



MySQL Basics

This MySQL basics section teaches you how to use SQL statements to manage data in MySQL. It'll provide you with everything you need to know to work with MySQL effectively.

Section 1. Querying data

- [SELECT FROM](https://www.mysqltutorial.org/mysql-select-statement-query-data.aspx) (<https://www.mysqltutorial.org/mysql-select-statement-query-data.aspx>) – show you how to use simple `SELECT FROM` statement to query the data from a single table.
- [SELECT](https://www.mysqltutorial.org/mysql-basics/mysql-select/) (<https://www.mysqltutorial.org/mysql-basics/mysql-select/>) – learn how to use the `SELECT` statement without referencing a table.

Section 2. Sorting data

- [ORDER BY](https://www.mysqltutorial.org/mysql-order-by/) (<https://www.mysqltutorial.org/mysql-order-by/>) – show you how to sort the result set using `ORDER BY` clause. The custom sort order with the `FIELD` function will be also covered.

Section 3. Filtering data

- [WHERE](https://www.mysqltutorial.org/mysql-where/) (<https://www.mysqltutorial.org/mysql-where/>) – learn how to use the `WHERE` clause to filter rows based on specified conditions.
- [SELECT DISTINCT](https://www.mysqltutorial.org/mysql-distinct.aspx) (<https://www.mysqltutorial.org/mysql-distinct.aspx>) – show you how to use the `DISTINCT` operator in the `SELECT` statement to eliminate duplicate rows in a result set.
- [AND](https://www.mysqltutorial.org/mysql-and/) (<https://www.mysqltutorial.org/mysql-and/>) – introduce you to the `AND` operator to combine Boolean expressions to form a complex condition for filtering data.

- [OR](https://www.mysqltutorial.org/mysql-or/) (<https://www.mysqltutorial.org/mysql-or/>) – introduce you to the `OR` operator and show you how to combine the `OR` operator with the `AND` operator to filter data.
- [IN](https://www.mysqltutorial.org/mysql-basics/mysql-in/) (<https://www.mysqltutorial.org/mysql-basics/mysql-in/>) – show you how to use the `IN` operator in the `WHERE` clause to determine if a value matches any value in a set.
- [NOT IN](https://www.mysqltutorial.org/mysql-basics/mysql-not-in/) (<https://www.mysqltutorial.org/mysql-basics/mysql-not-in/>) – negate the `IN` operator using the `NOT` operator to check if a value doesn't match any value in a set.
- [BETWEEN](https://www.mysqltutorial.org/mysql-between/) (<https://www.mysqltutorial.org/mysql-between/>) – show you how to query data based on a range using `BETWEEN` operator.
- [LIKE](https://www.mysqltutorial.org/mysql-like/) (<https://www.mysqltutorial.org/mysql-like/>) – provide you with technique to query data based on a pattern.
- [LIMIT](https://www.mysqltutorial.org/mysql-limit.aspx) (<https://www.mysqltutorial.org/mysql-limit.aspx>) – use `LIMIT` to constrain the number of rows returned by `SELECT` statement
- [IS NULL](https://www.mysqltutorial.org/mysql-is-null/) (<https://www.mysqltutorial.org/mysql-is-null/>) – test whether a value is `NULL` or not by using `IS NULL` operator.

Section 4. Joining tables

- [Table & Column Aliases](https://www.mysqltutorial.org/mysql-alias/) (<https://www.mysqltutorial.org/mysql-alias/>) – introduce you to table and column aliases.
- [Joins](https://www.mysqltutorial.org/mysql-join/) (<https://www.mysqltutorial.org/mysql-join/>) – give you an overview of joins supported in MySQL including inner join, left join, and right join.
- [INNER JOIN](https://www.mysqltutorial.org/mysql-inner-join.aspx) (<https://www.mysqltutorial.org/mysql-inner-join.aspx>) – query rows from a table that has matching rows in another table.
- [LEFT JOIN](https://www.mysqltutorial.org/mysql-left-join.aspx) (<https://www.mysqltutorial.org/mysql-left-join.aspx>) – return all rows from the left table and matching rows from the right table or null if no matching rows found in the right table.
- [RIGHT JOIN](https://www.mysqltutorial.org/mysql-right-join/) (<https://www.mysqltutorial.org/mysql-right-join/>) – return all rows from the right table and matching rows from the left table or null if no matching rows found in the left table.

- **CROSS JOIN** (<https://www.mysqltutorial.org/mysql-cross-join/>) – make a Cartesian product of rows from multiple tables.
- **Self-join** (<https://www.mysqltutorial.org/mysql-self-join/>) – join a table to itself using table alias and connect rows within the same table using inner join and left join.

Section 5. Grouping data

- **GROUP BY** (<https://www.mysqltutorial.org/mysql-group-by.aspx>) – show you how to group rows into groups based on columns or expressions.
- **HAVING** (<https://www.mysqltutorial.org/mysql-having.aspx>) – filter the groups by a specific condition.
- **ROLLUP** (<https://www.mysqltutorial.org/mysql-rollup/>) – generate multiple grouping sets considering a hierarchy between columns specified in the `GROUP BY` clause.

Section 6. Subqueries

- **Subquery** (<https://www.mysqltutorial.org/mysql-subquery/>) – show you how to nest a query (inner query) within another query (outer query) and use the result of the inner query for the outer query.
- **Derived table** (<https://www.mysqltutorial.org/mysql-derived-table/>) – introduce you to the derived table concept and show you how to use it to simplify complex queries.
- **EXISTS** (<https://www.mysqltutorial.org/mysql-exists/>) – test for the existence of rows.

Section 7. Common Table Expressions

- **Common Table Expression or CTE** (<https://www.mysqltutorial.org/mysql-cte/>) – explain to you the common table expression concept and show you how to use CTE for querying data from tables.



- [Recursive CTE](https://www.mysqltutorial.org/mysql-recursive-cte/) (https://www.mysqltutorial.org/mysql-recursive-cte/) – use the recursive CTE to traverse the hierarchical data.

Section 8. Set operators

- [UNION and UNION ALL](https://www.mysqltutorial.org/sql-union-mysql.aspx) (https://www.mysqltutorial.org/sql-union-mysql.aspx) – combine two or more result sets of multiple queries into a single result set.
- [INTERSECT](https://www.mysqltutorial.org/mysql-intersect/) (https://www.mysqltutorial.org/mysql-intersect/) – show you a couple of ways to simulate the `INTERSECT` operator.
- [MINUS](https://www.mysqltutorial.org/mysql-minus/) (https://www.mysqltutorial.org/mysql-minus/) – explain to you the SQL MINUS operator and show you how to simulate it.

Section 9. Modifying data in MySQL

In this section, you will learn how to insert, update, and delete data from tables using various MySQL statements.

- [INSERT](https://www.mysqltutorial.org/mysql-insert-statement.aspx) (https://www.mysqltutorial.org/mysql-insert-statement.aspx) – use various forms of the `INSERT` statement to insert data into a table.
- [INSERT Multiple Rows](https://www.mysqltutorial.org/mysql-insert-multiple-rows/) (https://www.mysqltutorial.org/mysql-insert-multiple-rows/) – insert multiple rows into a table.
- [INSERT INTO SELECT](https://www.mysqltutorial.org/mysql-insert-into-select/) (https://www.mysqltutorial.org/mysql-insert-into-select/) – insert data into a table from the result set of a query.
- [INSERT IGNORE](https://www.mysqltutorial.org/mysql-insert-ignore/) (https://www.mysqltutorial.org/mysql-insert-ignore/) – explain you the `INSERT IGNORE` statement that inserts rows into a table and ignores rows that cause errors.
- [UPDATE](https://www.mysqltutorial.org/mysql-update-data.aspx) (https://www.mysqltutorial.org/mysql-update-data.aspx) – learn how to use `UPDATE` statement and its options to update data in database tables.

- [UPDATE JOIN](https://www.mysqltutorial.org/mysql-update-join/) (https://www.mysqltutorial.org/mysql-update-join/) – show you how to perform cross-table update using `UPDATE JOIN` statement with `INNER JOIN` and `LEFT JOIN`.
- [DELETE](https://www.mysqltutorial.org/mysql-delete-statement.aspx) (https://www.mysqltutorial.org/mysql-delete-statement.aspx) – show you how to use the `DELETE` statement to delete rows from one or more tables.
- [ON DELETE CASCADE](https://www.mysqltutorial.org/mysql-on-delete-cascade/) (https://www.mysqltutorial.org/mysql-on-delete-cascade/) – learn how to use `ON DELETE CASCADE` referential action for a foreign key to delete data from a child table automatically when you delete data from a parent table.
- [DELETE JOIN](https://www.mysqltutorial.org/mysql-delete-join/) (https://www.mysqltutorial.org/mysql-delete-join/) – show you how to delete data from multiple tables.
- [REPLACE](https://www.mysqltutorial.org/mysql-replace.aspx) (https://www.mysqltutorial.org/mysql-replace.aspx) – learn how to insert or update data depends on whether data exists in the table or not.
- [Prepared Statement](https://www.mysqltutorial.org/mysql-prepared-statement.aspx) (https://www.mysqltutorial.org/mysql-prepared-statement.aspx) – show you how to use the prepared statement to execute a query.

Section 10. MySQL transaction

- [Transaction](https://www.mysqltutorial.org/mysql-transaction.aspx) (https://www.mysqltutorial.org/mysql-transaction.aspx) – learn about MySQL transactions, and how to use `COMMIT` and `ROLLBACK` to manage transactions in MySQL.
- [Table locking](https://www.mysqltutorial.org/mysql-table-locking/) (https://www.mysqltutorial.org/mysql-table-locking/) – learn how to use MySQL locking for cooperating table access between sessions.

Section 11. Managing databases

This section shows you how to manage MySQL databases.

- [Selecting a MySQL database](https://www.mysqltutorial.org/mysql-select-database/) (https://www.mysqltutorial.org/mysql-select-database/) – show you how to use the `USE` statement to set the current database.



- [CREATE DATABASE](https://www.mysqltutorial.org/mysql-create-database/) (https://www.mysqltutorial.org/mysql-create-database/) – show you step by step how to create a new database in MySQL Server.
- [DROP DATABASE](https://www.mysqltutorial.org/mysql-drop-database/) (https://www.mysqltutorial.org/mysql-drop-database/) – walk you through the steps of deleting a database from the database server.

Section 12. Working with tables

This section shows you how to manage the most important database objects in MySQL, including databases and tables.

- [MySQL storage engines](https://www.mysqltutorial.org/understand-mysql-table-types-innodb-mysam.aspx) (https://www.mysqltutorial.org/understand-mysql-table-types-innodb-mysam.aspx) – it is essential to understand the features of each storage engine so that you can use them effectively to maximize the performance of your databases.
- [CREATE TABLE](https://www.mysqltutorial.org/mysql-create-table/) (https://www.mysqltutorial.org/mysql-create-table/) – show you how to create new tables in a database using `CREATE TABLE` statement.
- [AUTO_INCREMENT](https://www.mysqltutorial.org/mysql-sequence/) (https://www.mysqltutorial.org/mysql-sequence/) – show you how to use an `AUTO_INCREMENT` column generate unique numbers automatically for the primary key.
- [ALTER TABLE](https://www.mysqltutorial.org/mysql-alter-table.aspx) (https://www.mysqltutorial.org/mysql-alter-table.aspx) – learn how to change the structure of a table using the `ALTER TABLE` statement.
- [Renaming tables](https://www.mysqltutorial.org/mysql-rename-table/) (https://www.mysqltutorial.org/mysql-rename-table/) – show you how to rename a table using `RENAME TABLE` statement.
- [Removing a column from a table](https://www.mysqltutorial.org/mysql-drop-column/) (https://www.mysqltutorial.org/mysql-drop-column/) – show you how to use the `ALTER TABLE DROP COLUMN` statement to remove one or more columns from a table.
- [Adding a new column to a table](https://www.mysqltutorial.org/mysql-add-column/) (https://www.mysqltutorial.org/mysql-add-column/) – show you how to add one or more columns to an existing table using `ALTER TABLE ADD COLUMN` statement.
- [DROP TABLE](https://www.mysqltutorial.org/mysql-drop-table/) (https://www.mysqltutorial.org/mysql-drop-table/) – show you how to remove existing tables using `DROP TABLE` statement.
- [Temporary tables](https://www.mysqltutorial.org/mysql-temporary-table/) (https://www.mysqltutorial.org/mysql-temporary-table/) – discuss MySQL temporary tables and show you how to manage temporary tables effectively.

- [TRUNCATE TABLE](https://www.mysqltutorial.org/mysql-truncate-table/) (https://www.mysqltutorial.org/mysql-truncate-table/) – show you how to delete all data from a table fast and more efficient using the `TRUNCATE TABLE` statement.
- [Generated columns](https://www.mysqltutorial.org/mysql-generated-columns/) (https://www.mysqltutorial.org/mysql-generated-columns/) – guide you on how to use the generated columns to store data computed from an expression or other columns.

Section 13. MySQL data types

- [MySQL data types](https://www.mysqltutorial.org/mysql-data-types.aspx) (https://www.mysqltutorial.org/mysql-data-types.aspx) – show you various data types in MySQL so that you can apply them effectively in designing database tables.
- [INT](https://www.mysqltutorial.org/mysql-int/) (https://www.mysqltutorial.org/mysql-int/) – show you how to use integer data type.
- [DECIMAL](https://www.mysqltutorial.org/mysql-decimal/) (https://www.mysqltutorial.org/mysql-decimal/) – show you how to use `DECIMAL` datatype to store exact values in decimal format.
- [BIT](https://www.mysqltutorial.org/mysql-bit/) (https://www.mysqltutorial.org/mysql-bit/) – introduce you `BIT` datatype and how to store bit values in MySQL.
- [BOOLEAN](https://www.mysqltutorial.org/mysql-boolean/) (https://www.mysqltutorial.org/mysql-boolean/) – explain to you how MySQL handles Boolean values by using `TINYINT(1)` internally.
- [CHAR](https://www.mysqltutorial.org/mysql-char-data-type/) (https://www.mysqltutorial.org/mysql-char-data-type/) – a guide to `CHAR` data type for storing the fixed-length string.
- [VARCHAR](https://www.mysqltutorial.org/mysql-varchar/) (https://www.mysqltutorial.org/mysql-varchar/) – give you the essential guide to `VARCHAR` datatype.
- [TEXT](https://www.mysqltutorial.org/mysql-text/) (https://www.mysqltutorial.org/mysql-text/) – show you how to store text data using `TEXT` datatype.
- [DATE](https://www.mysqltutorial.org/mysql-date/) (https://www.mysqltutorial.org/mysql-date/) – introduce you to the `DATE` datatype and show you some date functions to handle the date data effectively.
- [TIME](https://www.mysqltutorial.org/mysql-time/) (https://www.mysqltutorial.org/mysql-time/) – walk you through the features of `TIME` datatype and show you how to use some useful temporal functions to handle time data.



- **DATETIME** (<https://www.mysqltutorial.org/mysql-datetime/>) – introduce you to the **DATETIME** datatype and some useful functions to manipulate **DATETIME** values.
- **TIMESTAMP** (<https://www.mysqltutorial.org/mysql-timestamp.aspx>) – introduce you to **TIMESTAMP** and its features called automatic initialization and automatic update that allows you to define auto-initialized and auto-updated columns for a table.
- **JSON** (<https://www.mysqltutorial.org/mysql-json/>) – show you how to use JSON data type to store JSON documents.
- **ENUM** (<https://www.mysqltutorial.org/mysql-enum/>) – learn how to use **ENUM** datatype correctly to store enumeration values.

Section 14. MySQL constraints

- **NOT NULL** (<https://www.mysqltutorial.org/mysql-not-null-constraint/>) – introduce you to the **NOT NULL** constraint and show you how to declare a **NOT NULL** column or add a **NOT NULL** constraint to an existing column.
- **Primary key** (<https://www.mysqltutorial.org/mysql-primary-key/>) – guide you on how to use the primary key constraint to create the primary key for a table.
- **Foreign key** (<https://www.mysqltutorial.org/mysql-foreign-key/>) – introduce you to the foreign key and show you step by step how to create and drop foreign keys.
- **Disable foreign key checks** (<https://www.mysqltutorial.org/mysql-disable-foreign-key-checks/>) – learn how to disable foreign key checks.
- **UNIQUE constraint** (<https://www.mysqltutorial.org/mysql-unique-constraint/>) – show you how to use **UNIQUE** constraint to enforce the uniqueness of values in a column or a group of columns in a table.
- **CHECK constraint** (<https://www.mysqltutorial.org/mysql-check-constraint/>) – learn how to create **CHECK** constraints to ensure data integrity.
- **DEFAULT** (<https://www.mysqltutorial.org/mysql-basics/mysql-default/>) – show you how to set a default value for a column using the **DEFAULT** constraint.

- [CHECK constraint emulation](https://www.mysqltutorial.org/mysql-check-constraint-emulation/) (https://www.mysqltutorial.org/mysql-check-constraint-emulation/) – if you use MySQL 8.0.15 or earlier version, you can emulate `CHECK` constraints using views or triggers.

Section 15. MySQL globalization

- [Character Set](https://www.mysqltutorial.org/mysql-character-set/) (https://www.mysqltutorial.org/mysql-character-set/) – discuss character set and show you step by step how to perform various operations on character sets.
- [Collation](https://www.mysqltutorial.org/mysql-collation/) (https://www.mysqltutorial.org/mysql-collation/) – discuss collation and show you how to set character sets and collations for the MySQL server, database, tables, and columns.

Section 16. MySQL import & export CSV

- [Import CSV File Into MySQL Table](https://www.mysqltutorial.org/import-csv-file-mysql-table/) (https://www.mysqltutorial.org/import-csv-file-mysql-table/) – show you how to use `LOAD DATA INFILE` statement to import CSV file into a MySQL table.
- [Export MySQL Table to CSV](https://www.mysqltutorial.org/mysql-export-table-to-csv/) (https://www.mysqltutorial.org/mysql-export-table-to-csv/) – learn various techniques of how to export MySQL table to a CSV file format.

Section 17. Advanced techniques

- [Natural sorting](https://www.mysqltutorial.org/mysql-natural-sorting/) (https://www.mysqltutorial.org/mysql-natural-sorting/) – walk you through various natural sorting techniques in MySQL using the `ORDER BY` clause.