day one

Database.

An organized collection of structured information or data stored electronically in a computer system.

DBMS (Database Management system)

Collection of programs enabling users to create and maintain databases. it serves as an interface between the database and users, allowing data retrieval, update, and management.

Popular DBMS Examples

Oracle Database MySQL Microsoft SQL server, Postgre SQL, MongoDB. IBM. DB2.

Advantages of DBMS

Redundancy control

Restricted unauthorized access

Multiple user interfaces (CLI, GUI, web, Mobile)

Baekup and recovery

Disadvantages of file Processing system

Data redundancy and inconsistency

Difficult in accessing data

Data isolation

Data integrity challenges

Lack of concurrent access

security problems

Two Types of DBMS.

R-DBMS (Relational Database)

NR-DBMS (Non-Relational Database)

Structured Query Language (SQL)

A Programming language used for querying, manipulating, and defining data in relational databases.

Client Server Architecture in DBMS

Involves a client (user interface) and a server (data storage and processing) communicating over a network

CRUD Operations in DBMS

Create, Read, Update and Delete - fundamental operations for manipulating data in a database.

MySQL Data Types.

* Numeric Data Types

INT : Used to store whole numbers within a specified range.

FLOAT : Used to store single-precision Floating Point numbers.

DOUBLE : Used to store double precision Floating Point numbers.

DECIMAL : Used to store exact numeric values with a specified Precision and scale

* String Data Types

VARCHAR : Used to store variable-length strings with a maximum length

CHAR : Used to store fixed length strings with a specified length

TEXT : Used to store large strings of text.

* Data and Time Data Types.

DATE : Used to store a date (year, month, and day)

TIME : Used to store a time (hour, minute, and second)

DATETIME : Used to store a date and time combination.

TIMESTAMP: Used to store a timestamp representing a specific Point in time

* Boolean Data Type

BOOLEAN or BOOL: Used to store boolean values (true or false)

* Binary Data Types

BINARY : Used to store fixed-length binary data

VARBINARY : Used to store variable-length binary data.

BLOB : Used to store large binary objects.

* Enumerated Data Type

ENUM : Used to store one value from a predefined set of values.

* JSON Data Type

JSON : Used to store and manipulate JSON (Javascript object Notation) data.

* Basic MySQL Commands

* SHOW DATABASES.
* CREATE DATABASE <database name>; or CREATE DATABASE IF EXISTS <database name>;
* USE <database name>;
* DROP DATABASE <data base name>; or DROP DATABASE IF EXISTS <database name>;
* CREATE TABLE <table name> (

<Field name1><DATA TYPE>,
<field name2><DATA TYPE>,
<Field name3><DATA TYPE>,
<Field name4><DATA TYPE>,

);

DESCRIBE < table name >; or DESC < table name >;

INSERT INTO < table name > VALUES (< data 1 >, < data 2 >, < data 3 >, < data 4 >);

or

INSERT INTO < table name > (< Field name 1 >, < Field name 2 >, < Field name 3 >)

VALUES (< data 1 >, < data 2 >, < data 3 >);

SELECT * FROM < table name >;

SHOW TABLES;

DROP TABLE < table name >;

Day 02

MySQL / MODIFY ALTER TABLE statements

The ALTER statement is used to add, delete, or modify columns in an existing table. The ALTER TABLE statement is also used to add and drop various constraints on an existing table.

ALTER TABLE - ADD column

```
ALTER TABLE table_name ADD column_name datatype;
Ex: ALTER TABLE Customer ADD Email VARCHAR(25);
```

ALTER TABLE - DROP Column

```
ALTER TABLE table_name DROP COLUMN column_name;
ALTER TABLE Customer DROP Email;
```

ALTER TABLE - RENAME Column

```
ALTER TABLE table_name RENAME COLUMN old_name To
New_name:
Ex: ALTER TABLE Customer RENAME COLUMN Email To Gmail;
```

ALTER TABLE - ALTER / MODIFY DATA TYPE

```
ALTER TABLE table_name MODIFY COLUMN column_name datatype;
Ex: ALTER TABLE Customer MODIFY COLUMN Email char(25);
```

ALTER TABLE - RENAME TABLE NAME

```
ALTER TABLE table_name RENAME new_table_name;
Ex: ALTER TABLE Customer RENAME CustomerDetails;
```

SQL Constraints

SQL Constraints define rules for table data, ensuring accuracy and reliability by limiting the types of data allowed in a table.

NOT NULL - Ensures that a column cannot have a NULL value.

UNIQUE - Ensures that all values in a column are different.

UNIQUE NOT NULL - Ensures that all values in a column are different and a column cannot have a NULL value

PRIMARY KEY - a combination of a NOT NULL and UNIQUE. And uniquely identifies each row in a table a table can have only ONE Primary key.

CONSTRAINT PRIMARY key - Another method of define the PRIMARY key field.

EX: CONSTRAINT PRIMARY KEY (CustomerID)

CONSTRAINT COMPOSITE PRIMAPYKEY - Another method of defin the PRIMARY key field.

EX: CONSTRAINT PRIMARY KEY (CustomerID, name)

FOREIGN KEY - The FOREIGN KEY constraint is a key used to link two tables together.

EX: CONSTRAINT FOREIGN KEY (CustomerID) REFRENCES Customer (CustomerID)

CHECK - Ensures that tha values in a column satisfies a specific condition

EX; address VARCHAR(30) CHECK (address = "Galle")

DEFAULT - sets a default value for a column if no value is specifed

EX: address VARCHAR(30) DEFAULT "Galle";

Other commands

Remove primary key - ALTER TABLE Customer DROP PRIMARY KEY;

Add Primary key - ALTER TABLE Customer ADD PRIMARY KEY (Customer ID, Name)

Add UNIQUE - ALTER TABLE Customer ADD CONSTRAINT UNIQUE (Contact);

Add NOT NULL - ALTER TABLE Customer MODIFY address VARCHAR (30) NOT NULL;

Remove NOT NULL - ALTER TABLE Customer MODIFY address VARCHAR(30);

Day 03

ERD (Entity Relationship Diagram)

ER Diagrams Symbols.

Entity

Relationship

Attribute

Entity types

E.g. Employee, Student, Car, House, Bank Account

List of common entity types

People : humans who carry out some function Employees, Students Customers.

Things : tangible physical objects Equipments, Products, buildings

Organizations Team, Suppliers, departments.

Attribute

An attribute a characteristic or property of an entity. Attributes provide specific information about the entities in the database.

often shown as an oval or circle.

Relationship

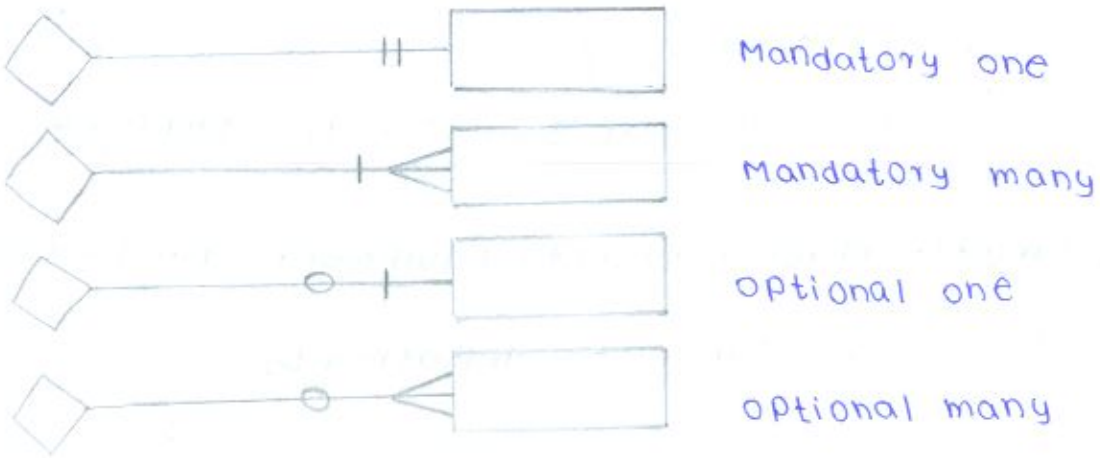
A relationship is an association among several entities. There are three types of relationships.

01) one to one

02) one to many / many to one

03) Many to Many.

Relationship cardinality



Steps to Create an ERD