Database Testing

Create

create database testdb;

use testdb;

CREATE TABLE Persons (

Personid int NOT NULL AUTO_INCREMENT,
LastName varchar(255) NOT NULL,
FirstName varchar(255),
Age int,
Address varchar(255),
City varchar(255),
PRIMARY KEY (Personid)
);

```
mysql> describe persons;
+-----------+--------------+------+-----+---------+----------------+
| Field     | Type         | Null | Key | Default | Extra          |
+-----------+--------------+------+-----+---------+----------------+
| Personid  | int          | NO   | PRI | NULL    | auto_increment |
| LastName  | varchar(255) | NO   |     | NULL    |                |
| FirstName | varchar(255) | YES  |     | NULL    |                |
| Age       | int          | YES  |     | NULL    |                |
| Address   | varchar(255) | YES  |     | NULL    |                |
| City      | varchar(255) | YES  |     | NULL    |                |
+-----------+--------------+------+-----+---------+----------------+
```

Insert

Insert Into persons(LastName, FirstName, Age, Address, City)

Values

('Smith', 'John', 30, '123 Elm St', 'Springfield'),

('Smith', 'John', 28, '123 Maple Street', 'Springfield'),

('Johnson', 'Emily', 35, '456 Oak Avenue', 'Springfield'),

('Brown', 'Michael', 42, '789 Pine Road', 'Springfield'),

('Jones', 'Robert', 52, '202 Pine St', 'Brookfield'),

('Garcia', 'Linda', 41, '303 Cedar St', 'Greenfield'),

('Miller', 'Michael', 28, '404 Spruce St', 'Parkland'),

('Davis', 'Barbara', 33, '505 Willow St', 'Fairview'),

('Smith', 'John', 30, '123 Elm Street', 'New York'),

('Johnson', 'Emily', 25, '123 Elm Street', 'Los Angeles'),

('Williams', 'Michael', 40, '123 Elm Street', 'Chicago'),

('Lopez', 'Susan', 54, '909 Magnolia St', 'Mapleton'),

('Gonzalez', 'Joseph', 43, '1010 Hickory St', 'Willowbrook'),

('Wilson', 'Karen', 39, '1111 Redwood St', 'Briarwood'),

('Smith', 'John', 30, '123 Maple St', 'Springfield'),

('Doe', 'Jane', 30, '456 Oak St', 'Shelbyville'),

('Brown', 'Alice', 30, '789 Pine St', 'Evergreen'),

('Doe', 'John', 30, '123 Elm St', 'Springfield'),

('Brown', 'Mike', 40, '123 Elm St', 'Springfield');

```
+----------+----------+-----------+------+------------------+-------------+
| Personid | LastName | FirstName | Age  | Address          | City        |
+----------+----------+-----------+------+------------------+-------------+
|        1 | Smith    | John      |   30 | 123 Elm St       | Springfield |
|        2 | Smith    | John      |   28 | 123 Maple Street | Springfield |
|        3 | Johnson  | Emily     |   35 | 456 Oak Avenue   | Springfield |
|        4 | Brown    | Michael   |   42 | 789 Pine Road    | Springfield |
|        5 | Jones    | Robert    |   52 | 202 Pine St      | Brookfield  |
|        6 | Garcia   | Linda     |   41 | 303 Cedar St     | Greenfield  |
|        7 | Miller   | Michael   |   28 | 404 Spruce St    | Parkland    |
|        8 | Davis    | Barbara   |   33 | 505 Willow St    | Fairview    |
|        9 | Smith    | John      |   30 | 123 Elm Street   | New York    |
|       10 | Johnson  | Emily     |   25 | 123 Elm Street   | Los Angeles |
|       11 | Williams | Michael   |   40 | 123 Elm Street   | Chicago     |
|       12 | Lopez    | Susan     |   54 | 909 Magnolia St  | Mapleton    |
|       13 | Gonzalez | Joseph    |   43 | 1010 Hickory St  | Willowbrook |
|       14 | Wilson   | Karen     |   39 | 1111 Redwood St  | Briarwood   |
|       15 | Smith    | John      |   30 | 123 Maple St     | Springfield |
|       16 | Doe      | Jane      |   30 | 456 Oak St       | Shelbyville |
|       17 | Brown    | Alice     |   30 | 789 Pine St      | Evergreen   |
|       18 | Doe      | John      |   30 | 123 Elm St       | Springfield |
|       19 | Brown    | Mike      |   40 | 123 Elm St       | Springfield |
+----------+----------+-----------+------+------------------+-------------+
```

Update

UPDATE persons SET LastName='Chowdhury', FirstName='Lopa', Age=25 WHERE Personid=1

```
mysql> select * from persons;
+----------+-----------+-----------+------+------------------+-------------+
| Personid | LastName  | FirstName | Age  | Address          | City        |
+----------+-----------+-----------+------+------------------+-------------+
|        1 | Chowdhury | Lopa      |   25 | 123 Elm St       | Springfield |
|        2 | Smith     | John      |   28 | 123 Maple Street | Springfield |
|        3 | Johnson   | Emily     |   35 | 456 Oak Avenue   | Springfield |
+----------+-----------+-----------+------+------------------+-------------+
```

Select

Select LastName, FirstName From persons;

```
+-----------+-----------+
| LastName  | FirstName |
+-----------+-----------+
| Chowdhury | Lopa      |
| Smith     | John      |
| Johnson   | Emily     |
| Brown     | Michael   |
| Jones     | Robert    |
| Garcia    | Linda     |
| Miller    | Michael   |
| Davis     | Barbara   |
| Smith     | John      |
| Johnson   | Emily     |
```

Select * From persons;

```
+----------+----------+-----------+------+------------------+-------------+
| Personid | LastName | FirstName | Age  | Address          | City        |
+----------+----------+-----------+------+------------------+-------------+
|        1 | Smith    | John      |   30 | 123 Elm St       | Springfield |
|        2 | Smith    | John      |   28 | 123 Maple Street | Springfield |
|        3 | Johnson  | Emily     |   35 | 456 Oak Avenue   | Springfield |
|        4 | Brown    | Michael   |   42 | 789 Pine Road    | Springfield |
|        5 | Jones    | Robert    |   52 | 202 Pine St      | Brookfield  |
|        6 | Garcia   | Linda     |   41 | 303 Cedar St     | Greenfield  |
|        7 | Miller   | Michael   |   28 | 404 Spruce St    | Parkland    |
|        8 | Davis    | Barbara   |   33 | 505 Willow St    | Fairview    |
|        9 | Smith    | John      |   30 | 123 Elm Street   | New York    |
|       10 | Johnson  | Emily     |   25 | 123 Elm Street   | Los Angeles |
|       11 | Williams | Michael   |   40 | 123 Elm Street   | Chicago     |
|       12 | Lopez    | Susan     |   54 | 909 Magnolia St  | Mapleton    |
|       13 | Gonzalez | Joseph    |   43 | 1010 Hickory St  | Willowbrook |
|       14 | Wilson   | Karen     |   39 | 1111 Redwood St  | Briarwood   |
|       15 | Smith    | John      |   30 | 123 Maple St     | Springfield |
|       16 | Doe      | Jane      |   30 | 456 Oak St       | Shelbyville |
|       17 | Brown    | Alice     |   30 | 789 Pine St      | Evergreen   |
|       18 | Doe      | John      |   30 | 123 Elm St       | Springfield |
|       19 | Brown    | Mike      |   40 | 123 Elm St       | Springfield |
+----------+----------+-----------+------+------------------+-------------+
```

Select * from persons Where Personid=1;

Select * from persons Where FirstName='John';

Select * from persons Where Age>30;

Select * from persons Where Age<40;

Select * from persons Where Age>=40;

Select * from persons Where Age<=40;

Select * from persons Where Age!=30;

Select Distinic

SELECT DISTINCT LastName from persons;

```
+------------+
| LastName   |
+------------+
| Chowdhury  |
| Smith      |
| Johnson    |
| Brown      |
| Jones      |
| Garcia     |
| Miller     |
| Davis      |
| Williams   |
| Lopez      |
| Gonzalez   |
| Wilson     |
| Doe        |
+------------+
```

Order BY

Select * from Persons Order By Age ASC;

```
Personid | LastName  | FirstName | Age | Address          | City
---------+-----------+-----------+-----+------------------+-------------
       1 | Chowdhury | Lopa      |  25 | 123 Elm St       | Springfield
      10 | Johnson   | Emily     |  25 | 123 Elm Street   | Los Angeles
       2 | Smith     | John      |  28 | 123 Maple Street | Springfield
       7 | Miller    | Michael   |  28 | 404 Spruce St    | Parkland
       9 | Smith     | John      |  30 | 123 Elm Street   | New York
      15 | Smith     | John      |  30 | 123 Maple St     | Springfield
      16 | Doe       | Jane      |  30 | 456 Oak St       | Shelbyville
      17 | Brown     | Alice     |  30 | 789 Pine St      | Evergreen
      18 | Doe       | John      |  30 | 123 Elm St       | Springfield
       8 | Davis     | Barbara   |  33 | 505 Willow St    | Fairview
       3 | Johnson   | Emily     |  35 | 456 Oak Avenue   | Springfield
      14 | Wilson    | Karen     |  39 | 1111 Redwood St  | Briarwood
      11 | Williams  | Michael   |  40 | 123 Elm Street   | Chicago
      19 | Brown     | Mike      |  40 | 123 Elm St       | Springfield
       6 | Garcia    | Linda     |  41 | 303 Cedar St     | Greenfield
       4 | Brown     | Michael   |  42 | 789 Pine Road    | Springfield
      13 | Gonzalez  | Joseph    |  43 | 1010 Hickory St  | Willowbrook
       5 | Jones     | Robert    |  52 | 202 Pine St      | Brookfield
      12 | Lopez     | Susan     |  54 | 909 Magnolia St  | Mapleton
---------+-----------+-----------+-----+------------------+-------------
```

Select * from Persons Order By Age DESC;

```
Personid | LastName  | FirstName | Age | Address          | City
---------+-----------+-----------+-----+------------------+-------------
      12 | Lopez     | Susan     |  54 | 909 Magnolia St  | Mapleton
       5 | Jones     | Robert    |  52 | 202 Pine St      | Brookfield
      13 | Gonzalez  | Joseph    |  43 | 1010 Hickory St  | Willowbrook
       4 | Brown     | Michael   |  42 | 789 Pine Road    | Springfield
       6 | Garcia    | Linda     |  41 | 303 Cedar St     | Greenfield
      11 | Williams  | Michael   |  40 | 123 Elm Street   | Chicago
      19 | Brown     | Mike      |  40 | 123 Elm St       | Springfield
      14 | Wilson    | Karen     |  39 | 1111 Redwood St  | Briarwood
       3 | Johnson   | Emily     |  35 | 456 Oak Avenue   | Springfield
       8 | Davis     | Barbara   |  33 | 505 Willow St    | Fairview
       9 | Smith     | John      |  30 | 123 Elm Street   | New York
      15 | Smith     | John      |  30 | 123 Maple St     | Springfield
      16 | Doe       | Jane      |  30 | 456 Oak St       | Shelbyville
      17 | Brown     | Alice     |  30 | 789 Pine St      | Evergreen
      18 | Doe       | John      |  30 | 123 Elm St       | Springfield
       2 | Smith     | John      |  28 | 123 Maple Street | Springfield
       7 | Miller    | Michael   |  28 | 404 Spruce St    | Parkland
       1 | Chowdhury | Lopa      |  25 | 123 Elm St       | Springfield
      10 | Johnson   | Emily     |  25 | 123 Elm Street   | Los Angeles
```

Select * from Persons Order By LastName ;

```
Personid | LastName  | FirstName | Age | Address          | City
---------+-----------+-----------+-----+------------------+-------------
    4    | Brown     | Michael   | 42  | 789 Pine Road    | Springfield
   17    | Brown     | Alice     | 30  | 789 Pine St      | Evergreen
   19    | Brown     | Mike      | 40  | 123 Elm St       | Springfield
    1    | Chowdhury | Lopa      | 25  | 123 Elm St       | Springfield
    8    | Davis     | Barbara   | 33  | 505 Willow St    | Fairview
   16    | Doe       | Jane      | 30  | 456 Oak St       | Shelbyville
   18    | Doe       | John      | 30  | 123 Elm St       | Springfield
    6    | Garcia    | Linda     | 41  | 303 Cedar St     | Greenfield
   13    | Gonzalez  | Joseph    | 43  | 1010 Hickory St  | Willowbrook
    3    | Johnson   | Emily     | 35  | 456 Oak Avenue   | Springfield
   10    | Johnson   | Emily     | 25  | 123 Elm Street   | Los Angeles
    5    | Jones     | Robert    | 52  | 202 Pine St      | Brookfield
   12    | Lopez     | Susan     | 54  | 909 Magnolia St  | Mapleton
    7    | Miller    | Michael   | 28  | 404 Spruce St    | Parkland
    2    | Smith     | John      | 28  | 123 Maple Street | Springfield
    9    | Smith     | John      | 30  | 123 Elm Street   | New York
   15    | Smith     | John      | 30  | 123 Maple St     | Springfield
   11    | Williams  | Michael   | 40  | 123 Elm Street   | Chicago
   14    | Wilson    | Karen     | 39  | 1111 Redwood St  | Briarwood
```

Select * from Persons Order By LastName ASC, City DESC;

```
Personid | LastName  | FirstName | Age | Address          | City
---------+-----------+-----------+-----+------------------+-------------
    4    | Brown     | Michael   | 42  | 789 Pine Road    | Springfield
   19    | Brown     | Mike      | 40  | 123 Elm St       | Springfield
   17    | Brown     | Alice     | 30  | 789 Pine St      | Evergreen
    1    | Chowdhury | Lopa      | 25  | 123 Elm St       | Springfield
    8    | Davis     | Barbara   | 33  | 505 Willow St    | Fairview
   18    | Doe       | John      | 30  | 123 Elm St       | Springfield
   16    | Doe       | Jane      | 30  | 456 Oak St       | Shelbyville
    6    | Garcia    | Linda     | 41  | 303 Cedar St     | Greenfield
   13    | Gonzalez  | Joseph    | 43  | 1010 Hickory St  | Willowbrook
    3    | Johnson   | Emily     | 35  | 456 Oak Avenue   | Springfield
   10    | Johnson   | Emily     | 25  | 123 Elm Street   | Los Angeles
    5    | Jones     | Robert    | 52  | 202 Pine St      | Brookfield
   12    | Lopez     | Susan     | 54  | 909 Magnolia St  | Mapleton
    7    | Miller    | Michael   | 28  | 404 Spruce St    | Parkland
    2    | Smith     | John      | 28  | 123 Maple Street | Springfield
   15    | Smith     | John      | 30  | 123 Maple St     | Springfield
    9    | Smith     | John      | 30  | 123 Elm Street   | New York
   11    | Williams  | Michael   | 40  | 123 Elm Street   | Chicago
   14    | Wilson    | Karen     | 39  | 1111 Redwood St  | Briarwood
```

Limit

Select * From persons Limit 3;

```
Personid | LastName  | FirstName | Age | Address          | City
---------+-----------+-----------+-----+------------------+-------------
    1    | Chowdhury | Lopa      | 25  | 123 Elm St       | Springfield
    2    | Smith     | John      | 28  | 123 Maple Street | Springfield
    3    | Johnson   | Emily     | 35  | 456 Oak Avenue   | Springfield
```

Select * From persons Where City='Springfield' Limit 3;

```
Personid | LastName  | FirstName | Age | Address          | City
---------+-----------+-----------+-----+------------------+-------------
    1    | Chowdhury | Lopa      | 25  | 123 Elm St       | Springfield
    2    | Smith     | John      | 28  | 123 Maple Street | Springfield
    3    | Johnson   | Emily     | 35  | 456 Oak Avenue   | Springfield
```

Select * From persons Order By FirstName DESC Limit 3;

```
+----------+----------+-----------+------+-----------------+------------+
| Personid | LastName | FirstName | Age  | Address         | City       |
+----------+----------+-----------+------+-----------------+------------+
|       12 | Lopez    | Susan     |   54 | 909 Magnolia St | Mapleton   |
|        5 | Jones    | Robert    |   52 | 202 Pine St     | Brookfield |
|       19 | Brown    | Mike      |   40 | 123 Elm St      | Springfield|
+----------+----------+-----------+------+-----------------+------------+
```

Like

Select * From persons Where FirstName Like 'A%';

```
+----------+----------+-----------+------+-------------+-----------+
| Personid | LastName | FirstName | Age  | Address     | City      |
+----------+----------+-----------+------+-------------+-----------+
|       17 | Brown    | Alice     |   30 | 789 Pine St | Evergreen |
+----------+----------+-----------+------+-------------+-----------+
```

Select * From persons Where FirstName Like 'J_se__';

```
+----------+----------+-----------+------+-----------------+------------+
| Personid | LastName | FirstName | Age  | Address         | City       |
+----------+----------+-----------+------+-----------------+------------+
|       13 | Gonzalez | Joseph    |   43 | 1010 Hickory St | Willowbrook|
+----------+----------+-----------+------+-----------------+------------+
```

Select * From persons Where FirstName Like '%L%';

```
+----------+----------+-----------+------+----------------+-------------+
| Personid | LastName | FirstName | Age  | Address        | City        |
+----------+----------+-----------+------+----------------+-------------+
|        1 | Chowdhury| Lopa      |   25 | 123 Elm St     | Springfield |
|        3 | Johnson  | Emily     |   35 | 456 Oak Avenue | Springfield |
|        4 | Brown    | Michael   |   42 | 789 Pine Road  | Springfield |
|        6 | Garcia   | Linda     |   41 | 303 Cedar St   | Greenfield  |
|        7 | Miller   | Michael   |   28 | 404 Spruce St  | Parkland    |
|       10 | Johnson  | Emily     |   25 | 123 Elm Street | Los Angeles |
|       11 | Williams | Michael   |   40 | 123 Elm Street | Chicago     |
|       17 | Brown    | Alice     |   30 | 789 Pine St    | Evergreen   |
+----------+----------+-----------+------+----------------+-------------+
```

Select * From persons Where FirstName Like 'Mi%';

```
+----------+----------+-----------+------+----------------+-------------+
| Personid | LastName | FirstName | Age  | Address        | City        |
+----------+----------+-----------+------+----------------+-------------+
|        4 | Brown    | Michael   |   42 | 789 Pine Road  | Springfield |
|        7 | Miller   | Michael   |   28 | 404 Spruce St  | Parkland    |
|       11 | Williams | Michael   |   40 | 123 Elm Street | Chicago     |
|       19 | Brown    | Mike      |   40 | 123 Elm St     | Springfield |
+----------+----------+-----------+------+----------------+-------------+
```

Select * From persons Where FirstName Like 'M%' Or FirstName Like 'L%';

```
Personid | LastName  | FirstName | Age  | Address         | City        |
---------+-----------+-----------+------+-----------------+-------------+
       1 | Chowdhury | Lopa      |   25 | 123 Elm St      | Springfield |
       4 | Brown     | Michael   |   42 | 789 Pine Road   | Springfield |
       6 | Garcia    | Linda     |   41 | 303 Cedar St    | Greenfield  |
       7 | Miller    | Michael   |   28 | 404 Spruce St   | Parkland    |
      11 | Williams  | Michael   |   40 | 123 Elm Street  | Chicago     |
      19 | Brown     | Mike      |   40 | 123 Elm St      | Springfield |
```

Select * From persons Where FirstName Like '%a';

```
Personid | LastName  | FirstName | Age  | Address        | City        |
---------+-----------+-----------+------+----------------+-------------+
       1 | Chowdhury | Lopa      |   25 | 123 Elm St     | Springfield |
       6 | Garcia    | Linda     |   41 | 303 Cedar St   | Greenfield  |
       8 | Davis     | Barbara   |   33 | 505 Willow St  | Fairview    |
```

Select * From persons Where FirstName Like 'L%a';

```
Personid | LastName  | FirstName | Age  | Address      | City        |
---------+-----------+-----------+------+--------------+-------------+
       1 | Chowdhury | Lopa      |   25 | 123 Elm St   | Springfield |
       6 | Garcia    | Linda     |   41 | 303 Cedar St | Greenfield  |
```

Select * From persons Where City Like '%ri%';

```
Personid | LastName  | FirstName | Age  | Address           | City        |
---------+-----------+-----------+------+-------------------+-------------+
       1 | Chowdhury | Lopa      |   25 | 123 Elm St        | Springfield |
       2 | Smith     | John      |   28 | 123 Maple Street  | Springfield |
       3 | Johnson   | Emily     |   35 | 456 Oak Avenue    | Springfield |
       4 | Brown     | Michael   |   42 | 789 Pine Road     | Springfield |
      14 | Wilson    | Karen     |   39 | 1111 Redwood St   | Briarwood   |
      15 | Smith     | John      |   30 | 123 Maple St      | Springfield |
      18 | Doe       | John      |   30 | 123 Elm St        | Springfield |
      19 | Brown     | Mike      |   40 | 123 Elm St        | Springfield |
```

Select * From persons Where City Like 'M%___';

```
Personid | LastName | FirstName | Age  | Address          | City     |
---------+----------+-----------+------+------------------+----------+
      12 | Lopez    | Susan     |   54 | 909 Magnolia St  | Mapleton |
```

Select * From persons Where City Like '_r%';

```
Personid | LastName | FirstName | Age  | Address          | City       |
---------+----------+-----------+------+------------------+------------+
       5 | Jones    | Robert    |   52 | 202 Pine St      | Brookfield |
       6 | Garcia   | Linda     |   41 | 303 Cedar St     | Greenfield |
      14 | Wilson   | Karen     |   39 | 1111 Redwood St  | Briarwood  |
```

Select * From persons Where City Like 'Springfield';

```
+----------+-----------+-----------+------+------------------+--------------+
| Personid | LastName  | FirstName | Age  | Address          | City         |
+----------+-----------+-----------+------+------------------+--------------+
|        1 | Chowdhury | Lopa      |   25 | 123 Elm St       | Springfield  |
|        2 | Smith     | John      |   28 | 123 Maple Street | Springfield  |
|        3 | Johnson   | Emily     |   35 | 456 Oak Avenue   | Springfield  |
|        4 | Brown     | Michael   |   42 | 789 Pine Road    | Springfield  |
|       15 | Smith     | John      |   30 | 123 Maple St     | Springfield  |
|       18 | Doe       | John      |   30 | 123 Elm St       | Springfield  |
|       19 | Brown     | Mike      |   40 | 123 Elm St       | Springfield  |
+----------+-----------+-----------+------+------------------+--------------+
```

Between

Select * From persons Where Age Between 40 And 52;

```
+----------+----------+-----------+------+------------------+-------------+
| Personid | LastName | FirstName | Age  | Address          | City        |
+----------+----------+-----------+------+------------------+-------------+
|        4 | Brown    | Michael   |   42 | 789 Pine Road    | Springfield |
|        5 | Jones    | Robert    |   52 | 202 Pine St      | Brookfield  |
|        6 | Garcia   | Linda     |   41 | 303 Cedar St     | Greenfield  |
|       11 | Williams | Michael   |   40 | 123 Elm Street   | Chicago     |
|       13 | Gonzalez | Joseph    |   43 | 1010 Hickory St  | Willowbrook |
|       19 | Brown    | Mike      |   40 | 123 Elm St       | Springfield |
+----------+----------+-----------+------+------------------+-------------+
```

Select * From persons Where Age Not Between 40 And 52;

```
+----------+-----------+-----------+------+------------------+-------------+
| Personid | LastName  | FirstName | Age  | Address          | City        |
+----------+-----------+-----------+------+------------------+-------------+
|        1 | Chowdhury | Lopa      |   25 | 123 Elm St       | Springfield |
|        2 | Smith     | John      |   28 | 123 Maple Street | Springfield |
|        3 | Johnson   | Emily     |   35 | 456 Oak Avenue   | Springfield |
|        7 | Miller    | Michael   |   28 | 404 Spruce St    | Parkland    |
|        8 | Davis     | Barbara   |   33 | 505 Willow St    | Fairview    |
|        9 | Smith     | John      |   30 | 123 Elm Street   | New York    |
|       10 | Johnson   | Emily     |   25 | 123 Elm Street   | Los Angeles |
|       12 | Lopez     | Susan     |   54 | 909 Magnolia St  | Mapleton    |
|       14 | Wilson    | Karen     |   39 | 1111 Redwood St  | Briarwood   |
|       15 | Smith     | John      |   30 | 123 Maple St     | Springfield |
|       16 | Doe       | Jane      |   30 | 456 Oak St       | Shelbyville |
|       17 | Brown     | Alice     |   30 | 789 Pine St      | Evergreen   |
|       18 | Doe       | John      |   30 | 123 Elm St       | Springfield |
+----------+-----------+-----------+------+------------------+-------------+
```

Select * From persons Where Age Between 40 And 52 And Personid In(2,6,19);

```
+----------+----------+-----------+------+---------------+-------------+
| Personid | LastName | FirstName | Age  | Address       | City        |
+----------+----------+-----------+------+---------------+-------------+
|        6 | Garcia   | Linda     |   41 | 303 Cedar St  | Greenfield  |
|       19 | Brown    | Mike      |   40 | 123 Elm St    | Springfield |
+----------+----------+-----------+------+---------------+-------------+
```

Select * From persons Where LastName Between 'Chowdhury' And 'Johnson' Order BY LastName;

```
Personid | LastName  | FirstName | Age | Address        | City        |
---------+-----------+-----------+-----+----------------+-------------+
       1 | Chowdhury | Lopa      |  25 | 123 Elm St     | Springfield |
       8 | Davis     | Barbara   |  33 | 505 Willow St  | Fairview    |
      16 | Doe       | Jane      |  30 | 456 Oak St     | Shelbyville |
      18 | Doe       | John      |  30 | 123 Elm St     | Springfield |
       6 | Garcia    | Linda     |  41 | 303 Cedar St   | Greenfield  |
      13 | Gonzalez  | Joseph    |  43 | 1010 Hickory St| Willowbrook |
       3 | Johnson   | Emily     |  35 | 456 Oak Avenue | Springfield |
      10 | Johnson   | Emily     |  25 | 123 Elm Street | Los Angeles |
---------+-----------+-----------+-----+----------------+-------------+
```

Select * From persons Where LastName Not Between 'Chowdhury' And 'Johnson' Order BY LastName;

```
Personid | LastName | FirstName | Age | Address          | City        |
---------+----------+-----------+-----+------------------+-------------+
       4 | Brown    | Michael   |  42 | 789 Pine Road    | Springfield |
      17 | Brown    | Alice     |  30 | 789 Pine St      | Evergreen   |
      19 | Brown    | Mike      |  40 | 123 Elm St       | Springfield |
       5 | Jones    | Robert    |  52 | 202 Pine St      | Brookfield  |
      12 | Lopez    | Susan     |  54 | 909 Magnolia St  | Mapleton    |
       7 | Miller   | Michael   |  28 | 404 Spruce St    | Parkland    |
       2 | Smith    | John      |  28 | 123 Maple Street | Springfield |
       9 | Smith    | John      |  30 | 123 Elm Street   | New York    |
      15 | Smith    | John      |  30 | 123 Maple St     | Springfield |
      11 | Williams | Michael   |  40 | 123 Elm Street   | Chicago     |
      14 | Wilson   | Karen     |  39 | 1111 Redwood St  | Briarwood   |
---------+----------+-----------+-----+------------------+-------------+
```

Create Order Table

```
CREATE TABLE Orders (
    OrderID int NOT NULL,
    OrderNumber int NOT NULL,
    PersonID int,
    PRIMARY KEY (OrderID),
    FOREIGN KEY (PersonID) REFERENCES persons(PersonID)
);
```

Insert Into

```
INSERT INTO Orders (OrderID, OrderNumber, PersonID)
VALUES (1, 1001, 1),
(2, 1002, 2), (3, 1003, 3),
(4, 1004, 4),
(5, 1005, 5),
(6, 1006, 6),
```

(7, 1007, 7),
(8, 1008, 8),
(9, 1009, 9),
(10, 1010, 10);

```
mysql> select * from Orders;
+---------+-------------+----------+
| OrderID | OrderNumber | PersonID |
+---------+-------------+----------+
|       1 |        1001 |        1 |
|       2 |        1002 |        2 |
|       3 |        1003 |        3 |
|       4 |        1004 |        4 |
|       5 |        1005 |        5 |
|       6 |        1006 |        6 |
|       7 |        1007 |        7 |
|       8 |        1008 |        8 |
|       9 |        1009 |        9 |
|      10 |        1010 |       10 |
+---------+-------------+----------+
```

IN

Select * From persons Where City In ('Springfield','Brookfield','New York');

```
+----------+-----------+-----------+-----+----------------+-------------+
| Personid | LastName  | FirstName | Age | Address        | City        |
+----------+-----------+-----------+-----+----------------+-------------+
|        1 | Chowdhury | Lopa      |  25 | 123 Elm St     | Springfield |
|        2 | Smith     | John      |  28 | 123 Maple Street | Springfield |
|        3 | Johnson   | Emily     |  35 | 456 Oak Avenue | Springfield |
|        4 | Brown     | Michael   |  42 | 789 Pine Road  | Springfield |
|        5 | Jones     | Robert    |  52 | 202 Pine St    | Brookfield  |
|        9 | Smith     | John      |  30 | 123 Elm Street | New York    |
|       15 | Smith     | John      |  30 | 123 Maple St   | Springfield |
|       18 | Doe       | John      |  30 | 123 Elm St     | Springfield |
|       19 | Brown     | Mike      |  40 | 123 Elm St     | Springfield |
+----------+-----------+-----------+-----+----------------+-------------+
```

Select * From persons Where City Not In ('Springfield','Brookfield','New York');

```
+----------+----------+-----------+-----+----------------+-------------+
| Personid | LastName | FirstName | Age | Address        | City        |
+----------+----------+-----------+-----+----------------+-------------+
|        6 | Garcia   | Linda     |  41 | 303 Cedar St   | Greenfield  |
|        7 | Miller   | Michael   |  28 | 404 Spruce St  | Parkland    |
|        8 | Davis    | Barbara   |  33 | 505 Willow St  | Fairview    |
|       10 | Johnson  | Emily     |  25 | 123 Elm Street | Los Angeles |
|       11 | Williams | Michael   |  40 | 123 Elm Street | Chicago     |
|       12 | Lopez    | Susan     |  54 | 909 Magnolia St | Mapleton   |
|       13 | Gonzalez | Joseph    |  43 | 1010 Hickory St | Willowbrook |
|       14 | Wilson   | Karen     |  39 | 1111 Redwood St | Briarwood  |
|       16 | Doe      | Jane      |  30 | 456 Oak St     | Shelbyville |
|       17 | Brown    | Alice     |  30 | 789 Pine St    | Evergreen   |
+----------+----------+-----------+-----+----------------+-------------+
```

Select * From persons Where Personid In(Select PersonID from Orders);

```
+----------+-----------+-----------+-----+----------------+-------------+
| Personid | LastName  | FirstName | Age | Address        | City        |
+----------+-----------+-----------+-----+----------------+-------------+
|        1 | Chowdhury | Lopa      |  25 | 123 Elm St     | Springfield |
|        2 | Smith     | John      |  28 | 123 Maple Street | Springfield |
|        3 | Johnson   | Emily     |  35 | 456 Oak Avenue | Springfield |
|        4 | Brown     | Michael   |  42 | 789 Pine Road  | Springfield |
|        5 | Jones     | Robert    |  52 | 202 Pine St    | Brookfield  |
|        6 | Garcia    | Linda     |  41 | 303 Cedar St   | Greenfield  |
|        7 | Miller    | Michael   |  28 | 404 Spruce St  | Parkland    |
|        8 | Davis     | Barbara   |  33 | 505 Willow St  | Fairview    |
|        9 | Smith     | John      |  30 | 123 Elm Street | New York    |
|       10 | Johnson   | Emily     |  25 | 123 Elm Street | Los Angeles |
+----------+-----------+-----------+-----+----------------+-------------+
```

Select * From persons Where Personid Not In(Select PersonID from Orders);

```
Personid | LastName | FirstName | Age  | Address        | City         |
---------+----------+-----------+------+----------------+--------------+
      11 | Williams | Michael   |   40 | 123 Elm Street | Chicago      |
      12 | Lopez    | Susan     |   54 | 909 Magnolia St| Mapleton     |
      13 | Gonzalez | Joseph    |   43 | 1010 Hickory St| Willowbrook  |
      14 | Wilson   | Karen     |   39 | 1111 Redwood St| Briarwood    |
      15 | Smith    | John      |   30 | 123 Maple St   | Springfield  |
      16 | Doe      | Jane      |   30 | 456 Oak St     | Shelbyville  |
      17 | Brown    | Alice     |   30 | 789 Pine St    | Evergreen    |
      18 | Doe      | John      |   30 | 123 Elm St     | Springfield  |
      19 | Brown    | Mike      |   40 | 123 Elm St     | Springfield  |
---------+----------+-----------+------+----------------+--------------+
```

And

Select * From persons Where LastName='Smith' And Address='123 Elm Street' And Age <40;

```
Personid | LastName | FirstName | Age  | Address        | City     |
---------+----------+-----------+------+----------------+----------+
       9 | Smith    | John      |   30 | 123 Elm Street | New York |
---------+----------+-----------+------+----------------+----------+
```

Select * From persons Where LastName='Smith' And (City Like 'S%' OR City Like 'N%');

```
Personid | LastName | FirstName | Age  | Address          | City        |
---------+----------+-----------+------+------------------+-------------+
       2 | Smith    | John      |   28 | 123 Maple Street | Springfield |
       9 | Smith    | John      |   30 | 123 Elm Street   | New York    |
      15 | Smith    | John      |   30 | 123 Maple St     | Springfield |
---------+----------+-----------+------+------------------+-------------+
```

Select * From persons Where LastName='Smith' And City Like 'N%' OR City Like 'S%';

```
Personid | LastName  | FirstName | Age | Address          | City        |
---------+-----------+-----------+-----+------------------+-------------+
       1 | Chowdhury | Lopa      |  25 | 123 Elm St       | Springfield |
       2 | Smith     | John      |  28 | 123 Maple Street | Springfield |
       3 | Johnson   | Emily     |  35 | 456 Oak Avenue   | Springfield |
       4 | Brown     | Michael   |  42 | 789 Pine Road    | Springfield |
       9 | Smith     | John      |  30 | 123 Elm Street   | New York    |
      15 | Smith     | John      |  30 | 123 Maple St     | Springfield |
      16 | Doe       | Jane      |  30 | 456 Oak St       | Shelbyville |
      18 | Doe       | John      |  30 | 123 Elm St       | Springfield |
      19 | Brown     | Mike      |  40 | 123 Elm St       | Springfield |
---------+-----------+-----------+-----+------------------+-------------+
```

OR

Select * From persons Where LastName='Smith' OR City Like 'N%' OR City Like 'S%';

```
Personid | LastName  | FirstName | Age | Address          | City        |
---------+-----------+-----------+-----+------------------+-------------+
       1 | Chowdhury | Lopa      |  25 | 123 Elm St       | Springfield |
       2 | Smith     | John      |  28 | 123 Maple Street | Springfield |
       3 | Johnson   | Emily     |  35 | 456 Oak Avenue   | Springfield |
       4 | Brown     | Michael   |  42 | 789 Pine Road    | Springfield |
       9 | Smith     | John      |  30 | 123 Elm Street   | New York    |
      15 | Smith     | John      |  30 | 123 Maple St     | Springfield |
      16 | Doe       | Jane      |  30 | 456 Oak St       | Shelbyville |
      18 | Doe       | John      |  30 | 123 Elm St       | Springfield |
      19 | Brown     | Mike      |  40 | 123 Elm St       | Springfield |
---------+-----------+-----------+-----+------------------+-------------+
```

Count

Select Count(*) From persons;

```
+-----------+
| Count(*)  |
+-----------+
|        19 |
+-----------+
```

Select Count(Age) From persons;

```
+------------+
| Count(Age) |
+------------+
|         19 |
+------------+
```

Select Count(Personid) From persons Where Age >30;

```
+-----------------+
| Count(Personid) |
+-----------------+
|              10 |
+-----------------+
```

Select Count(Distinct Age) AS 'Number OF Records' From persons;

```
+-------------------+
| Number OF Records |
+-------------------+
|                12 |
+-------------------+
```

Select Count(*) AS 'Number OF Records', Age From persons Group By Age;

```
+-------------------+------+
| Number OF Records | Age  |
+-------------------+------+
|                 2 |   25 |
|                 2 |   28 |
|                 1 |   35 |
|                 1 |   42 |
|                 1 |   52 |
|                 1 |   41 |
|                 1 |   33 |
|                 5 |   30 |
|                 2 |   40 |
|                 1 |   54 |
|                 1 |   43 |
|                 1 |   39 |
+-------------------+------+
12 rows in set (0.00 sec)
```

Min Max

Select Min(Age) As 'Smallest Age' From persons;

```
+---------------+
| Smallest  Age |
+---------------+
|            25 |
+---------------+
```

Select Max(Age) As 'Largest Age' From persons;

```
+-------------+
| Largest Age |
+-------------+
|          54 |
+-------------+
1 row in set (0.00 sec)
```

Alter

ALTER TABLE Orders
ADD Price int;

UPDATE Orders SET PersonID= 2 WHERE OrderID = 8;

UPDATE Orders SET Price = 120 WHERE OrderID = 2;

UPDATE Orders SET Price = 90 WHERE OrderID = 3;

UPDATE Orders SET Price = 110 WHERE OrderID = 4;

UPDATE Orders SET Price = 95 WHERE OrderID = 5;

UPDATE Orders SET Price = 115 WHERE OrderID = 6;

UPDATE Orders SET Price = 105 WHERE OrderID = 7;

UPDATE Orders SET Price = 125 WHERE OrderID = 8;

UPDATE Orders SET Price = 80 WHERE OrderID = 9;

UPDATE Orders SET Price = 130 WHERE OrderID = 10;

Sum

Select Sum(Price) From Orders;

```
+------------+
| Sum(Price) |
+------------+
|       1070 |
+------------+
1 row in set (0.01 sec)
```

Select Sum(Price) From Orders Where PersonID=3;

```
+------------+
| Sum(Price) |
+------------+
|        335 |
+------------+
1 row in set (0.00 sec)
```

Select Sum(Price) As'Total Price',PersonID From Orders Group BY PersonID;

```
+-------------+----------+
| Total Price | PersonID |
+-------------+----------+
|         190 |        1 |
|         220 |        2 |
|         335 |        3 |
|         115 |        6 |
|          80 |        9 |
|         130 |       10 |
+-------------+----------+
```

Select Sum(Price *10) From Orders;

```
+---------------+
| Sum(Price *10) |
+---------------+
|         10700 |
+---------------+
1 row in set (0.00 sec)
```

Avg

Select Avg(Price) As 'Total' From Orders Where PersonID= 3;

```
Total    |
---------+
111.6667 |
---------+
row in set (0.00 sec)
```

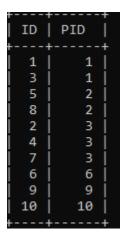Select * From Orders Where Price > (Select Avg(Price) From Orders);

```
+---------+-------------+----------+-------+
| OrderID | OrderNumber | PersonID | Price |
+---------+-------------+----------+-------+
|       2 |        1002 |        3 |   120 |
|       4 |        1004 |        3 |   110 |
|       6 |        1006 |        6 |   115 |
|       8 |        1008 |        2 |   125 |
|      10 |        1010 |       10 |   130 |
+---------+-------------+----------+-------+
```

Select Avg(Price) As 'total', PersonID From Orders Group BY PersonID;

```
----------+----------+
total     | PersonID |
----------+----------+
  95.0000 |        1 |
 110.0000 |        2 |
 111.6667 |        3 |
 115.0000 |        6 |
  80.0000 |        9 |
 130.0000 |       10 |
----------+----------+
```

Aliases

Select OrderID as ID, PersonID As PID From Orders;

```
+----+------+
| ID | PID  |
+----+------+
|  1 |    1 |
|  3 |    1 |
|  5 |    2 |
|  8 |    2 |
|  2 |    3 |
|  4 |    3 |
|  7 |    3 |
|  6 |    6 |
|  9 |    9 |
| 10 |   10 |
+----+------+
```

Select FirstName, CONCAT(Address,City) As Address From persons;

```
FirstName | Address                       |
----------+-------------------------------+
Lopa      | 123 Elm StSpringfield         |
John      | 123 Maple StreetSpringfield   |
Emily     | 456 Oak AvenueSpringfield     |
Michael   | 789 Pine RoadSpringfield      |
Robert    | 202 Pine StBrookfield         |
Linda     | 303 Cedar StGreenfield        |
Michael   | 404 Spruce StParkland         |
Barbara   | 505 Willow StFairview         |
John      | 123 Elm StreetNew York        |
Emily     | 123 Elm StreetLos Angeles     |
Michael   | 123 Elm StreetChicago         |
Susan     | 909 Magnolia StMapleton       |
Joseph    | 1010 Hickory StWillowbrook    |
Karen     | 1111 Redwood StBriarwood      |
John      | 123 Maple StSpringfield       |
Jane      | 456 Oak StShelbyville         |
Alice     | 789 Pine StEvergreen          |
John      | 123 Elm StSpringfield         |
Mike      | 123 Elm StSpringfield         |
----------+-------------------------------+
```

GROUP BY

Select Count(OrderID), PersonID From Orders Group BY PersonID Order By Count(OrderID)
DESC;

```
+---------------+----------+
| Count(OrderID) | PersonID |
+---------------+----------+
|             3 |        3 |
|             2 |        1 |
|             2 |        2 |
|             1 |        6 |
|             1 |        9 |
|             1 |       10 |
+---------------+----------+
6 rows in set (0.01 sec)
```
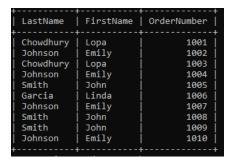
SELECT p.FirstName, COUNT(o.OrderNumber) AS Records FROM Orders As o
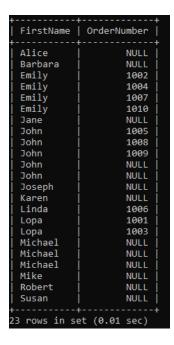LEFT JOIN persons as p ON o.PersonId = p.Personid GROUP BY FirstName;

```
+-----------+----------+
| FirstName | Records  |
+-----------+----------+
| Lopa      |        2 |
| Emily     |        4 |
| John      |        3 |
| Linda     |        1 |
+-----------+----------+
4 rows in set (0.00 sec)
```

Join

Inner Join:

Select LastName, FirstName, OrderNumber From persons AS p Inner Join Orders As o On
p.Personid=o.PersonID;

```
+-----------+-----------+-------------+
| LastName  | FirstName | OrderNumber |
+-----------+-----------+-------------+
| Chowdhury | Lopa      |        1001 |
| Johnson   | Emily     |        1002 |
| Chowdhury | Lopa      |        1003 |
| Johnson   | Emily     |        1004 |
| Smith     | John      |        1005 |
| Garcia    | Linda     |        1006 |
| Johnson   | Emily     |        1007 |
| Smith     | John      |        1008 |
| Smith     | John      |        1009 |
| Johnson   | Emily     |        1010 |
+-----------+-----------+-------------+
```

Left Join:

Select p.FirstName,O.OrderNumber From persons As p Left Join Orders AS o On
p.Personid=o.PersonID Order By FirstName;

```
+-----------+-------------+
| FirstName | OrderNumber |
+-----------+-------------+
| Alice     |        NULL |
| Barbara   |        NULL |
| Emily     |        1002 |
| Emily     |        1004 |
| Emily     |        1007 |
| Emily     |        1010 |
| Jane      |        NULL |
| John      |        1005 |
| John      |        1008 |
| John      |        1009 |
| John      |        NULL |
| John      |        NULL |
| Joseph    |        NULL |
| Karen     |        NULL |
| Linda     |        1006 |
| Lopa      |        1001 |
| Lopa      |        1003 |
| Michael   |        NULL |
| Michael   |        NULL |
| Michael   |        NULL |
| Mike      |        NULL |
| Robert    |        NULL |
| Susan     |        NULL |
+-----------+-------------+
23 rows in set (0.01 sec)
```

Right Join:

Select p.FirstName,O.OrderNumber From persons As p Right Join Orders AS o On p.Personid=o.PersonID Order By FirstName;

```
| FirstName | OrderNumber |
+-----------+-------------+
| Emily     |        1002 |
| Emily     |        1004 |
| Emily     |        1007 |
| Emily     |        1010 |
| John      |        1005 |
| John      |        1008 |
| John      |        1009 |
| Linda     |        1006 |
| Lopa      |        1001 |
| Lopa      |        1003 |
+-----------+-------------+
10 rows in set (0.00 sec)
```