 100;
+--------+------------+------------+-----------+--------+------------+
| emp_no | birth_date | first_name | last_name | gender | hire_date  |
+--------+------------+------------+-----------+--------+------------+
|  10001 | 1953-09-02 | Georgi     | Facello   | M      | 1986-06-26 |
|  10002 | 1964-06-02 | Bezalel    | Simmel    | F      | 1985-11-21 |
|  10003 | 1959-12-03 | Parto      | Bamford   | M      | 1986-08-28 |
|  10004 | 1954-05-01 | Chirstian  | Koblick   | M      | 1986-12-01 |
|  10005 | 1955-01-21 | Kyoichi    | Maliniak  | M      | 1989-09-12 |
|  10006 | 1953-04-20 | Anneke     | Preusig   | F      | 1989-06-02 |
|  10007 | 1957-05-23 | Tzvetan    | Zielinski | F      | 1989-02-10 |
|  10008 | 1958-02-19 | Saniya     | Kalloufi  | M      | 1994-09-15 |
|  10009 | 1952-04-19 | Sumant     | Peac      | F      | 1985-02-18 |
|  10010 | 1963-06-01 | Duangkaew  | Piveteau  | F      | 1989-08-24 |
|  10011 | 1953-11-07 | Mary       | Sluis     | F      | 1990-01-22 |
|  10012 | 1960-10-04 | Patricio   | Bridgland | M      | 1992-12-18 |
|  10013 | 1963-06-07 | Eberhardt  | Terkki    | M      | 1985-10-20 |
|  10014 | 1956-02-12 | Berni      | Genin     | M      | 1987-03-11 |
|  10015 | 1959-08-19 | Guoxiang   | Nooteboom | M      | 1987-07-02 |
|  10016 | 1961-05-02 | Kazuhito   | Cappelletti| M     | 1995-01-27 |
|  10017 | 1958-07-06 | Cristinel  | Bouloucos | F      | 1993-08-03 |
|  10018 | 1954-06-19 | Kazuhide   | Peha      | F      | 1987-04-03 |
```

To select all employees where the last_name is null:

Select * from employees

Where last_name is null

limit 100;

```
MySQL  localhost:3306 ssl  employees  SQL > Select * from employees
                                        -> Where last_name is null
                                        -> limit 100;
Empty set (0.0006 sec)
```

SQL Update

To update the date first_name to "Goh M. H. " and last_name to "Eric"

```
MySQL  localhost:3306 ssl  employees  SQL > select * from employees where emp_no = 500001;
+--------+------------+------------+-----------+--------+------------+
| emp_no | birth_date | first_name | last_name | gender | hire_date  |
+--------+------------+------------+-----------+--------+------------+
| 500001 | 1964-06-02 | Goh        | M. H.     | M      | 1987-09-21 |
+--------+------------+------------+-----------+--------+------------+
1 row in set (0.0006 sec)

MySQL  localhost:3306 ssl  employees  SQL > _
```

We can use:

Update employees

Set first_name='Goh M. H. ', last_name='Eric'

Where emp_no=500001;

```
MySQL  localhost:3306 ssl  employees  SQL > Update employees Set first_name='Goh M. H. ', last_name='Eric' Where emp_no=500001;
Query OK, 1 row affected (0.0339 sec)
Rows matched: 1  Changed: 1  Warnings: 0
MySQL  localhost:3306 ssl  employees  SQL > select * from employees where emp_no=500001;
+--------+------------+------------+-----------+--------+------------+
| emp_no | birth_date | first_name | last_name | gender | hire_date  |
+--------+------------+------------+-----------+--------+------------+
| 500001 | 1964-06-02 | Goh M. H.  | Eric      | M      | 1987-09-21 |
+--------+------------+------------+-----------+--------+------------+
1 row in set (0.0005 sec)
```

SQL Delete

To delete the employees with emp_no=500001, we can use:

Delete from employees where emp_no=500001;

```
MySQL  localhost:3306 ssl  employees  SQL > Delete from employees where emp_no=500001;
Query OK, 1 row affected (0.1505 sec)

MySQL  localhost:3306 ssl  employees  SQL > select * from employees where emp_no=500001;
Empty set (0.0005 sec)

MySQL  localhost:3306 ssl  employees  SQL > _
```

We can insert again using:

```
MySQL  localhost:3306 ssl  employees  SQL > Insert into employees (emp_no, birth_date, first_name, last_name, gender, hire_date) Values(500001,
'1964-06-02', 'Goh', 'M. H. ', 'M', '1987-09-21');
Query OK, 1 row affected (0.0710 sec)

MySQL  localhost:3306 ssl  employees  SQL > select * from employees where emp_no=500001;
+--------+------------+------------+-----------+--------+------------+
| emp_no | birth_date | first_name | last_name | gender | hire_date  |
+--------+------------+------------+-----------+--------+------------+
| 500001 | 1964-06-02 | Goh        | M. H.     | M      | 1987-09-21 |
+--------+------------+------------+-----------+--------+------------+
1 row in set (0.0005 sec)

MySQL  localhost:3306 ssl  employees  SQL > _
```

SQL Min Max

To get the min and max of salary form the salaries table, we can use;

Select min(salary) from salaries;

Select max(salary) from salaries;

```
MySQL  localhost:3306 ssl  employees  SQL > select min(salary) from salaries;
+-------------+
| min(salary) |
+-------------+
|       38623 |
+-------------+
1 row in set (1.1726 sec)

MySQL  localhost:3306 ssl  employees  SQL > select max(salary) from salaries;
+-------------+
| max(salary) |
+-------------+
|      158220 |
+-------------+
1 row in set (1.0926 sec)
```

SQL Count, Sum, Avg

To count the number of rows in salaries table, we can use:

Select count(*) from salaries;

```
MySQL  localhost:3306 ssl  employees  SQL > Select count(*) from salaries;
+----------+
| count(*) |
+----------+
|  2844047 |
+----------+
1 row in set (0.8314 sec)
```

To get the sum of the salary from salaries table, we can use:

Select sum(salary) from salaries;

```
MySQL  localhost:3306 ssl  employees  SQL > Select sum(salary) from salaries;
+--------------+
| sum(salary)  |
+--------------+
| 181480757419 |
+--------------+
1 row in set (1.3449 sec)
```

To get the average salary from the salaries table, we can use;

Select avg(salary) from salaries;

```
MySQL  localhost:3306 ssl  employees  SQL > Select avg(salary) from salaries;
+-------------+
| avg(salary) |
+-------------+
|  63810.7448 |
+-------------+
1 row in set (1.1808 sec)
```

SQL Like

To select employees whose last_name start with d:

Select * from employees

where last_name like 'd%'

limit 100;

MySQL Shell

```
MySQL  localhost:3306 ssl  employees  SQL > Select * from employees  where last_name like 'd%'  limit 100;
+--------+------------+-------------+------------+--------+------------+
| emp_no | birth_date | first_name  | last_name  | gender | hire_date  |
+--------+------------+-------------+------------+--------+------------+
|  10030 | 1958-07-14 | Elvis       | Demeyer    | M      | 1994-02-17 |
|  10050 | 1958-05-21 | Yinghua     | Dredge     | M      | 1990-12-25 |
|  10055 | 1956-06-06 | Georgy      | Dredge     | M      | 1992-04-27 |
|  10075 | 1960-03-09 | Gao         | Dolinsky   | F      | 1987-03-19 |
|  10093 | 1964-06-11 | Sailaja     | Desikan    | M      | 1996-11-05 |
|  10114 | 1957-02-16 | Munir       | Demeyer    | F      | 1992-07-17 |
|  10179 | 1961-11-25 | Deniz       | Duclos     | F      | 1990-10-04 |
|  10215 | 1954-04-02 | Xiaobin     | Duclos     | M      | 1987-10-19 |
|  10231 | 1963-07-21 | Shaowen     | Desikan    | F      | 1996-04-13 |
|  10280 | 1964-10-29 | Stabislas   | Delgrange  | M      | 1988-03-18 |
|  10298 | 1954-07-06 | Dietrich    | DuCasse    | F      | 1999-03-30 |
|  10312 | 1957-06-18 | Rasiah      | Deyuan     | F      | 1986-08-28 |
|  10322 | 1954-05-28 | Isamu       | Dahlbom    | F      | 1990-01-29 |
|  10333 | 1953-04-27 | Snehasis    | Dymetman   | M      | 1993-01-16 |
|  10362 | 1963-09-16 | Shalesh     | dAstous    | M      | 1988-08-24 |
|  10364 | 1954-09-21 | Nakhoon     | Dengi      | M      | 1985-11-14 |
|  10382 | 1955-06-12 | Shirish     | Dredge     | M      | 1990-07-04 |
|  10393 | 1958-03-24 | Yagil       | DasSarma   | M      | 1989-06-23 |
|  10395 | 1952-02-17 | Takahiro    | Deverell   | M      | 1987-02-04 |
|  10433 | 1954-09-02 | Reuven      | Dengi      | M      | 1989-02-14 |
|  10545 | 1963-01-12 | Hauke       | dAstous    | M      | 1990-06-30 |
|  10588 | 1956-07-30 | Shigeo      | Dulay      | F      | 1987-01-28 |
|  10615 | 1955-08-30 | Keung       | Delgrande  | M      | 1996-03-10 |
|  10623 | 1953-07-11 | Aleksander  | Danlos     | F      | 1987-03-07 |
|  10626 | 1957-06-26 | Danil       | Deverell   | M      | 1996-12-03 |
|  10655 | 1959-02-02 | Remko       | Dalton     | F      | 1985-07-14 |
|  10676 | 1953-08-26 | Valeri      | Danley     | F      | 1986-03-20 |
|  10693 | 1953-12-14 | Berhard     | Daescu     | F      | 1986-01-08 |
|  10699 | 1964-02-02 | Hatim       | Deverell   | M      | 1985-11-17 |
|  10711 | 1963-06-20 | Arvind      | DuBourdieux| F      | 1991-06-21 |
|  10750 | 1953-06-14 | Roddy       | Demeyer    | F      | 1991-08-04 |
|  10760 | 1963-05-27 | Phillip     | Dratva     | M      | 1994-06-15 |
|  10767 | 1954-02-28 | Monique     | Doering    | F      | 1987-06-17 |
|  10772 | 1956-01-21 | Munehiro    | Dayana     | M      | 1987-06-29 |
|  10786 | 1964-05-19 | Patricia    | dAstous    | M      | 1989-03-14 |
|  10814 | 1952-09-17 | Nidapan     | Dymetman   | F      | 1993-07-17 |
|  10827 | 1953-09-25 | Willard     | Danley     | M      | 1996-11-07 |
```

LIKE Operator	Description
WHERE CustomerName LIKE 'a%'	Finds any values that start with "a"
WHERE CustomerName LIKE '%a'	Finds any values that end with "a"
WHERE CustomerName LIKE '%or%'	Finds any values that have "or" in any position
WHERE CustomerName LIKE '_r%'	Finds any values that have "r" in the second position
WHERE CustomerName LIKE 'a_%_%'	Finds any values that start with "a" and are at least 3 characters in length
WHERE ContactName LIKE 'a%o'	Finds any values that start with "a" and ends with "o"

Source: https://www.w3schools.com/sql/sql_like.asp