What is DataBase?!

A database is an organized collection of data, generally stored and accessed electronically from a computer system.
Databases are structured to facilitate the storage, retrieval, modification, and deletion of data in conjunction with various data-processing operations.

Types Of DataBase

1. **Relational Databases (RDBMS)**

2. **Non Relational Databases (N-RDBMS)**

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1. Relational Databases (RDBMS)

Structure: Data is organized into tables (relations) with rows and columns.

Examples: MySQL, PostgreSQL, Microsoft SQL Server, and Oracle Database.

Use Cases: Suitable for applications requiring complex queries, transaction management, and data integrity..

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2. NON Relational Databases (NoSQL Databases)

Non Structure: Store data as documents, typically in JSON

Examples: MongoDB, CouchDB.

Use Cases: Suitable for applications with flexible schema requirements, high scalability, and performance needs, such as real-time web applications and big data analytics.

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We will use Relational Databases (RDBMS) **(Oracle DB)**

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1. Install Oracle DB

2. Download tool DBeaver

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Unlocking the HR Schema

Run this query on commend

```
sqlplus / as sysdba;
alter session set container=orclpdb;
alter pluggable database open;
alter pluggable database orclpdb save state;
alter user hr identified by hr account unlock;
```

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SQL Commands | DDL, DML, DCL

1 - Data Definition Language (DDL) Statements

2 - Data Manipulation Language (DML) Statements

3 - Data Control Language (DCL)

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Data Definition Language (DDL) Statements

DDL or Data Definition Language actually consists of the SQL commands that can be used to define the database schema. It simply deals with descriptions of the database schema and is used to create and modify the structure of database objects in the database.

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Data Definition Language (DDL) Statements

Command	Description	Syntax
CREATE	Create database or its objects (table, index, function, views, store procedure, and triggers)	CREATE TABLE table_name (column1 data_type, column2 data_type, ...);
DROP	Delete objects from the database	DROP TABLE table_name;
ALTER	Alter the structure of the database	ALTER TABLE table_name ADD COLUMN column_name data_type;
TRUNCATE	Remove all records from a table, including all spaces allocated for the records are removed	TRUNCATE TABLE table_name;
COMMENT	Add comments to the data dictionary	COMMENT 'comment_text' ON TABLE table_name;
RENAME	Rename an object existing in the database	RENAME TABLE old_table_name TO new_table_name;

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SQL Commands | DDL, DML, DCL

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Data Manipulation Language (DML) Statements

The SQL commands that deal with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements.

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Data Manipulation Language (DML) Statements

Command	Description	Syntax
INSERT	Insert data into a table	INSERT INTO table_name (column1, column2, ...) VALUES (value1, value2, ...);
UPDATE	Update existing data within a table	UPDATE table_name SET column1 = value1, column2 = value2 WHERE condition;
DELETE	Delete records from a database table	DELETE FROM table_name WHERE condition;
LOCK	Table control concurrency	LOCK TABLE table_name IN lock_mode;
CALL	Call a PL/SQL or JAVA subprogram	CALL procedure_name(arguments);
EXPLAIN PLAN	Describe the access path to data	EXPLAIN PLAN FOR SELECT * FROM table_name;

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DCL (Data Control Language)

DCL includes commands such as GRANT and REVOKE which mainly deal with the rights, permissions, and other controls of the database system.

Command	Description	Syntax
GRANT	Assigns new privileges to a user account, allowing access to specific database objects, actions, or functions.	GRANT privilege_type [(column_list)] ON [object_type] object_name TO user [WITH GRANT OPTION];
REVOKE	Removes previously granted privileges from a user account, taking away their access to certain database objects or actions.	REVOKE [GRANT OPTION FOR] privilege_type [(column_list)] ON [object_type] object_name FROM user [CASCADE];

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Data Definition Language (DDL) Statements

Database Object Naming Rules

Database object names must follow some standard rules

1. They should start with a letter.

2. Can contain only A-Z, a-z, 0-9, -, $, and # characters.

3. Can be up to 128 characters in length.12c Release 2

4. Cannot have the same name as another existing object in the same schema.
5. Cannot be a reserved word like SELECT, FROM, UPDATE, DELETE, WHERE, HAVING, etc.

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Data Definition Language (DDL) Statements

DataTypes

Data types	DESC
VARCHAR2(size)	Variable-length character data
CHAR(size)	Fixed-length character data
NUMBER(p, s)	numeric data (precision, scale)
DATE	Date and time values
CLOB	TO Store FILE

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Data Definition Language (DDL) Statements

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CREATE TABLE Statement

The CREATE TABLE statement is used to create a new table

To create a table you must have the CREATE TABLE privilege.

```
CREATE TABLE schema_name. table_name
(column_name_1 datatype [DEFAULT default_value] [NULL NOT NULL],
column_name_2 datatype [DEFAULT default_value] [NULL NOT NULL]
.....
);
```

```
CREATE TABLE employees(id    NUMBER(3)        NOT NULL,
                       first_name    VARCHAR2(50)    DEFAULT 'No Name',
                       last_name     VARCHAR2(50),
                       hire_date     DATE DEFAULT    sysdate NOT NULL);
```

1. CREATE+TABLE+Statement+(Code+Samples).sql

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Data Definition Language (DDL) Statements

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```sql
SELECT * FROM employees WHERE 1=2;

CREATE TABLE employees_copy AS SELECT * FROM employees;
CREATE TABLE employees_copy2 AS SELECT * FROM employees;
SELECT * FROM employees;
SELECT * FROM employees_copy2;

CREATE TABLE employees_copy3 AS
    SELECT * FROM employees WHERE 1=2;
SELECT * FROM employees_copy3;

CREATE TABLE employees_copy4 AS
    SELECT * FROM employees WHERE job_id = 'IT_PROG';
SELECT * FROM employees_copy4;

CREATE TABLE employees_copy5 AS
    SELECT first_name, last_name, salary FROM employees;
SELECT * FROM employees_copy5;

CREATE TABLE employees_copy6 AS
    SELECT first_name, last_name l_name, salary FROM employees;
SELECT * FROM employees_copy6;

CREATE TABLE employees_copy7 (name, surname) AS
    SELECT first_name, last_name l_name, salary FROM employees;
CREATE TABLE employees_copy7 (name, surname, annual_salary) AS
    SELECT first_name, last_name l_name, salary*12 FROM employees;
SELECT * FROM employees_copy7;
DESC employees_copy7;
```

CREATE+TABLE+AS+SELECT+(CTAS)+Statement+in+Oracle.sql

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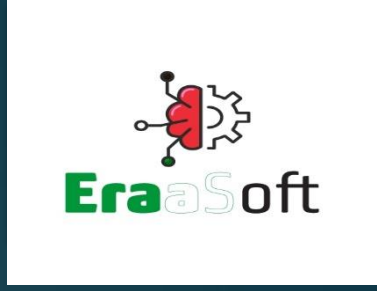
Data Definition Language (DDL) Statements



ALTER TABLE Statements

The ALTER TABLE statement changes the structure of an existing table.
With the ALTER TABLE command, you can:

* Add one or more new columns to a table.
* Modify the data type of one or more existing columns.
* Drop one or more columns from a table.
* Rename a column or a table.

Much more..

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Data Definition Language (DDL) Statements

```sql
CREATE TABLE my_employees (employee_id NUMBER(3), first_name VARCHAR2(50), hire_date DATE DEFAULT sysdate);

CREATE TABLE my_employees (employee_id NUMBER(3), first_name VARCHAR2(50), hire_date DATE DEFAULT sysdate, phone VARCHAR2(20));

DESC employees_copy;

ALTER TABLE employees_copy ADD ssn varchar2(11);

SELECT * FROM employees_copy;

ALTER TABLE employees_copy
ADD (fax_number VARCHAR2(11), birth_date DATE, password VARCHAR2(10) DEFAULT 'abc1234');

ALTER TABLE employees_copy MODIFY passwordd VARCHAR2(50);

ALTER TABLE employees_copy MODIFY (fax_number VARCHAR2(11) DEFAULT '-', password VARCHAR2(10));

INFO employees_copy;

ALTER TABLE employees_copy MODIFY (fax_number VARCHAR2(11) DEFAULT NULL, password VARCHAR2(10) NOT NULL);

ALTER TABLE employees_copy MODIFY (fax_number VARCHAR2(11) DEFAULT NULL, password VARCHAR2(10) DEFAULT '0000');

ALTER TABLE employees_copy DROP COLUMN ssn;

ALTER TABLE employees_copy DROP (fax_number, password);

ALTER TABLE employees_copy DROP (birth_date);
```

ALTER+TABLE+Statement+(Code+Samples).sql

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Data Definition Language (DDL) Statements

READ ONLY Tables

Read-only means allowing users to read, but not modify, data
We need to do maintenance on some tables
During these times, we may want to prevent any DML operations and certain DDL statements that affect the data on those tables against any accidental changes
Oracle allows us to create such tables using the "READ-ONLY" feature.The READ ONLY clause is used at the end of the ALTER TABLE syntax to set a table to read-only
To change a read-only table to read-write again, the READ WRITE clause is used at the end of the ALTER TABLE statement.

```
ALTER TABLE emp_temp READ ONLY;

ALTER TABLE emp_temp READ WRITE;
```

READ-ONLY+Tables+in+SQL+(Code+Samples).sql

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Data Definition Language (DDL) Statements

The DROP TABLE statement removes an existing table with all its data from the database and moves it to the recycle bin
After dropping a table, we can restore it for a short time using the FLASHBACK TABLE statement.
After dropping a table, all the objects related to that table will also be deleted or become invalid.

```
DROP TABLE employees_copy4;

FLASHBACK TABLE employees_copy4 TO BEFORE DROP;
```

DROP+TABLE+Statement(Code+Samples).sql

Data Definition Language (DDL) Statements

- TRUNCATE TABLE Statement& The DELETE statement deletes all data row by row where as the TRUNCATE statement deletes all row from a table more quickly

- The TRUNCATE statement is one of the DDL (Data Definition Language) statements so it will auto-commit changes immediately after removing data.

- TRUNCATE does not allow rollback.

- The data deleted using the TRUNCATE statement cannot easily be restored (FLASHBACK) because TRUNCATE does not generate any undo information log data. or

- The TRUNCATE statement works faster than the DELETE statement.

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Data Definition Language (DDL) Statements

```sql
SELECT * FROM employees_copy;
DELETE FROM employees_copy;
TRUNCATE TABLE employees_copy;
DROP TABLE employees_copy;

CREATE TABLE employees_test AS SELECT * FROM employees;

SELECT COUNT(*) FROM employees_test;

DELETE FROM employees_test;

TRUNCATE TABLE employees_test;

DROP TABLE employees_test;
```

TRUNCATE+TABLE+Statement+(Code+Samples).sql

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RENAME Statement

The RENAME statement is used to change the name of an existing column or table

We can change the name of a column.

We can change the name of a table.

Data Definition Language (DDL) Statements

```
DESC employees_copy;
ALTER TABLE employees_copy RENAME COLUMN hire_date TO start_date;

RENAME employees_copy TO employees_backup;

SELECT * FROM employees_copy;
SELECT * FROM employees_backup;

ALTER TABLE employees_backup RENAME TO employees_copy;
SELECT * FROM employees_copy;
```

RENAME+Statement+(Code+Samples).sql