What is RDBMS?

RDBMS stands for **R**elational **D**atabase **M**anagement **S**ystem. RDBMS is the basis for SQL, and for all modern database systems like MS SQL Server, IBM DB2, Oracle, MySQL, and Microsoft Access.

A Relational database management system (RDBMS) is a database management system (DBMS) that is based on the relational model as introduced by E. F. Codd.

What is a table?

The data in an RDBMS is stored in database objects which are called as **tables**. This table is basically a collection of related data entries and it consists of numerous columns and rows.

Remember, a table is the most common and simplest form of data storage in a relational database. The following program is an example of a CUSTOMERS table −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

What is a field?

Every table is broken up into smaller entities called fields. The fields in the CUSTOMERS table consist of ID, NAME, AGE, ADDRESS and SALARY.

A field is a column in a table that is designed to maintain specific information about every record in the table.

What is a Record or a Row?

A record is also called as a row of data is each individual entry that exists in a table. For example, there are 7 records in the above CUSTOMERS table. Following is a single row of data or record in the CUSTOMERS table −

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

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

A record is a horizontal entity in a table.

What is a column?

A column is a vertical entity in a table that contains all information associated with a specific field in a table.

For example, a column in the CUSTOMERS table is ADDRESS, which represents location description and would be as shown below −

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

| ADDRESS |

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

| Ahmedabad |

| Delhi |

| Kota |

| Mumbai |

| Bhopal |

| MP |

| Indore |

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

What is a NULL value?

A NULL value in a table is a value in a field that appears to be blank, which means a field with a NULL value is a field with no value.

It is very important to understand that a NULL value is different than a zero value or a field that contains spaces. A field with a NULL value is the one that has been left blank during a record creation.

SQL Constraints

Constraints are the rules enforced on data columns on a table. These are used to limit the type of data that can go into a table. This ensures the accuracy and reliability of the data in the database.

Constraints can either be column level or table level. Column level constraints are applied only to one column whereas, table level constraints are applied to the entire table.

Following are some of the most commonly used constraints available in SQL −

* [NOT NULL Constraint](https://www.tutorialspoint.com/sql/sql-not-null.htm) − Ensures that a column cannot have a NULL value.
* [DEFAULT Constraint](https://www.tutorialspoint.com/sql/sql-default.htm) − Provides a default value for a column when none is specified.
* [UNIQUE Constraint](https://www.tutorialspoint.com/sql/sql-unique.htm) − Ensures that all the values in a column are different.
* [PRIMARY Key](https://www.tutorialspoint.com/sql/sql-primary-key.htm) − Uniquely identifies each row/record in a database table.
* [FOREIGN Key](https://www.tutorialspoint.com/sql/sql-foreign-key.htm) − Uniquely identifies a row/record in any another database table.
* [CHECK Constraint](https://www.tutorialspoint.com/sql/sql-check.htm) − The CHECK constraint ensures that all values in a column satisfy certain conditions.
* [INDEX](https://www.tutorialspoint.com/sql/sql-index.htm) − Used to create and retrieve data from the database very quickly.

There are many popular RDBMS available to work with. This tutorial gives a brief overview of some of the most popular RDBMS’s. This would help you to compare their basic features.

MySQL

MySQL is an open source SQL database, which is developed by a Swedish company – MySQL AB. MySQL is pronounced as "my ess-que-ell," in contrast with SQL, pronounced "sequel."

MySQL is supporting many different platforms including Microsoft Windows, the major Linux distributions, UNIX, and Mac OS X.

MySQL has free and paid versions, depending on its usage (non-commercial/commercial) and features. MySQL comes with a very fast, multi-threaded, multi-user and robust SQL database server.

History

* Development of MySQL by Michael Widenius & David Axmark beginning in 1994.
* First internal release on 23rd May 1995.
* Windows Version was released on the 8th January 1998 for Windows 95 and NT.
* Version 3.23: beta from June 2000, production release January 2001.
* Version 4.0: beta from August 2002, production release March 2003 (unions).
* Version 4.01: beta from August 2003, Jyoti adopts MySQL for database tracking.
* Version 4.1: beta from June 2004, production release October 2004.
* Version 5.0: beta from March 2005, production release October 2005.
* Sun Microsystems acquired MySQL AB on the 26th February 2008.
* Version 5.1: production release 27th November 2008.

Features

* High Performance.
* High Availability.
* Scalability and Flexibility Run anything.
* Robust Transactional Support.
* Web and Data Warehouse Strengths.
* Strong Data Protection.
* Comprehensive Application Development.
* Management Ease.
* Open Source Freedom and 24 x 7 Support.
* Lowest Total Cost of Ownership.

MS SQL Server

MS SQL Server is a Relational Database Management System developed by Microsoft Inc. Its primary query languages are −

* T-SQL
* ANSI SQL

History

* 1987 - Sybase releases SQL Server for UNIX.
* 1988 - Microsoft, Sybase, and Aston-Tate port SQL Server to OS/2.
* 1989 - Microsoft, Sybase, and Aston-Tate release SQL Server 1.0 for OS/2.
* 1990 - SQL Server 1.1 is released with support for Windows 3.0 clients.
* Aston - Tate drops out of SQL Server development.
* 2000 - Microsoft releases SQL Server 2000.
* 2001 - Microsoft releases XML for SQL Server Web Release 1 (download).
* 2002 - Microsoft releases SQLXML 2.0 (renamed from XML for SQL Server).
* 2002 - Microsoft releases SQLXML 3.0.
* 2005 - Microsoft releases SQL Server 2005 on November 7th, 2005.

Features

* High Performance
* High Availability
* Database mirroring
* Database snapshots
* CLR integration
* Service Broker
* DDL triggers
* Ranking functions
* Row version-based isolation levels
* XML integration
* TRY...CATCH
* Database Mail

ORACLE

It is a very large multi-user based database management system. Oracle is a relational database management system developed by 'Oracle Corporation'.

Oracle works to efficiently manage its resources, a database of information among the multiple clients requesting and sending data in the network.

It is an excellent database server choice for client/server computing. Oracle supports all major operating systems for both clients and servers, including MSDOS, NetWare, UnixWare, OS/2 and most UNIX flavors.

History

Oracle began in 1977 and celebrating its 32 wonderful years in the industry (from 1977 to 2009).

* 1977 - Larry Ellison, Bob Miner and Ed Oates founded Software Development Laboratories to undertake development work.
* 1979 - Version 2.0 of Oracle was released and it became first commercial relational database and first SQL database. The company changed its name to Relational Software Inc. (RSI).
* 1981 - RSI started developing tools for Oracle.
* 1982 - RSI was renamed to Oracle Corporation.
* 1983 - Oracle released version 3.0, rewritten in C language and ran on multiple platforms.
* 1984 - Oracle version 4.0 was released. It contained features like concurrency control - multi-version read consistency, etc.
* 1985 - Oracle version 4.0 was released. It contained features like concurrency control - multi-version read consistency, etc.
* 2007 - Oracle released Oracle11g. The new version focused on better partitioning, easy migration, etc.

Features

* Concurrency
* Read Consistency
* Locking Mechanisms
* Quiesce Database
* Portability
* Self-managing database
* SQL\*Plus
* ASM
* Scheduler
* Resource Manager
* Data Warehousing
* Materialized views
* Bitmap indexes
* Table compression
* Parallel Execution
* Analytic SQL
* Data mining
* Partitioning

MS ACCESS

This is one of the most popular Microsoft products. Microsoft Access is an entry-level database management software. MS Access database is not only inexpensive but also a powerful database for small-scale projects.

MS Access uses the Jet database engine, which utilizes a specific SQL language dialect (sometimes referred to as Jet SQL).

MS Access comes with the professional edition of MS Office package. MS Access has easyto-use intuitive graphical interface.

* 1992 - Access version 1.0 was released.
* 1993 - Access 1.1 released to improve compatibility with inclusion the Access Basic programming language.
* The most significant transition was from Access 97 to Access 2000.
* 2007 - Access 2007, a new database format was introduced ACCDB which supports complex data types such as multi valued and attachment fields.

Features

* Users can create tables, queries, forms and reports and connect them together with macros.
* Option of importing and exporting the data to many formats including Excel, Outlook, ASCII, dBase, Paradox, FoxPro, SQL Server, Oracle, ODBC, etc.
* There is also the Jet Database format (MDB or ACCDB in Access 2007), which can contain the application and data in one file. This makes it very convenient to distribute the entire application to another user, who can run it in disconnected environments.
* Microsoft Access offers parameterized queries. These queries and Access tables can be referenced from other programs like VB6 and .NET through DAO or ADO.
* The desktop editions of Microsoft SQL Server can be used with Access as an alternative to the Jet Database Engine.
* Microsoft Access is a file server-based database. Unlike the client-server relational database management systems (RDBMS), Microsoft Access does not implement database triggers, stored procedures or transaction logging.

SQL is followed by a unique set of rules and guidelines called Syntax. This tutorial gives you a quick start with SQL by listing all the basic SQL Syntax.

All the SQL statements start with any of the keywords like SELECT, INSERT, UPDATE, DELETE, ALTER, DROP, CREATE, USE, SHOW and all the statements end with a semicolon (;).

The most important point to be noted here is that SQL is case insensitive, which means SELECT and select have same meaning in SQL statements. Whereas, MySQL makes difference in table names. So, if you are working with MySQL, then you need to give table names as they exist in the database.

Various Syntax in SQL

All the examples given in this tutorial have been tested with a MySQL server.

SQL SELECT Statement

SELECT column1, column2....columnN

FROM table\_name;

SQL DISTINCT Clause

SELECT DISTINCT column1, column2....columnN

FROM table\_name;

SQL WHERE Clause

SELECT column1, column2....columnN

FROM table\_name

WHERE CONDITION;

SQL AND/OR Clause

SELECT column1, column2....columnN

FROM table\_name

WHERE CONDITION-1 {AND|OR} CONDITION-2;

SQL IN Clause

SELECT column1, column2....columnN

FROM table\_name

WHERE column\_name IN (val-1, val-2,...val-N);

SQL BETWEEN Clause

SELECT column1, column2....columnN

FROM table\_name

WHERE column\_name BETWEEN val-1 AND val-2;

SQL LIKE Clause

SELECT column1, column2....columnN

FROM table\_name

WHERE column\_name LIKE { PATTERN };

SQL ORDER BY Clause

SELECT column1, column2....columnN

FROM table\_name

WHERE CONDITION

ORDER BY column\_name {ASC|DESC};

SQL GROUP BY Clause

SELECT SUM(column\_name)

FROM table\_name

WHERE CONDITION

GROUP BY column\_name;

SQL COUNT Clause

SELECT COUNT(column\_name)

FROM table\_name

WHERE CONDITION;

SQL HAVING Clause

SELECT SUM(column\_name)

FROM table\_name

WHERE CONDITION

GROUP BY column\_name

HAVING (arithematic function condition);

SQL CREATE TABLE Statement

CREATE TABLE table\_name(

column1 datatype,

column2 datatype,

column3 datatype,

.....

columnN datatype,

PRIMARY KEY( one or more columns )

);

SQL DROP TABLE Statement

DROP TABLE table\_name;

SQL CREATE INDEX Statement

CREATE UNIQUE INDEX index\_name

ON table\_name ( column1, column2,...columnN);

SQL DROP INDEX Statement

ALTER TABLE table\_name

DROP INDEX index\_name;

SQL DESC Statement

DESC table\_name;

SQL TRUNCATE TABLE Statement

TRUNCATE TABLE table\_name;

SQL ALTER TABLE Statement

ALTER TABLE table\_name {ADD|DROP|MODIFY} column\_name {data\_ype};

SQL ALTER TABLE Statement (Rename)

ALTER TABLE table\_name RENAME TO new\_table\_name;

SQL INSERT INTO Statement

INSERT INTO table\_name( column1, column2....columnN)

VALUES ( value1, value2....valueN);

SQL UPDATE Statement

UPDATE table\_name

SET column1 = value1, column2 = value2....columnN=valueN

[ WHERE CONDITION ];

SQL DELETE Statement

DELETE FROM table\_name

WHERE {CONDITION};

SQL CREATE DATABASE Statement

CREATE DATABASE database\_name;

SQL DROP DATABASE Statement

DROP DATABASE database\_name;

SQL USE Statement

USE database\_name;

SQL COMMIT Statement

COMMIT;

SQL ROLLBACK Statement

ROLLBACK;

SQL Data Type is an attribute that specifies the type of data of any object. Each column, variable and expression has a related data type in SQL. You can use these data types while creating your tables. You can choose a data type for a table column based on your requirement.

SQL Server offers six categories of data types for your use which are listed below −

Exact Numeric Data Types

|  |  |  |
| --- | --- | --- |
| **DATA TYPE** | **FROM** | **TO** |
| bigint | -9,223,372,036,854,775,808 | 9,223,372,036,854,775,807 |
| int | -2,147,483,648 | 2,147,483,647 |
| smallint | -32,768 | 32,767 |
| tinyint | 0 | 255 |
| bit | 0 | 1 |
| decimal | -10^38 +1 | 10^38 -1 |
| numeric | -10^38 +1 | 10^38 -1 |
| money | -922,337,203,685,477.5808 | +922,337,203,685,477.5807 |
| smallmoney | -214,748.3648 | +214,748.3647 |

Approximate Numeric Data Types

|  |  |  |
| --- | --- | --- |
| **DATA TYPE** | **FROM** | **TO** |
| float | -1.79E + 308 | 1.79E + 308 |
| real | -3.40E + 38 | 3.40E + 38 |

Date and Time Data Types

|  |  |  |
| --- | --- | --- |
| **DATA TYPE** | **FROM** | **TO** |
| datetime | Jan 1, 1753 | Dec 31, 9999 |
| smalldatetime | Jan 1, 1900 | Jun 6, 2079 |
| date | Stores a date like June 30, 1991 | |
| time | Stores a time of day like 12:30 P.M. | |

**Note** − Here, datetime has 3.33 milliseconds accuracy where as smalldatetime has 1 minute accuracy.

Character Strings Data Types

|  |  |
| --- | --- |
| **Sr.No.** | **DATA TYPE & Description** |
| 1 | **char**  Maximum length of 8,000 characters.( Fixed length non-Unicode characters) |
| 2 | **varchar**  Maximum of 8,000 characters.(Variable-length non-Unicode data). |
| 3 | **varchar(max)**  Maximum length of 231characters, Variable-length non-Unicode data (SQL Server 2005 only). |
| 4 | **text**  Variable-length non-Unicode data with a maximum length of 2,147,483,647 characters. |

Unicode Character Strings Data Types

|  |  |
| --- | --- |
| **Sr.No.** | **DATA TYPE & Description** |
| 1 | **nchar**  Maximum length of 4,000 characters.( Fixed length Unicode) |
| 2 | **nvarchar**  Maximum length of 4,000 characters.(Variable length Unicode) |
| 3 | **nvarchar(max)**  Maximum length of 231characters (SQL Server 2005 only).( Variable length Unicode) |
| 4 | **ntext**  Maximum length of 1,073,741,823 characters. ( Variable length Unicode ) |

Binary Data Types

|  |  |
| --- | --- |
| **Sr.No.** | **DATA TYPE & Description** |
| 1 | **binary**  Maximum length of 8,000 bytes(Fixed-length binary data ) |
| 2 | **varbinary**  Maximum length of 8,000 bytes.(Variable length binary data) |
| 3 | **varbinary(max)**  Maximum length of 231 bytes (SQL Server 2005 only). ( Variable length Binary data) |
| 4 | **image**  Maximum length of 2,147,483,647 bytes. ( Variable length Binary Data) |

Misc Data Types

|  |  |
| --- | --- |
| **Sr.No.** | **DATA TYPE & Description** |
| 1 | **sql\_variant**  Stores values of various SQL Server-supported data types, except text, ntext, and timestamp. |
| 2 | **timestamp**  Stores a database-wide unique number that gets updated every time a row gets updated |
| 3 | **uniqueidentifier**  Stores a globally unique identifier (GUID) |
| 4 | **xml**  Stores XML data. You can store xml instances in a column or a variable (SQL Server 2005 only). |
| 5 | **cursor**  Reference to a cursor object |
| 6 | **table**  Stores a result set for later processing |

What is an Operator in SQL?

An operator is a reserved word or a character used primarily in an SQL statement's WHERE clause to perform operation(s), such as comparisons and arithmetic operations. These Operators are used to specify conditions in an SQL statement and to serve as conjunctions for multiple conditions in a statement.

* Arithmetic operators
* Comparison operators
* Logical operators
* Operators used to negate conditions

SQL Arithmetic Operators

Assume **'variable a'** holds 10 and **'variable b'** holds 20, then −

[Show Examples](https://www.tutorialspoint.com/sql/sql-arithmetic-operators.htm)

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| + (Addition) | Adds values on either side of the operator. | a + b will give 30 |
| - (Subtraction) | Subtracts right hand operand from left hand operand. | a - b will give -10 |
| \* (Multiplication) | Multiplies values on either side of the operator. | a \* b will give 200 |
| / (Division) | Divides left hand operand by right hand operand. | b / a will give 2 |
| % (Modulus) | Divides left hand operand by right hand operand and returns remainder. | b % a will give 0 |

SQL Comparison Operators

Assume **'variable a'** holds 10 and **'variable b'** holds 20, then −

[Show Examples](https://www.tutorialspoint.com/sql/sql-comparison-operators.htm)

|  |  |  |
| --- | --- | --- |
| **Operator** | **Description** | **Example** |
| = | Checks if the values of two operands are equal or not, if yes then condition becomes true. | (a = b) is not true. |
| != | Checks if the values of two operands are equal or not, if values are not equal then condition becomes true. | (a != b) is true. |
| <> | Checks if the values of two operands are equal or not, if values are not equal then condition becomes true. | (a <> b) is true. |
| > | Checks if the value of left operand is greater than the value of right operand, if yes then condition becomes true. | (a > b) is not true. |
| < | Checks if the value of left operand is less than the value of right operand, if yes then condition becomes true. | (a < b) is true. |
| >= | Checks if the value of left operand is greater than or equal to the value of right operand, if yes then condition becomes true. | (a >= b) is not true. |
| <= | Checks if the value of left operand is less than or equal to the value of right operand, if yes then condition becomes true. | (a <= b) is true. |
| !< | Checks if the value of left operand is not less than the value of right operand, if yes then condition becomes true. | (a !< b) is false. |
| !> | Checks if the value of left operand is not greater than the value of right operand, if yes then condition becomes true. | (a !> b) is true. |

SQL Logical Operators

Here is a list of all the logical operators available in SQL.

[Show Examples](https://www.tutorialspoint.com/sql/sql-logical-operators.htm)

|  |  |
| --- | --- |
| **Sr.No.** | **Operator & Description** |
| 1 | **ALL**  The ALL operator is used to compare a value to all values in another value set. |
| 2 | **AND**  The AND operator allows the existence of multiple conditions in an SQL statement's WHERE clause. |
| 3 | **ANY**  The ANY operator is used to compare a value to any applicable value in the list as per the condition. |
| 4 | **BETWEEN**  The BETWEEN operator is used to search for values that are within a set of values, given the minimum value and the maximum value. |
| 5 | **EXISTS**  The EXISTS operator is used to search for the presence of a row in a specified table that meets a certain criterion. |
| 6 | **IN**  The IN operator is used to compare a value to a list of literal values that have been specified. |
| 7 | **LIKE**  The LIKE operator is used to compare a value to similar values using wildcard operators. |
| 8 | **NOT**  The NOT operator reverses the meaning of the logical operator with which it is used. Eg: NOT EXISTS, NOT BETWEEN, NOT IN, etc. **This is a negate operator.** |
| 9 | **OR**  The OR operator is used to combine multiple conditions in an SQL statement's WHERE clause. |
| 10 | **IS NULL**  The NULL operator is used to compare a value with a NULL value. |
| 11 | **UNIQUE**  The UNIQUE operator searches every row of a specified table for uniqueness (no duplicates). |

An expression is a combination of one or more values, operators and SQL functions that evaluate to a value. These SQL EXPRESSIONs are like formulae and they are written in query language. You can also use them to query the database for a specific set of data.

Syntax

Consider the basic syntax of the SELECT statement as follows −

SELECT column1, column2, columnN

FROM table\_name

WHERE [CONDITION|EXPRESSION];

There are different types of SQL expressions, which are mentioned below −

* Boolean
* Numeric
* Date

Let us now discuss each of these in detail.

Boolean Expressions

SQL Boolean Expressions fetch the data based on matching a single value. Following is the syntax −

SELECT column1, column2, columnN

FROM table\_name

WHERE SINGLE VALUE MATCHING EXPRESSION;

Consider the CUSTOMERS table having the following records −

SQL> SELECT \* FROM CUSTOMERS;

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

7 rows in set (0.00 sec)

The following table is a simple example showing the usage of various SQL Boolean Expressions −

SQL> SELECT \* FROM CUSTOMERS WHERE SALARY = 10000;

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 7 | Muffy | 24 | Indore | 10000.00 |

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

1 row in set (0.00 sec)

Numeric Expression

These expressions are used to perform any mathematical operation in any query. Following is the syntax −

SELECT numerical\_expression as OPERATION\_NAME

[FROM table\_name

WHERE CONDITION] ;

Here, the numerical\_expression is used for a mathematical expression or any formula. Following is a simple example showing the usage of SQL Numeric Expressions −

SQL> SELECT (15 + 6) AS ADDITION

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

| ADDITION |

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

| 21 |

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

1 row in set (0.00 sec)

There are several built-in functions like avg(), sum(), count(), etc., to perform what is known as the aggregate data calculations against a table or a specific table column.

SQL> SELECT COUNT(\*) AS "RECORDS" FROM CUSTOMERS;

+---------+

| RECORDS |

+---------+

| 7 |

+---------+

1 row in set (0.00 sec)

Date Expressions

Date Expressions return current system date and time values −

SQL> SELECT CURRENT\_TIMESTAMP;

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

| Current\_Timestamp |

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

| 2009-11-12 06:40:23 |

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

1 row in set (0.00 sec)

Another date expression is as shown below −

SQL> SELECT GETDATE();;

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

| GETDATE |

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

| 2009-10-22 12:07:18.140 |

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

1 row in set (0.00 sec)

The SQL **CREATE DATABASE** statement is used to create a new SQL database.

Syntax

The basic syntax of this CREATE DATABASE statement is as follows −

CREATE DATABASE DatabaseName;

Always the database name should be unique within the RDBMS.

Example

If you want to create a new database <testDB>, then the CREATE DATABASE statement would be as shown below −

SQL> CREATE DATABASE testDB;

Make sure you have the admin privilege before creating any database. Once a database is created, you can check it in the list of databases as follows −

SQL> SHOW DATABASES;

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

| Database |

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

| information\_schema |

| AMROOD |

| TUTORIALSPOINT |

| mysql |

| orig |

| test |

| testDB |

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

7 rows in set (0.00 sec)

The SQL **DROP DATABASE** statement is used to drop an existing database in SQL schema.

Syntax

The basic syntax of DROP DATABASE statement is as follows −

DROP DATABASE DatabaseName;

Always the database name should be unique within the RDBMS.

Example

If you want to delete an existing database <testDB>, then the DROP DATABASE statement would be as shown below −

SQL> DROP DATABASE testDB;

**NOTE** − Be careful before using this operation because by deleting an existing database would result in loss of complete information stored in the database.

Make sure you have the admin privilege before dropping any database. Once a database is dropped, you can check it in the list of the databases as shown below −

SQL> SHOW DATABASES;

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

| Database |

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

| information\_schema |

| AMROOD |

| TUTORIALSPOINT |

| mysql |

| orig |

| test |

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

6 rows in set (0.00 sec)

When you have multiple databases in your SQL Schema, then before starting your operation, you would need to select a database where all the operations would be performed.

The SQL **USE** statement is used to select any existing database in the SQL schema.

Syntax

The basic syntax of the USE statement is as shown below −

USE DatabaseName;

Always the database name should be unique within the RDBMS.

Example

You can check the available databases as shown below −

SQL> SHOW DATABASES;

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

| Database |

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

| information\_schema |

| AMROOD |

| TUTORIALSPOINT |

| mysql |

| orig |

| test |

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

6 rows in set (0.00 sec)

Now, if you want to work with the AMROOD database, then you can execute the following SQL command and start working with the AMROOD database.

SQL> USE AMROOD;

Creating a basic table involves naming the table and defining its columns and each column's data type.

The SQL **CREATE TABLE** statement is used to create a new table.

Syntax

The basic syntax of the CREATE TABLE statement is as follows −

CREATE TABLE table\_name(

column1 datatype,

column2 datatype,

column3 datatype,

.....

columnN datatype,

PRIMARY KEY( one or more columns )

);

CREATE TABLE is the keyword telling the database system what you want to do. In this case, you want to create a new table. The unique name or identifier for the table follows the CREATE TABLE statement.

Then in brackets comes the list defining each column in the table and what sort of data type it is. The syntax becomes clearer with the following example.

A copy of an existing table can be created using a combination of the CREATE TABLE statement and the SELECT statement. You can check the complete details at [Create Table Using another Table.](https://www.tutorialspoint.com/sql/sql-create-table-using-tables.htm)

Example

The following code block is an example, which creates a CUSTOMERS table with an ID as a primary key and NOT NULL are the constraints showing that these fields cannot be NULL while creating records in this table −

SQL> CREATE TABLE CUSTOMERS(

ID INT NOT NULL,

NAME VARCHAR (20) NOT NULL,

AGE INT NOT NULL,

ADDRESS CHAR (25) ,

SALARY DECIMAL (18, 2),

PRIMARY KEY (ID)

);

You can verify if your table has been created successfully by looking at the message displayed by the SQL server, otherwise you can use the **DESC**command as follows −

SQL> DESC CUSTOMERS;

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

| Field | Type | Null | Key | Default | Extra |

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

| ID | int(11) | NO | PRI | | |

| NAME | varchar(20) | NO | | | |

| AGE | int(11) | NO | | | |

| ADDRESS | char(25) | YES | | NULL | |

| SALARY | decimal(18,2) | YES | | NULL | |

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

5 rows in set (0.00 sec)

Now, you have CUSTOMERS table available in your database which you can use to store the required information related to customers.

The SQL **DROP TABLE** statement is used to remove a table definition and all the data, indexes, triggers, constraints and permission specifications for that table.

**NOTE** − You should be very careful while using this command because once a table is deleted then all the information available in that table will also be lost forever.

Syntax

The basic syntax of this DROP TABLE statement is as follows −

DROP TABLE table\_name;

Example

Let us first verify the CUSTOMERS table and then we will delete it from the database as shown below −

SQL> DESC CUSTOMERS;

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

| Field | Type | Null | Key | Default | Extra |

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

| ID | int(11) | NO | PRI | | |

| NAME | varchar(20) | NO | | | |

| AGE | int(11) | NO | | | |

| ADDRESS | char(25) | YES | | NULL | |

| SALARY | decimal(18,2) | YES | | NULL | |

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

5 rows in set (0.00 sec)

This means that the CUSTOMERS table is available in the database, so let us now drop it as shown below.

SQL> DROP TABLE CUSTOMERS;

Query OK, 0 rows affected (0.01 sec)

Now, if you would try the DESC command, then you will get the following error −

SQL> DESC CUSTOMERS;

ERROR 1146 (42S02): Table 'TEST.CUSTOMERS' doesn't exist

Here, TEST is the database name which we are using for our examples.

The SQL **INSERT INTO** Statement is used to add new rows of data to a table in the database.

Syntax

There are two basic syntaxes of the INSERT INTO statement which are shown below.

INSERT INTO TABLE\_NAME (column1, column2, column3,...columnN)

VALUES (value1, value2, value3,...valueN);

Here, column1, column2, column3,...columnN are the names of the columns in the table into which you want to insert the data.

You may not need to specify the column(s) name in the SQL query if you are adding values for all the columns of the table. But make sure the order of the values is in the same order as the columns in the table.

The **SQL INSERT INTO** syntax will be as follows −

INSERT INTO TABLE\_NAME VALUES (value1,value2,value3,...valueN);

Example

The following statements would create six records in the CUSTOMERS table.

INSERT INTO CUSTOMERS (ID,NAME,AGE,ADDRESS,SALARY)

VALUES (1, 'Ramesh', 32, 'Ahmedabad', 2000.00 );

INSERT INTO CUSTOMERS (ID,NAME,AGE,ADDRESS,SALARY)

VALUES (2, 'Khilan', 25, 'Delhi', 1500.00 );

INSERT INTO CUSTOMERS (ID,NAME,AGE,ADDRESS,SALARY)

VALUES (3, 'kaushik', 23, 'Kota', 2000.00 );

INSERT INTO CUSTOMERS (ID,NAME,AGE,ADDRESS,SALARY)

VALUES (4, 'Chaitali', 25, 'Mumbai', 6500.00 );

INSERT INTO CUSTOMERS (ID,NAME,AGE,ADDRESS,SALARY)

VALUES (5, 'Hardik', 27, 'Bhopal', 8500.00 );

INSERT INTO CUSTOMERS (ID,NAME,AGE,ADDRESS,SALARY)

VALUES (6, 'Komal', 22, 'MP', 4500.00 );

You can create a record in the CUSTOMERS table by using the second syntax as shown below.

INSERT INTO CUSTOMERS

VALUES (7, 'Muffy', 24, 'Indore', 10000.00 );

All the above statements would produce the following records in the CUSTOMERS table as shown below.

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

Populate one table using another table

You can populate the data into a table through the select statement over another table; provided the other table has a set of fields, which are required to populate the first table.

Here is the syntax −

INSERT INTO first\_table\_name [(column1, column2, ... columnN)]

SELECT column1, column2, ...columnN

FROM second\_table\_name

[WHERE condition];

The SQL **SELECT** statement is used to fetch the data from a database table which returns this data in the form of a result table. These result tables are called result-sets.

Syntax

The basic syntax of the SELECT statement is as follows −

SELECT column1, column2, columnN FROM table\_name;

Here, column1, column2... are the fields of a table whose values you want to fetch. If you want to fetch all the fields available in the field, then you can use the following syntax.

SELECT \* FROM table\_name;

Example

Consider the CUSTOMERS table having the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

The following code is an example, which would fetch the ID, Name and Salary fields of the customers available in CUSTOMERS table.

SQL> SELECT ID, NAME, SALARY FROM CUSTOMERS;

This would produce the following result −

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

| ID | NAME | SALARY |

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

| 1 | Ramesh | 2000.00 |

| 2 | Khilan | 1500.00 |

| 3 | kaushik | 2000.00 |

| 4 | Chaitali | 6500.00 |

| 5 | Hardik | 8500.00 |

| 6 | Komal | 4500.00 |

| 7 | Muffy | 10000.00 |

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

If you want to fetch all the fields of the CUSTOMERS table, then you should use the following query.

SQL> SELECT \* FROM CUSTOMERS;

This would produce the result as shown below.

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

The SQL **WHERE** clause is used to specify a condition while fetching the data from a single table or by joining with multiple tables. If the given condition is satisfied, then only it returns a specific value from the table. You should use the WHERE clause to filter the records and fetching only the necessary records.

The WHERE clause is not only used in the SELECT statement, but it is also used in the UPDATE, DELETE statement, etc., which we would examine in the subsequent chapters.

Syntax

The basic syntax of the SELECT statement with the WHERE clause is as shown below.

SELECT column1, column2, columnN

FROM table\_name

WHERE [condition]

You can specify a condition using the [comparison or logical operators](https://www.tutorialspoint.com/sql/sql-operators.htm) like >, <, =, **LIKE, NOT**, etc. The following examples would make this concept clear.

Example

Consider the CUSTOMERS table having the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

The following code is an example which would fetch the ID, Name and Salary fields from the CUSTOMERS table, where the salary is greater than 2000 −

SQL> SELECT ID, NAME, SALARY

FROM CUSTOMERS

WHERE SALARY > 2000;

This would produce the following result −

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

| ID | NAME | SALARY |

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

| 4 | Chaitali | 6500.00 |

| 5 | Hardik | 8500.00 |

| 6 | Komal | 4500.00 |

| 7 | Muffy | 10000.00 |

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

The following query is an example, which would fetch the ID, Name and Salary fields from the CUSTOMERS table for a customer with the name **Hardik**.

Here, it is important to note that all the strings should be given inside single quotes (''). Whereas, numeric values should be given without any quote as in the above example.

SQL> SELECT ID, NAME, SALARY

FROM CUSTOMERS

WHERE NAME = 'Hardik';

This would produce the following result −

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

| ID | NAME | SALARY |

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

| 5 | Hardik | 8500.00 |

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

The SQL **AND** & **OR** operators are used to combine multiple conditions to narrow data in an SQL statement. These two operators are called as the conjunctive operators.

These operators provide a means to make multiple comparisons with different operators in the same SQL statement.

The AND Operator

The **AND** operator allows the existence of multiple conditions in an SQL statement's WHERE clause.

Syntax

The basic syntax of the AND operator with a WHERE clause is as follows −

SELECT column1, column2, columnN

FROM table\_name

WHERE [condition1] AND [condition2]...AND [conditionN];

You can combine N number of conditions using the AND operator. For an action to be taken by the SQL statement, whether it be a transaction or a query, all conditions separated by the AND must be TRUE.

Example

Consider the CUSTOMERS table having the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

Following is an example, which would fetch the ID, Name and Salary fields from the CUSTOMERS table, where the salary is greater than 2000 and the age is less than 25 years −

SQL> SELECT ID, NAME, SALARY

FROM CUSTOMERS

WHERE SALARY > 2000 AND age < 25;

This would produce the following result −

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

| ID | NAME | SALARY |

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

| 6 | Komal | 4500.00 |

| 7 | Muffy | 10000.00 |

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

The OR Operator

The OR operator is used to combine multiple conditions in an SQL statement's WHERE clause.

Syntax

The basic syntax of the OR operator with a WHERE clause is as follows −

SELECT column1, column2, columnN

FROM table\_name

WHERE [condition1] OR [condition2]...OR [conditionN]

You can combine N number of conditions using the OR operator. For an action to be taken by the SQL statement, whether it be a transaction or query, the only any ONE of the conditions separated by the OR must be TRUE.

Example

Consider the CUSTOMERS table having the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

The following code block hasa query, which would fetch the ID, Name and Salary fields from the CUSTOMERS table, where the salary is greater than 2000 and the age is less than 25 years.

SQL> SELECT ID, NAME, SALARY

FROM CUSTOMERS

WHERE SALARY > 2000 OR age < 25;

This would produce the following result −

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

| ID | NAME | SALARY |

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

| 3 | kaushik | 2000.00 |

| 4 | Chaitali | 6500.00 |

| 5 | Hardik | 8500.00 |

| 6 | Komal | 4500.00 |

| 7 | Muffy | 10000.00 |

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

The SQL **UPDATE** Query is used to modify the existing records in a table. You can use the WHERE clause with the UPDATE query to update the selected rows, otherwise all the rows would be affected.

Syntax

The basic syntax of the UPDATE query with a WHERE clause is as follows −

UPDATE table\_name

SET column1 = value1, column2 = value2...., columnN = valueN

WHERE [condition];

You can combine N number of conditions using the AND or the OR operators.

Example

Consider the CUSTOMERS table having the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

The following query will update the ADDRESS for a customer whose ID number is 6 in the table.

SQL> UPDATE CUSTOMERS

SET ADDRESS = 'Pune'

WHERE ID = 6;

Now, the CUSTOMERS table would have the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | Pune | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

If you want to modify all the ADDRESS and the SALARY column values in the CUSTOMERS table, you do not need to use the WHERE clause as the UPDATE query would be enough as shown in the following code block.

SQL> UPDATE CUSTOMERS

SET ADDRESS = 'Pune', SALARY = 1000.00;

Now, CUSTOMERS table would have the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Pune | 1000.00 |

| 2 | Khilan | 25 | Pune | 1000.00 |

| 3 | kaushik | 23 | Pune | 1000.00 |

| 4 | Chaitali | 25 | Pune | 1000.00 |

| 5 | Hardik | 27 | Pune | 1000.00 |

| 6 | Komal | 22 | Pune | 1000.00 |

| 7 | Muffy | 24 | Pune | 1000.00 |

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

The SQL DELETE Query is used to delete the existing records from a table.

You can use the WHERE clause with a DELETE query to delete the selected rows, otherwise all the records would be deleted.

Syntax

The basic syntax of the DELETE query with the WHERE clause is as follows −

DELETE FROM table\_name

WHERE [condition];

You can combine N number of conditions using AND or OR operators.

Example

Consider the CUSTOMERS table having the following records −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

The following code has a query, which will DELETE a customer, whose ID is 6.

SQL> DELETE FROM CUSTOMERS

WHERE ID = 6;

Now, the CUSTOMERS table would have the following records.

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

If you want to DELETE all the records from the CUSTOMERS table, you do not need to use the WHERE clause and the DELETE query would be as follows −

SQL> DELETE FROM CUSTOMERS;

Now, the CUSTOMERS table would not have any record.

The SQL **LIKE** clause is used to compare a value to similar values using wildcard operators. There are two wildcards used in conjunction with the LIKE operator.

* The percent sign (%)
* The underscore (\_)

The percent sign represents zero, one or multiple characters. The underscore represents a single number or character. These symbols can be used in combinations.

Syntax

The basic syntax of % and \_ is as follows −

SELECT FROM table\_name

WHERE column LIKE 'XXXX%'

or

SELECT FROM table\_name

WHERE column LIKE '%XXXX%'

or

SELECT FROM table\_name

WHERE column LIKE 'XXXX\_'

or

SELECT FROM table\_name

WHERE column LIKE '\_XXXX'

or

SELECT FROM table\_name

WHERE column LIKE '\_XXXX\_'

You can combine N number of conditions using AND or OR operators. Here, XXXX could be any numeric or string value.

Example

The following table has a few examples showing the WHERE part having different LIKE clause with '%' and '\_' operators −

|  |  |
| --- | --- |
| **Sr.No.** | **Statement & Description** |
| 1 | **WHERE SALARY LIKE '200%'**  Finds any values that start with 200. |
| 2 | **WHERE SALARY LIKE '%200%'**  Finds any values that have 200 in any position. |
| 3 | **WHERE SALARY LIKE '\_00%'**  Finds any values that have 00 in the second and third positions. |
| 4 | **WHERE SALARY LIKE '2\_%\_%'**  Finds any values that start with 2 and are at least 3 characters in length. |
| 5 | **WHERE SALARY LIKE '%2'**  Finds any values that end with 2. |
| 6 | **WHERE SALARY LIKE '\_2%3'**  Finds any values that have a 2 in the second position and end with a 3. |
| 7 | **WHERE SALARY LIKE '2\_\_\_3'**  Finds any values in a five-digit number that start with 2 and end with 3. |

Let us take a real example, consider the CUSTOMERS table having the records as shown below.

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 2 | Khilan | 25 | Delhi | 1500.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

| 4 | Chaitali | 25 | Mumbai | 6500.00 |

| 5 | Hardik | 27 | Bhopal | 8500.00 |

| 6 | Komal | 22 | MP | 4500.00 |

| 7 | Muffy | 24 | Indore | 10000.00 |

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

Following is an example, which would display all the records from the CUSTOMERS table, where the SALARY starts with 200.

SQL> SELECT \* FROM CUSTOMERS

WHERE SALARY LIKE '200%';

This would produce the following result −

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

| ID | NAME | AGE | ADDRESS | SALARY |

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

| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |

| 3 | kaushik | 23 | Kota | 2000.00 |

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