MySQL Cheat Sheet

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MySQL is a popular open-source relational database management system known for its ease of use and scalability. Sometimes, you will need a little help while working on a project. That's why we created this MySQL Cheat Sheet.

Instructions for installing MySQL are available at:
https://dev.mysql.com

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CONNECTING TO A MYSQL SERVER

Connect to a MySQL server with a username and a password using the mysql command-line client.
MySQL will prompt for the password:

```
mysql -u [username] -p
```

To connect to a specific database on a MySQL server using a username and a password:

```
mysql -u [username] -p [database]
```

To export data using the `mysqldump` tool:

```
mysqldump -u [username] -p \
  [database] > data_backup.sql
```

To exit the client:

```
quit or exit
```

For a full list of commands:

```
help
```

CREATING AND DISPLAYING DATABASES

To create a database:

```
CREATE DATABASE zoo;
```

To list all the databases on the server:

```
SHOW DATABASES;
```

To use a specified database:

```
USE zoo;
```

To delete a specified database:

```
DROP DATABASE zoo;
```

To list all tables in the database:

```
SHOW TABLES;
```

To get information about a specified table:

```
DESCRIBE animal;
```

It outputs column names, data types, default values, and more about the table.

CREATING TABLES

To create a table:

```
CREATE TABLE habitat (
  id INT,
  name VARCHAR(64)
);
```

Use AUTO_INCREMENT to increment the ID automatically with each new record. An AUTO_INCREMENT column must be defined as a primary or unique key:

```
CREATE TABLE habitat (
  id INT PRIMARY KEY AUTO_INCREMENT,
  name VARCHAR(64)
);
```

To create a table with a foreign key:

```
CREATE TABLE animal (
  id INT PRIMARY KEY AUTO_INCREMENT,
  name VARCHAR(64),
  species VARCHAR(64),
  age INT,
  habitat_id INT,
  FOREIGN KEY (habitat_id)
    REFERENCES habitat(id)
);
```

MODIFYING TABLES

Use the `ALTER TABLE` statement to modify the table structure.

To change a table name:

```
ALTER TABLE animal RENAME pet;
```

To add a column to the table:

```
ALTER TABLE animal
ADD COLUMN name VARCHAR(64);
```

To change a column name:

```
ALTER TABLE animal
RENAME COLUMN id TO identifier;
```

To change a column data type:

```
ALTER TABLE animal
MODIFY COLUMN name VARCHAR(128);
```

To delete a column:

```
ALTER TABLE animal
DROP COLUMN name;
```

To delete a table:

```
DROP TABLE animal;
```

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QUERYING DATA

To select data from a table, use the `SELECT` command.
An example of a single-table query:

```
SELECT species, AVG(age) AS average_age
FROM animal
WHERE id != 3
GROUP BY species
HAVING AVG(age) > 3
ORDER BY AVG(age) DESC;
```

An example of a multiple-table query:

```
SELECT city.name, country.name
FROM city
[INNER | LEFT | RIGHT] JOIN country
  ON city.country_id = country.id;
```

Use +, -, *, / to do some basic math.
To get the number of seconds in a week:

```
SELECT 60 * 60 * 24 * 7; -- result: 604800
```

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AGGREGATION AND GROUPING

- **AVG(**expr**)** – average value of `expr` for the group.
- **COUNT(**expr**)** – count of `expr` values within the group.
- **MAX(**expr**)** – maximum value of `expr` values within the group.
- **MIN(**expr**)** – minimum value of `expr` values within the group.
- **SUM(**expr**)** – sum of `expr` values within the group.

To count the rows in the table:

```
SELECT COUNT(*)
FROM animal;
```

To count the non-NULL values in a column:

```
SELECT COUNT(name)
FROM animal;
```

To count unique values in a column:

```
SELECT COUNT(DISTINCT name)
FROM animal;
```

GROUP BY

To count the animals by species:

```
SELECT species, COUNT(id)
FROM animal
GROUP BY species;
```

To get the average, minimum, and maximum ages by habitat:

```
SELECT habitat_id, AVG(age),
       MIN(age), MAX(age)
FROM animal
GROUP BY habitat_id;
```

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INSERTING DATA

To insert data into a table, use the `INSERT` command:

```
INSERT INTO habitat VALUES
(1, 'River'),
(2, 'Forest');
```

You may specify the columns in which the data is added. The remaining columns are filled with default values or `NULL`s.

```
INSERT INTO habitat (name) VALUES
('Savanna');
```

UPDATING DATA

To update the data in a table, use the `UPDATE` command:

```
UPDATE animal
SET
  species = 'Duck',
  name = 'Quack'
WHERE id = 2;
```

DELETING DATA

To delete data from a table, use the `DELETE` command:

```
DELETE FROM animal
WHERE id = 1;
```

This deletes all rows satisfying the `WHERE` condition.
To delete all data from a table, use the `TRUNCATE TABLE` statement:

```
TRUNCATE TABLE animal;
```

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CASTING

From time to time, you need to change the type of a value.
Use the CAST() function to do this.
In MySQL, you can cast to these data types:

```
CHAR     NCHAR  BINARY DATE  DATETIME
DECIMAL  DOUBLE FLOAT  REAL  SIGNED
UNSIGNED TIME   YEAR   JSON  spatial_type
```

To get a number as a signed integer:

```
SELECT CAST(1234.567 AS signed);
-- result: 1235
```

To change a column type to double:

```
SELECT CAST(column AS double);
```

TEXT FUNCTIONS

FILTERING THE OUTPUT

To fetch the city names that are not Berlin:

```
SELECT name
FROM city
WHERE name != 'Berlin';
```

TEXT OPERATORS

To fetch the city names that start with a 'P' or end with an 's':

```
SELECT name
FROM city
WHERE name LIKE 'P%' OR name LIKE '%s';
```

To fetch the city names that start with any letter followed by 'ublin' (like Dublin in Ireland or Lublin in Poland):

```
SELECT name
FROM city
WHERE name LIKE '_ublin';
```

CONCATENATION

Use the CONCAT() function to concatenate two strings:

```
SELECT CONCAT('Hi ', 'there!');
-- result: Hi there!
```

If any of the string is NULL, the result is NULL:

```
SELECT CONCAT(Great ', 'day', NULL);
-- result: NULL
```

MySQL allows specifying a separating character (separator) using the CONCAT_WS() function. The separator is placed between the concatenated values:

```
SELECT CONCAT_WS(' ', 1, 'Olivier', 'Norris'); --
result: 1 Olivier Norris
```

OTHER USEFUL TEXT FUNCTIONS

To get the count of characters in a string:

```
SELECT LENGTH('LearnSQL.com');
-- result: 12
```

To convert all letters to lowercase:

```
SELECT LOWER('LEARNSQL.COM');
-- result: learnsql.com
```

To convert all letters to uppercase:

```
SELECT UPPER('LearnSQL.com');
-- result: LEARNSQL.COM
```

To get just a part of a string:

```
SELECT SUBSTRING('LearnSQL.com', 9);
-- result: .com
SELECT SUBSTRING('LearnSQL.com', 1, 5);
-- result: Learn
```

To replace a part of a string:

```
SELECT REPLACE('LearnSQL.com', 'SQL', 'Python');
-- result: LearnPython.com
```

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NUMERIC FUNCTIONS

To get the remainder of a division:
```
SELECT MOD(13, 2); -- result: 1
```

To round a number to its nearest integer:
```
SELECT ROUND(1234.56789); -- result: 1235
```

To round a number to three decimal places:
```
SELECT ROUND(1234.56789, 3);
-- result: 1234.568
```

To round a number up:
```
SELECT CEIL(13.1); -- result: 14
SELECT CEIL(-13.9); -- result: -13
```

The `CEIL(x)` function returns the smallest integer not less than `x`. To round the number down:
```
SELECT FLOOR(13.8); -- result: 13
SELECT FLOOR(-13.2); -- result: -14
```

The `FLOOR(x)` function returns the greatest integer not greater than `x`. To round towards 0 irrespective of the sign of a number:
```
SELECT TRUNCATE(13.56, 0); -- result: 13
SELECT TRUNCATE(-13.56, 1); -- result: -13.5
```

To get the absolute value of a number:
```
SELECT ABS(-12); -- result: 12
```

To get the square root of a number:
```
SELECT SQRT(9); -- result: 3
```

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USEFUL NULL FUNCTIONS

To fetch the names of the cities whose rating values are not missing:

```
SELECT name
FROM city
WHERE rating IS NOT NULL;
```

COALESCE(x, y, ...)

To replace NULL in a query with something meaningful:

```
SELECT domain,
       COALESCE(domain, 'domain missing')
FROM contacts;
```

The `COALESCE()` function takes any number of arguments and returns the value of the first argument that is not NULL.

NULLIF(x, y)

To save yourself from *division by 0* errors:

```
SELECT last_month, this_month,
  this_month * 100.0
    / NULLIF(last_month, 0)
    AS better_by_percent
FROM video_views;
```

The `NULLIF(x, y)` function returns NULL if x equals y, else it returns the value of x value.

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DATE AND TIME

There are 5 main time-related types in MySQL:
`DATE` `TIME` `DATETIME` `TIMESTAMP` `YEAR`

DATE – stores the year, month, and day in the `YYYY-MM-DD` format.

TIME – stores the hours, minutes, and seconds in the `HH:MM:SS` format.

DATETIME – stores the date and time in the `YYYY-MM-DD HH:MM:SS` format. The supported range is `'1000-01-01 00:00:00'` to `'9999-12-31 23:59:59'`.

TIMESTAMP – stores the date and time. The range is `'1970-01-01 00:00:01'` UTC to `'2038-01-19 03:14:07'` UTC. MySQL converts `TIMESTAMP` values from the current time zone to UTC for storage, and back from UTC to the current time zone for retrieval.

YEAR – stores the year in the `YYYY` format.

INTERVALS

An interval is the duration between two points in time.
To define an interval: `INTERVAL 1 DAY`
This syntax consists of the `INTERVAL` keyword, a value, and a time part keyword (`YEAR`, `QUARTER`, `MONTH`, `WEEK`, `DAY`, `HOUR`, `MINUTE`, `SECOND`, `MICROSECOND`).

You may combine different `INTERVAL`s using the + or − operator:

```
INTERVAL 1 YEAR + INTERVAL 3 MONTH
```

You may also use the standard SQL syntax:

```
INTERVAL '1-3' YEAR_MONTH
-- 1 year and 3 months
INTERVAL '3-12' HOUR_MINUTE
-- 3 hours 12 minutes
```

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WHAT TIME IS IT?

To answer this question, use:

- CURRENT_TIME or CURTIME – to get the current time.
- CURRENT_DATE or CURDATE – to get the current date.
- NOW() or CURRENT_TIMESTAMP – to get the current timestamp with both of the above.

CREATING VALUES

To create a date, time, or datetime, write the value as a string and cast it to the proper type.

```
SELECT CAST('2021-12-31' AS date),
  CAST('15:31' AS time),
  CAST('2021-12-31 23:59:29' AS datetime);
```

You may skip casting in simple conditions; the database knows what you mean.

```
SELECT airline, flight_no, departure_time
FROM airport_schedule
WHERE departure_time < '12:00';
```

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EXTRACTING PARTS OF DATES

To extract a part of a date, use the functions YEAR, MONTH, WEEK, DAY, HOUR, and so on.

```
SELECT YEAR(CAST('2021-12-31' AS date));
-- result: 2021
SELECT MONTH(CAST('2021-12-31' AS date));
-- result: 12
SELECT DAY(CAST('2021-12-31' AS date));
-- result: 31
```

DATE ARITHMETICS

To add or subtract an interval from a DATE, use the ADDDATE() function:

```
ADDDATE('2021-10-31', INTERVAL 2 MONTH);
-- result: '2021-12-31'
ADDDATE('2014-04-05', INTERVAL -3 DAY);
-- result: '2014-04-02'
```

To add or subtract an interval from a TIMESTAMP or DATETIME, use the TIMESTAMPADD() function:

```
TIMESTAMPADD(MONTH, 2,
  '2014-06-10 07:55:00');
-- result: '2014-08-10 07:55:00'
TIMESTAMPADD(MONTH, -2,
  '2014-06-10 07:55:00');
-- result: '2014-04-10 07:55:00'
```

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To add or subtract TIME from a DATETIME, use the ADDTIME() function:

```
ADDTIME('2018-02-12 10:20:24', '12:43:02');
-- result: '2018-02-12 23:03:26'
ADDTIME('2018-02-12 10:20:24', '-12:43:02');
-- result: '2018-02-11 21:37:22'
```

To find the difference between two dates, use the DATEDIFF() function:

```
DATEDIFF('2015-01-01', '2014-01-02');
-- result: 364
```

To find the difference between two times, use the TIMEDIFF() function:

```
SELECT TIMEDIFF('09:30:00', '07:55:00');
-- result: '01:35:00'
```

To find the difference between two datetimes (in a given unit of time), use the TIMESTAMPDIFF() function. Here's an example with the difference given in weeks:

```
SELECT TIMESTAMPDIFF(
  WEEK, '2018-02-26', '2018-03-21'
); -- result: 3
```

Learn it all at LearnSQL.com