IOTA ACADEMY

Become Job Ready...

Data Analytics & Placement Training Institute

SQL

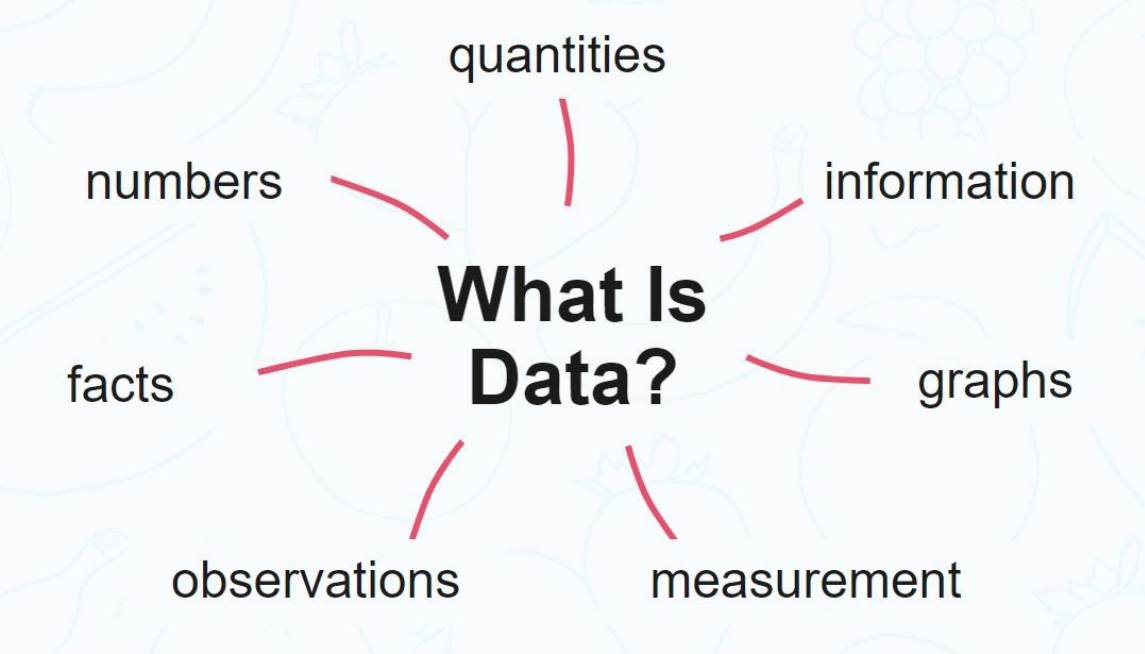
KNOWING ABOUT DATA, DATABASES, DBMS and SQL

WHAT IS SQL?

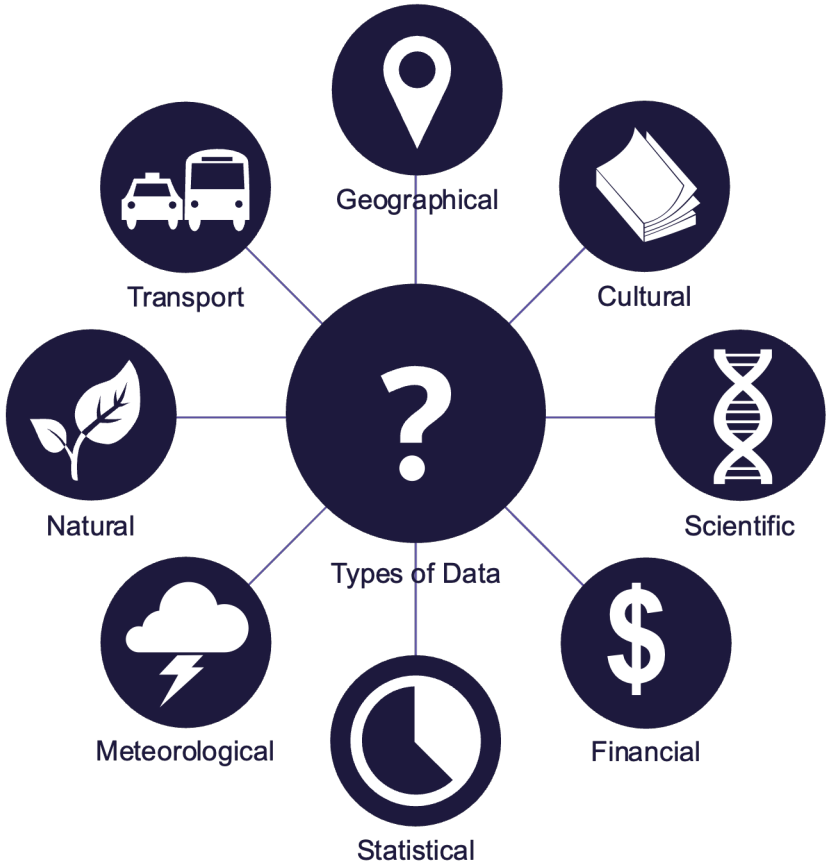
- Structured Query Language
- Programming language
- Standard Database Language
- A Language used for managing and manipulating relational databases.

DATA

- Data can be **facts** related to any object in consideration.
- Data are a **collection of discrete values** that convey information.



DATA IN VARIOUS SECTORS



DATABASE

- A database is a **systematic or organized collection of related information** that is stored in such a way that it can be easily accessed, retrieved, managed, and updated.
- Apart from storing the data itself, a database also keeps the relationships between data points.
- The **main purpose** of the database is to operate a large amount of information.

EVOLUTION OF DATABASE

- **Charles Bachman** developed the first Network data model, called **Integrated Data Store (IDS)**. It was introduced in the early **1960s** and standardized in **1971**.
- In **1970**, the **Relational Database** was introduced.
- Today, it is the era of Relational Databases and Database Management.

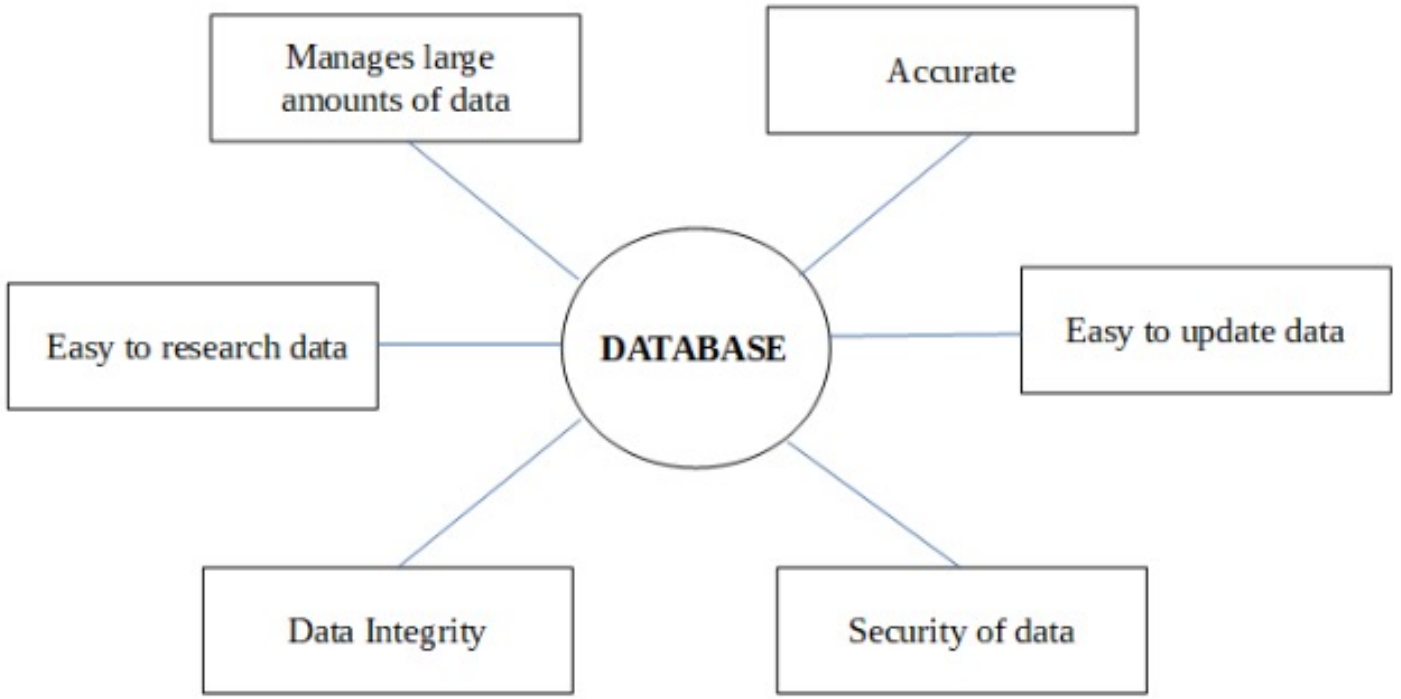
DATABASE SERVER

A database server is a **machine running database software** dedicated to providing database services.

A database server consists of hardware and software that run a database.

- **The software side** of a database server, or the **database instance**, is the back-end database application.
- **The hardware side** of a database server is the **server system** used for database storage and retrieval.

NEED OF DATABASE



NEED OF DATABASE...

Manages large amounts of data

- A database stores and manages a large amount of data on a daily basis. This would not be possible using any other tool such as a spreadsheet as they would simply not work.

Accurate

- Data accuracy refers to how correct and precise the data values are in relation to the real-world entities or phenomena they represent. It focuses on the correctness and exactness of the data values themselves.

Easy to update data

- In a database, it is easy to update data using various Data Manipulation languages (DML) available. One of these languages is SQL.

NEED OF DATABASE...

Security of data

- Databases have various methods to ensure the security of data. There are user logins required before accessing a database and various access specifiers. These allow only authorised users to access the database.

Data integrity

- Data integrity refers to the overall quality, consistency, and reliability of data. It ensures that data remains intact, complete, and uncorrupted throughout its lifecycle. This is ensured in databases by using various constraints for data.

Easy to research data

- It is very easy to access and research data in a database. This is done using Data Query Languages (DQL) which allow searching of any data in the database and performing computations on it.

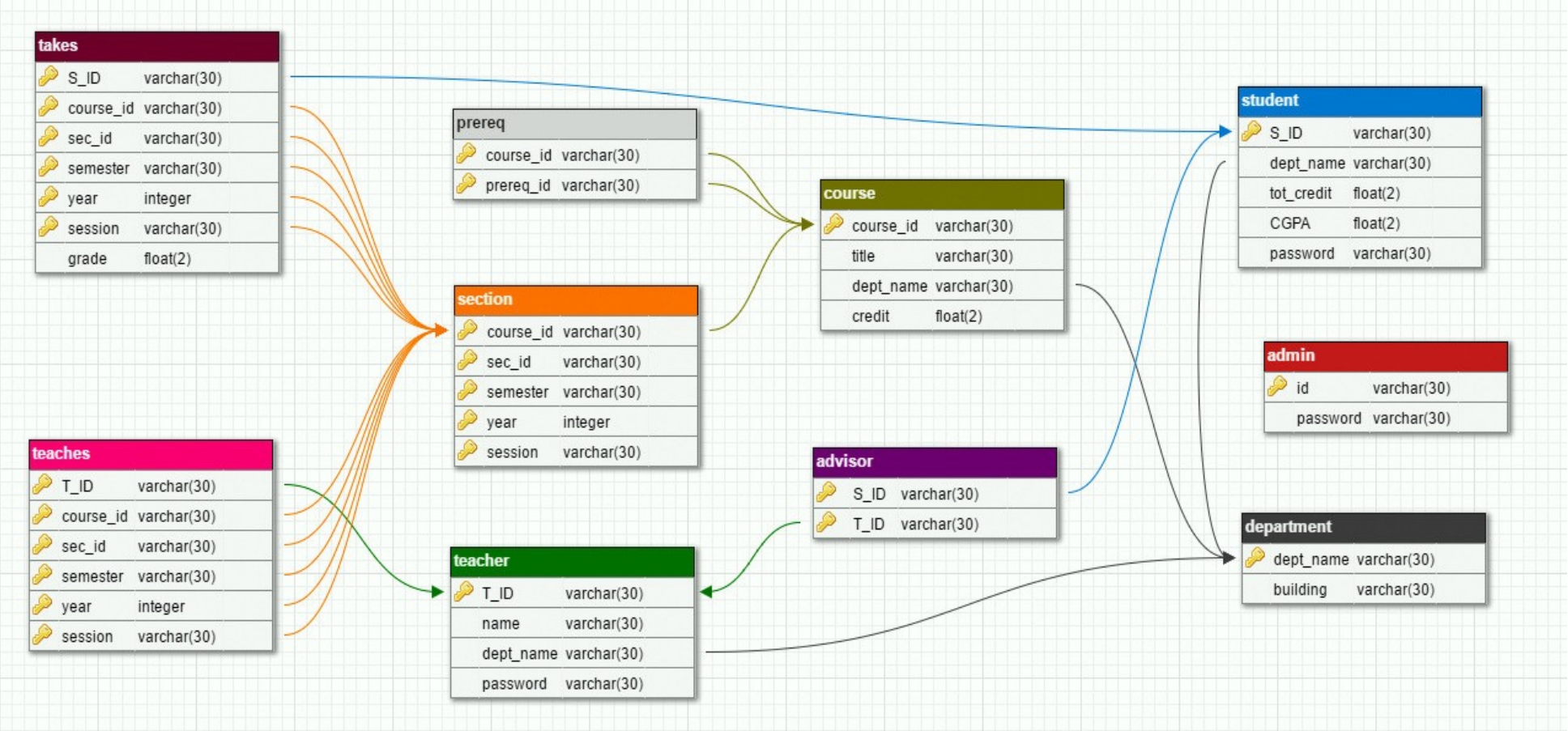
TYPE OF DATABASES

- **Relational databases:** This type of database **organizes data in a tabular format**, with each table containing rows and columns of data. Relational databases use **SQL** as the query language and are well-suited for structured data.

- **NoSQL databases:** Unlike relational databases, NoSQL databases **do not use a tabular format to store data**, and they don't rely on a fixed schema. Instead, they allow for **more flexible and dynamic data structures**, making them suitable for handling large, unstructured datasets.

- **Object-oriented databases:** This type of database **stores data as objects**, which can be more intuitive for developers who are familiar with **object-oriented programming**. Object-oriented databases can be useful for applications that handle complex data structures and relationships.

EXAMPLE: RELATIONAL MODEL



DBMS

- DBMS stands for Database Management System. It is a **software system** that is **used to manage and manipulate databases.**
- A **DBMS provides an interface between the database and the user or application,** allowing users to create, modify, and retrieve data in a structured and controlled way.

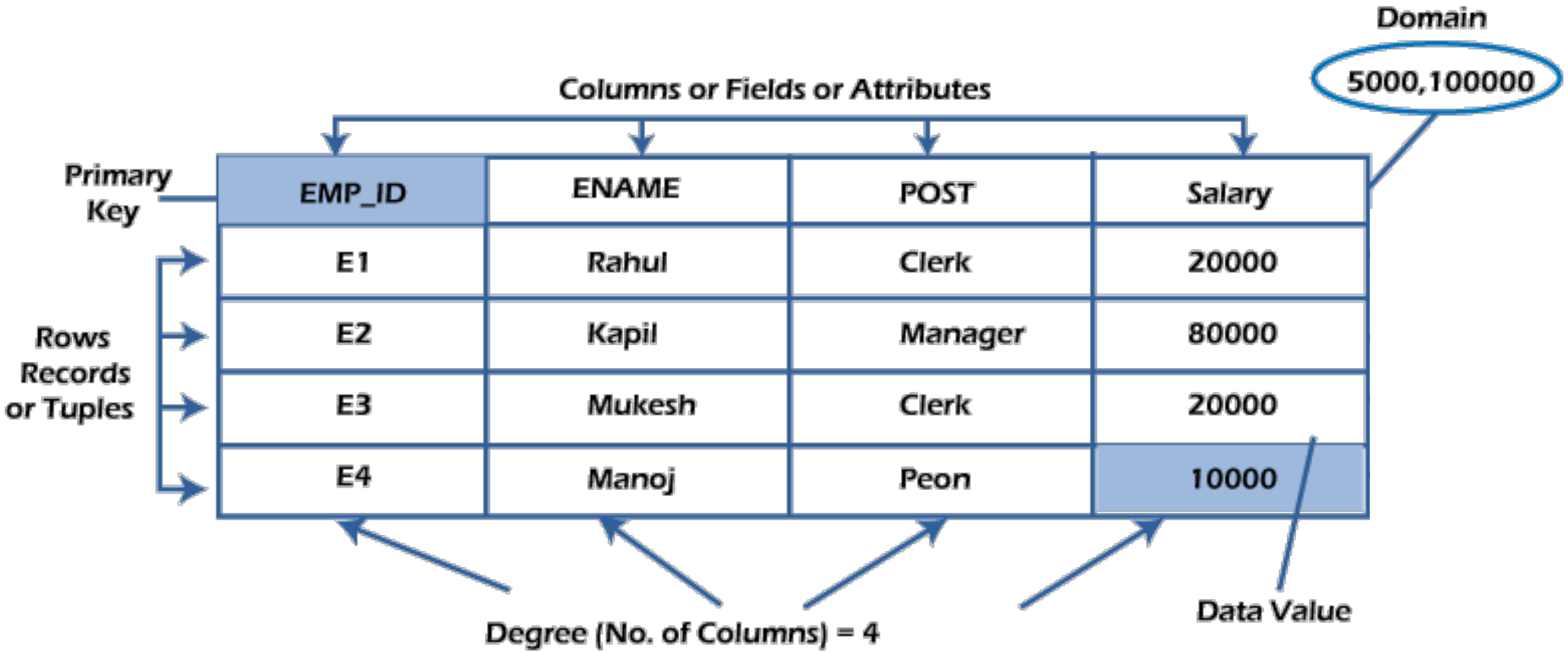
WHAT IS RDBMS?

- **RDBMS** stands for ***Relational Database Management System.***
- It is called Relational Database Management System (RDBMS) because it is **based** on the **relational model** introduced by E.F. Codd.
- It contains several tables which are connected to each other through keys which are called **Relationships**.
- All modern database management systems like **MS SQL Server, IBM DB2, ORACLE, My-SQL,** and **Microsoft Access** are based on RDBMS.

DATA REPRESENTATION IN RDBMS

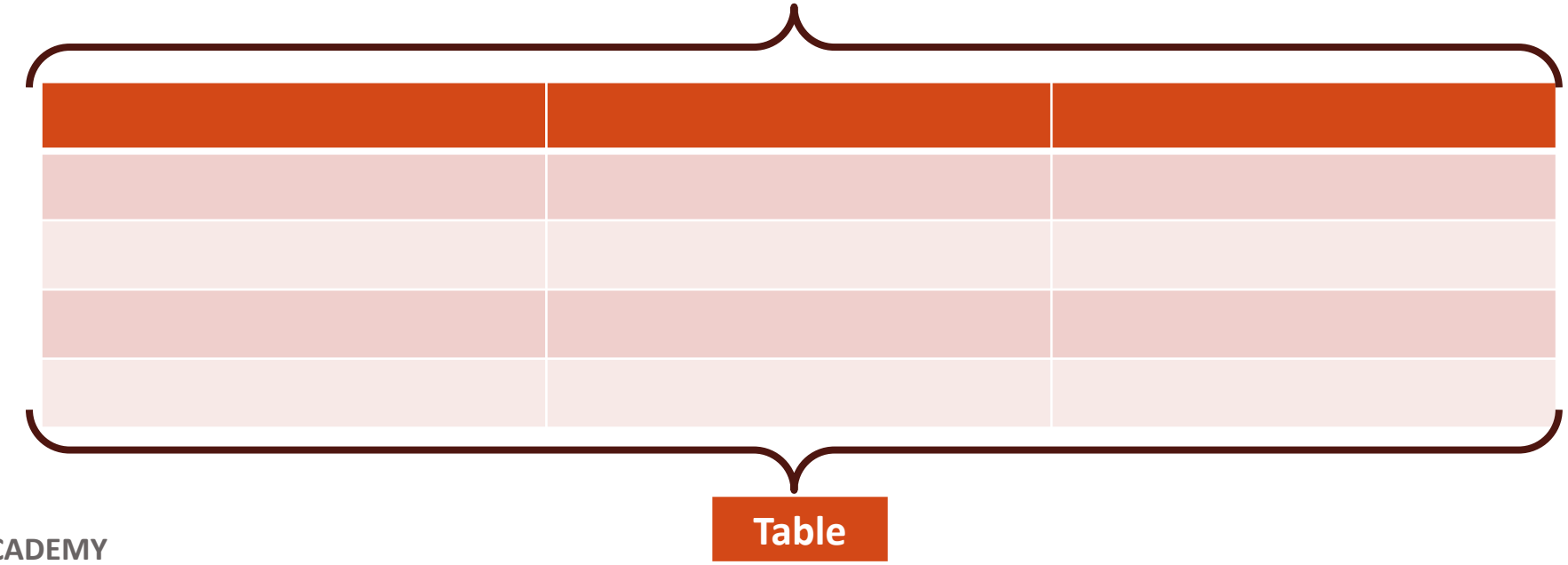
- Data is represented in terms of **tuples (rows)** in RDBMS.
- A relational database is the **most commonly used database**. It contains several tables, and each table has its primary key.
- Due to a collection of an organized set of tables, data can be accessed easily in RDBMS.

TERMINOLOGIES OF RDBMS



TABLE

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



TABLE…

- Remember, a **table** is the most common and simplest form of ***data storage*** in a relational database.
- 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?

- A field is a column in a table that is **designed to maintain specific information** about every record in the table.
- Every table is broken up into smaller entities called fields. The fields in the CUSTOMERS table consist of ID, NAME, AGE, ADDRESS and SALARY.

```
+----+----------+-----+--------------+-------------+
| ID | NAME | AGE | ADDRESS | SALARY |
+----+----------+-----+--------------+-------------+
```

Field

WHAT IS A RECORD?

- A single entry in a table is called a **Tuple** or **Record** or **Row**.
- A **tuple** in a table represents a set of related data.
- A record is a **horizontal** entity in a table.
- For **example**, there are 7 records in **CUSTOMERS** table.
- Following is a single row of data or record in the CUSTOMERS table −

```
+----+----------+-----+----------------+------------+
| 1 | Ramesh | 32 | Ahmedabad | 2000.00 |
+----+----------+-----+----------------+------------+
```

Record

SQL

- SQL stands for **Structured Query Language**.
- SQL is used to **communicate** with a database.
- SQL is a computer language for storing, manipulating and retrieving data stored in a relational database.
- All the RDBMS like MySQL, MS Access, Oracle, Sybase, Informix, Postgres and SQL Server use SQL as their **standard database language**.
- SQL is **not a case-sensitive** language.

  Example: Select or SELECT both are same.

SQL?

- Structured Query Language (SQL) is a **standard programming language** used for managing and manipulating **relational databases.**

- The term "**structured**" in SQL refers to the fact that it follows a well-defined structure and syntax for accessing and manipulating data in a database.
- The term "**query language**" indicates that SQL is primarily used for querying and retrieving data from databases.

USES OF SQL

- SEQUEL widely known as **SQL**, Structured Query Language is the most popular standard language to work on **databases**.
- It is a **domain-specific language** that is mostly used to perform tons of operations which include creating a database, storing data in the form of tables, modifying, extracting and a lot more.

USES OF SQL...

- SQL helps to perform tons of commands which helps us to perform various operations in a database. They can be broadly classified into the following categories:
  - **Data Definition Language(DDL):** SQL helps to make a database and tables and perform certain operations like CREATE, ALTER, DROP, RENAME, TRUNCATE, COMMENT etc.
  - **Data Query Language(DQL):** We broadly use the command SELECT to retrieve information from the database.
  - **Data Manipulation Language(DML):** SQL is used to manipulate data in a database. The operations are INSERT, UPDATE, DELETE etc.
  - **Data Control Language(DCL):** Control commands like GRANT is used to grant user permission/access to perform a specific operation. To take back the access from the user REVOKE is used.

MYSQL

- MySQL is a Relational Database Management System(RDBMS).
- MySQL is the DBMS behind some of the top websites and web-based applications in the world, including Airbnb, Uber, LinkedIn, Facebook, Twitter, and YouTube.

Thank You