Table of Contents

[1. Case sensitivity 1](#_Toc345191627)

[2. Storing Char and Varchar data 3](#_Toc345191628)

[3. Comparing string data and trailing spaces 4](#_Toc345191629)

[4. Strings as numbers 5](#_Toc345191630)

[4.1. Casting string literals to numbers 5](#_Toc345191631)

[4.2. Using a string column as a predicate 7](#_Toc345191632)

[4.3. Using a number as a predicate 8](#_Toc345191633)

When we come to testing strings - char and varchar- we need to look more closely at how these types work in MySQL. Treatment of strings and case-sensitivity and trailing spaces in strings can differ with different dbms and also within versions of MySQL. For some of this, we will need to do some testing and also refer to the Manuals. This material can get quite confusing. Read through this and try some experiments to see some of the issues with strings in MySQL.

1. Case sensitivity

In your a\_testbed database , create a small table

Create table a\_testbed.z\_tst\_case (

col\_id int primary key

, col\_1 varchar(10) not null

);

Insert a few rows with differing case for col\_1.

Insert into a\_testbed.z\_tst\_case values (1, 'zebra');

Insert into a\_testbed.z\_tst\_case values (2, 'ZEBRA');

Insert into a\_testbed.z\_tst\_case values (3, 'Zebra');

Insert into a\_testbed.z\_tst\_case values (4, 'ZEBra');

1. Filter for 'zebra' and all of the rows match.

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where col\_1 = 'zebra';

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 1 | zebra |

| 2 | ZEBRA |

| 3 | Zebra |

| 4 | ZEBra |

+--------+-------+

With our default character set and collation, string comparison is case insensitive. Suppose you do not want that behavior. You can specify a binary operator in the test; using the binary operator means that the comparison is done on a byte by byte comparison

1. Forcing a case sensitive test.

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where binary col\_1 = 'zebra';

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 1 | zebra |

+--------+-------+

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where **binary** col\_1 = 'ZEBra';

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 4 | ZEBra |

+--------+-------+

You can use binary on the either part of the comparison.

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where col\_1 = binary 'ZEBRA';

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 2 | ZEBRA |

+--------+-------+

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where binary col\_1 IN( 'ZEBRA', 'Zebra');

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 2 | ZEBRA |

| 3 | Zebra |

+--------+-------+

1. Another feature of using binary is that trailing spaces are significant.

Without binary

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where col\_1 = 'zebra ';

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 1 | zebra |

| 2 | ZEBRA |

| 3 | Zebra |

| 4 | ZEBra |

+--------+-------+

With binary

Select col\_id, col\_1 from a\_testbed.z\_tst\_case where binary col\_1 = 'zebra ';

Empty set (0.00 sec)

Select col\_id, col\_1 from a\_testbed.z\_tst\_case where col\_1 = **binary** 'zebra ';

Empty set (0.00 sec)

1. Storing Char and Varchar data

I want to start this with the demos. Create the following table in your a\_testbed database.

1. Create table z\_tst\_strings

create table a\_testbed.z\_tst\_strings(

col\_id int primary key

, col\_1 char(10)

, col\_2 varchar(10)

);

Col\_1 is of the char type which is a fixed length column - in this case length 10. When you insert data into this column, it is end-padded with spaces to a length of 10.

Col\_2 is of the varchar type which means it can store up to 10 characters of data and it is not end-padded with spaces.

We are going to insert the string 'zebra' into these two columns with a variety of leading and trailing spaces.

Look at the following inserts and try to figure out what will be stored with each row. Think about this before you do the inserts. Then execute these insert queries.

1. Inserts for z\_tst\_strings

-- no explicit spaces

insert into a\_testbed.z\_tst\_strings values (1, 'zebra', 'zebra');

-- two trailing spaces for col\_2

insert into a\_testbed.z\_tst\_strings values (2, 'zebra', 'zebra ');

-- two leading spaces for col\_2

insert into a\_testbed.z\_tst\_strings values (3, 'zebra', ' zebra');

-- explicit spaces for col\_1 to a length of 10

insert into a\_testbed.z\_tst\_strings values (4, 'zebra ', 'zebra');

-- explicit spaces for col\_1 and col\_2 to a length of 10

insert into a\_testbed.z\_tst\_strings values (5, 'zebra ', 'zebra ');

1. Now display the data

Select col\_id, col\_1, col\_2

from a\_testbed.z\_tst\_strings

;

+--------+-------+------------+

| col\_id | col\_1 | col\_2 |

+--------+-------+------------+

| 1 | zebra | zebra |

| 2 | zebra | zebra |

| 3 | zebra | zebra |

| 4 | zebra | zebra |

| 5 | zebra | zebra |

+--------+-------+------------+

You can see the leading spaces for col\_2 in row 3. You might be suspicious of the column width used for col\_1. But we need to see any trailing spaces. We can do this by concatenating a character to the end of the string. I am also going to use the function that tells us the length of the string.

1. Concatenate and display the data

Select col\_id

, concat(col\_1, 'X') as col\_1, length(col\_1)

, concat(col\_2, 'X') as col\_2, length(col\_2)

from a\_testbed.z\_tst\_strings ;

+--------+--------+---------------+-------------+---------------+

| col\_id | col\_1 | length(col\_1) | col\_2 | length(col\_2) |

+--------+--------+---------------+-------------+---------------+

| 1 | zebraX | 5 | zebraX | 5 |

| 2 | zebraX | 5 | zebra X | 7 |

| 3 | zebraX | 5 | zebraX | 7 |

| 4 | zebraX | 5 | zebraX | 5 |

| 5 | zebraX | 5 | zebra X | 10 |

+--------+--------+---------------+-------------+---------------+

Looking at col\_1 we don't see any trailing spaces even though this was defined as a char(10) type column. The length is always 5- for the 5 characters in "zebra"

Looking at col\_2 we can see that the trailing spaces as well as the leading spaces were preserved and the length reflects this.

To quote the manual:

"When [CHAR](http://dev.mysql.com/doc/refman/5.0/en/char.html) values are stored, they are right-padded with spaces to the specified length. When [CHAR](http://dev.mysql.com/doc/refman/5.0/en/char.html) values are retrieved, trailing spaces are removed." That might not be what you expected but this is a pretty clear statement of intent.

" VARCHAR values are not padded when they are stored. Trailing spaces are retained when values are stored and retrieved, in conformance with standard SQL

(In some earlier versions of MySQL this is not the case; before MySQL 5.0.3, trailing spaces are removed from values when they are stored into a [VARCHAR](http://dev.mysql.com/doc/refman/5.0/en/char.html) column; this means that the spaces also are absent from retrieved values. This means that if you are working with a variety of MySQL versions you will need to watch out for this. There is a trend in MySQL to come closer to the standards with each new version-but that does mean that you may have to watch code that worked in one version and now works differently.)

The question of whether trailing spaces should be stored in **your** database is a **business decision**. You can have the application that supplies data to your insert statement remove trailing spaces- and maybe remove leading spaces. It is not common to remove internal spaces- so you would not change "Grevy's Zebra" to "Grevy'sZebra" but you might want the application to collapse contiguous spaces changing  
"Grevy 's Zebra" to "Grevy's Zebra".

There is an option PAD\_CHAR\_TO\_FULL\_LENGTH which forces char types to return the full character values without stripping the trailing blanks.

1. Comparing string data and trailing spaces

Now let's go back to our table and run the following query against col\_2.

1. Testing and trailing spaces

Select col\_id, col\_2, concat(col\_2, 'X')

From a\_testbed.z\_tst\_strings

Where col\_2 = 'zebra';

+--------+------------+--------------------+

| col\_id | col\_2 | concat(col\_2, 'X') |

+--------+------------+--------------------+

| 1 | zebra | zebraX |

| 2 | zebra | zebra X |

| 4 | zebra | zebraX |

| 5 | zebra | zebra X |

+--------+------------+--------------------+

We get back the rows where col\_2 stored the string "zebra' and also where it stored "zebra" with trailing spaces even though they are not the same value.

" All MySQL collations are of type PADSPACE. This means that all CHAR and VARCHAR values in MySQL are compared without regard to any trailing spaces. … This is true for all MySQL versions. "

Leading spaces are significant for comparisons; trailing blanks are not.

1. Binary testing and trailing spaces

Select col\_id, col\_2, concat(col\_2, 'X')

From a\_testbed.z\_tst\_strings

Where col\_2 = binary 'zebra';

+--------+-------+--------------------+

| col\_id | col\_2 | concat(col\_2, 'X') |

+--------+-------+--------------------+

| 1 | zebra | zebraX |

| 4 | zebra | zebraX |

+--------+-------+--------------------+

1. Binary testing and trailing spaces

Select col\_id, col\_2, concat(col\_2, 'X')

From a\_testbed.z\_tst\_strings

Where col\_2 = binary 'zebra ';

+--------+---------+--------------------+

| col\_id | col\_2 | concat(col\_2, 'X') |

+--------+---------+--------------------+

| 2 | zebra | zebra X |

+--------+---------+--------------------+

Binary testing is not the same as using the collation and it is sensitive to trailing spaces.

At this point your head is probably spinning. This is not difficult but it is a lot to keep in mind when you work with data that comes into your database from sources with varying attitudes towards whitespace. Often the best solution is to clean the data before it is inserted. You might wish to remove leading and trailing spaces. You might have a policy of case patterns for data (although this is much more difficult for real data ( e.e. cummings comes to mind) but maybe you could agree on a case pattern for some of the data. Again- the decision about the significance of whitespace in the data is a business decision. MySQL just has its own rules about how to deal with the data you enter.

1. Strings as numbers

Under some circumstances, MySQL will treat alphanumeric string as numbers and may cast them to zero. This is not always a good idea- particularly when you do not pay close attention to your data.

Casting string literals to numbers

Let's start with literals; the output probably seems OK to you.

Select '450' + 5, '25.08' \* 6;

+-----------+-------------+

| '450' + 5 | '25.08' \* 6 |

+-----------+-------------+

| 455 | 150.48 |

+-----------+-------------+

Now try some other literals; this does give you warnings on the expression but it does treat these the string as 0 values. It does not say that it is invalid to treat 'ABC' as a number.

Select 'ABC' + 5;

+-----------+

| 'ABC' + 5 |

+-----------+

| 5 |

+-----------+

1 row in set, 1 warning (0.00 sec)

show warnings;

+---------+------+--------------------------------------------+

| Level | Code | Message |

+---------+------+--------------------------------------------+

| Warning | 1292 | Truncated incorrect DOUBLE value: 'ABC' |

+---------+------+--------------------------------------------+

1. You might have hoped that the result would be 15.25- but the first operand is a string. You would get the same result with 5 + '10.25'

Select '$10.25' + 5;

+-------------+

| '$10.25' +5 |

+-------------+

| 5 |

+-------------+

1 row in set, 1 warning (0.00 sec)

show warnings;

+---------+------+--------------------------------------------+

| Level | Code | Message |

+---------+------+--------------------------------------------+

| Warning | 1292 | Truncated incorrect DOUBLE value: '$10.25' |

+---------+------+--------------------------------------------+

1 row in set (0.00 sec)

1. Adding a number to a null returns a null; there is no warning associated with this.

Select null + 5;

+----------+

| null + 5 |

+----------+

| NULL |

+----------+

1. But what if the literal string contains digits? What pattern do you see here?

Select '123ABC' + 10, '123ABC' \* 1, '123,456' \* 1;

+---------------+--------------+---------------+

| '123ABC' + 10 | '123ABC' \* 1 | '123,456' \* 1 |

+---------------+--------------+---------------+

| 133 | 123 | 123 |

+---------------+--------------+---------------+

1 row in set, 3 warnings (0.00 sec)

You might like this feature or not- but you do need to be aware of it.

Using a string column as a predicate

Another demo of string features you might not have expected and probably should not use.

We are using the expression col\_1 in a place where we should have a logical expression. MySQL casts this to a number -0 and then treats 0 as a logical False value.

Select col\_id, col\_1

from a\_testbed.z\_tst\_case

where col\_1;

Empty set (0.08 sec)

When we add 1 to col\_1 we get 0 + 1 = 1 which is cast to a logical True value.

Select col\_id, col\_1, col\_1 +1

from a\_testbed.z\_tst\_case

where col\_1 + 1

;

+--------+-------+-----------+

| col\_id | col\_1 | col\_1 + 1 |

+--------+-------+-----------+

| 1 | zebra | 1 |

| 2 | ZEBRA | 1 |

| 3 | Zebra | 1 |

| 4 | ZEBra | 1 |

+--------+-------+-----------+

4 rows in set, 8 warnings (0.00 sec)

mysql> show warnings;

+---------+------+-------------------------------------------+

| Level | Code | Message |

+---------+------+-------------------------------------------+

| Warning | 1292 | Truncated incorrect DOUBLE value: 'zebra' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'zebra' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'ZEBRA' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'ZEBRA' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'Zebra' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'Zebra' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'ZEBra' |

| Warning | 1292 | Truncated incorrect DOUBLE value: 'ZEBra' |

+---------+------+-------------------------------------------+

8 rows in set (0.00 sec)

Select \*

from z\_tst\_case

where col\_1 + 3

;

+--------+-------+

| col\_id | col\_1 |

+--------+-------+

| 1 | zebra |

| 2 | ZEBRA |

| 3 | Zebra |

| 4 | ZEBra |

+--------+-------+

Without running it- what do you think this querywould return? Then try it.

Select \*

from a\_vets.vt\_animals

where an\_name;

Using a number as a predicate

This is not a string issue, but it seems relevant here in a discussion of MySQL features. What does the following query do?

Select \*

from a\_vets.vt\_animals

where 45;

In Oracle or in SQL Server, this query does not run- it is an error to use a number as a predicate. But MySQL will execute that query returning all of the rows from the table.

The following query in Mysql returns no rows in the result set.

Select \*

from a\_vets.vt\_animals

where 0;

There is a convention that you see in some languages that equate the number 0 with the logical value False and other numbers with the logical value True. You see this fairly often in MySQL code and the people who do this seem pleased with themselves. I would prefer you write code that is more obvious.