**MY SQL**

**What is Database?**

* A database is a storage system that has a collection of data. Relational database store data in the form of tables that can be easily retrieved, managed, and updated

**What are the Popular Databases?**

* MySQL, Oracle, MongoDB, Microsoft SQL Server, Apache Cassandra, Postgress SQL

**What is SQL?**

* SQL is the language to communicate with databases. SQL commands help you to store, process, analyze and manipulate databases

**What is Table?**

**Features of SQL?**

* It Can Access any data within the relational database
* It is Very fast in retrieving a large amount of data very efficiently
* It is Versatile as it works with database systems from Oracle, IBM, Microsoft, etc.
* It can help you to manage databases without knowing lot of coding

**Applications of SQL?**

* SQL is used to create a database, define its structure, implement it and let's you perform many functions
* SQL is also maintaining an already existing database. SQL is a powerful language for entering data, modifying data, and extracting data in a database.
* SQL is extensively used as a client/server language to connect the front end thus supporting the client/server architecture
* SQL when deployed as data control language (DCL) helps protect your database from unauthorized access.

**What is Entity Relationship (ER) Diagram?**

* An ER diagram describes the relationship of entities that need to be stored in a database
* ER Diagram is mainly structural design for the databases. It is a framework using specialized symbols to define the relationship between entities
* ER Diagram is created based on three main components entities, attributes, and relationships

Diagram

Description automatically generated

**Why use Entity Relationship Diagram?**

* Helps us conceptualize the database and help us know which fields need to be embedded for a particular entity & helps to describe elements using the Entity-Relationship model.
* ER Diagram gives a better understanding of the information to be stored in a database
* Reduces complexity and saves time which allows you to build databases quickly

**Components of ER Diagram?**

* **Entity**: Weak Entity
* **Attribute**: Key, Composite, Multivalued
* **Relationship**: One to One, One to Many, Many to One, Many to Many

**Entity**: It is an entity that can be either a living or non-living component. it is showcased as a rectangle in an ER Diagram. Ex: Student study course. Here student & course are entities.

**Weak Entity**: An entity that relies over another entity is called a weak entity. The weak entity is showcased as a double rectangle in ER Diagram

**Attribute**: An attribute describes the property of an entity. it is represented as Oval in an ER Diagram

**Key Attribute**: Key Attribute uniquely identifies an entity from an entity set. The text of the key attribute is underlined. For Example, student Roll No can uniquely identify a student from a set of students. **Ex**: Student Roll No, Name, Age, Address.

**Composite Attribute**: An attribute that is composed of other attributes is known as a composite attribute. The composite attribute is represented with an oval, and that attribute is further connected with other ovals. Ex: Name, FirstName, Middle Name, Last Name

**Multivalued Attribute:** An attribute that can possess more than one value, such attributes are called multivalued attributes. The double oval is used to represent a multivalued attribute. **Ex**: Phone No, Name.

**Derived Attribute:** An attribute that can be extracted from other attributes of the entity is known as a derived attribute. In ER Diagram, the derived attribute is represented by a dashed oval. **Ex**: Student, Address, Name, Date of Birth, Age.

**Relationship:** A Relationship is showcased by a diamond shape in ER Diagram. It shows the relationship among entities. Ex: Study, Student, Course & their Relationship.

**One-to-One Relationship**: When a Single element of an entity is associated with a single element of another entity that is called one to one relationship. For example, a student has only one Identification card and an identification card is given to one person. Ex: Student has an Identification card.

**One-to-Many Relationship**: When a Single element of an entity is associated with more than one element of another entity that is called one to many relationships. For example, a customer can place many orders, but an order can’t be placed by many customers. Ex: Customer placed Order.

**Many to One Relationship**: When more than one element of an entity is related to a single element of another entity then it is called many to one relationship. For Example, the student enrolls for only one course, but a course can have many students.

**Many to Many Relationships**: When more than one element of an entity is associated with more than one element of another entity that is called many to many relationships. For Example, Employee can be assigned to many projects and a project can have many employees.

**Types of SQL Commands**

**Data Definition Language (DDL)**: DDL Commands will change the structure of the table. Create, Alter, Drop, Truncate & all the commands in DDL are auto-committed which means permanently saving the changes in the database.

**Data Manipulation Language (DML)**: DML Commands are used to modify the database with respect to all forms of changes in databases. DML Commands Update, Delete, Insert, Select(DQL) & all are not auto committed and will not save the changes in databases automatically.

**Data Control Language (DCL):** DCL (Grant, Revoke) commands allow you to access the data within the database.

**Transaction Control Language (TCL**): TCL commands allow users to manage database transactions, commit and roll back are examples of TCL commands.

**SQL Commands Structure**: Basic Structure

select column1, column2..

From table\_name

where condition 1, condition 2...

Group by column 1, column 2..

Having condition 1, condition 2...

Order by column1, column2..

**Data Types in SQL**: there are various data types in SQL.

* Exact Numeric datatype: int, smallint, bit, decimal
* Approximate Numeric datatype: float, real
* Date & Time datatype: date, time, timestamp
* String Datatype: char, varchar, text
* Binary Datatype: binary, varbinary, image

**SQL Operators:**

* Arithmetic Operators (+, -, \*, /, %)
* Logical Operators (ALL, AND, OR, NOT, ANY, BETWEEN, EXISTS)
* Comparison Operators (=, !=, <>, ><, >=, <=, !<, !>)