DATABASE MANAGEMENT SYSTEM LAB

Week #1

IQRA UNIVERSITY IU

INTRODUCTION

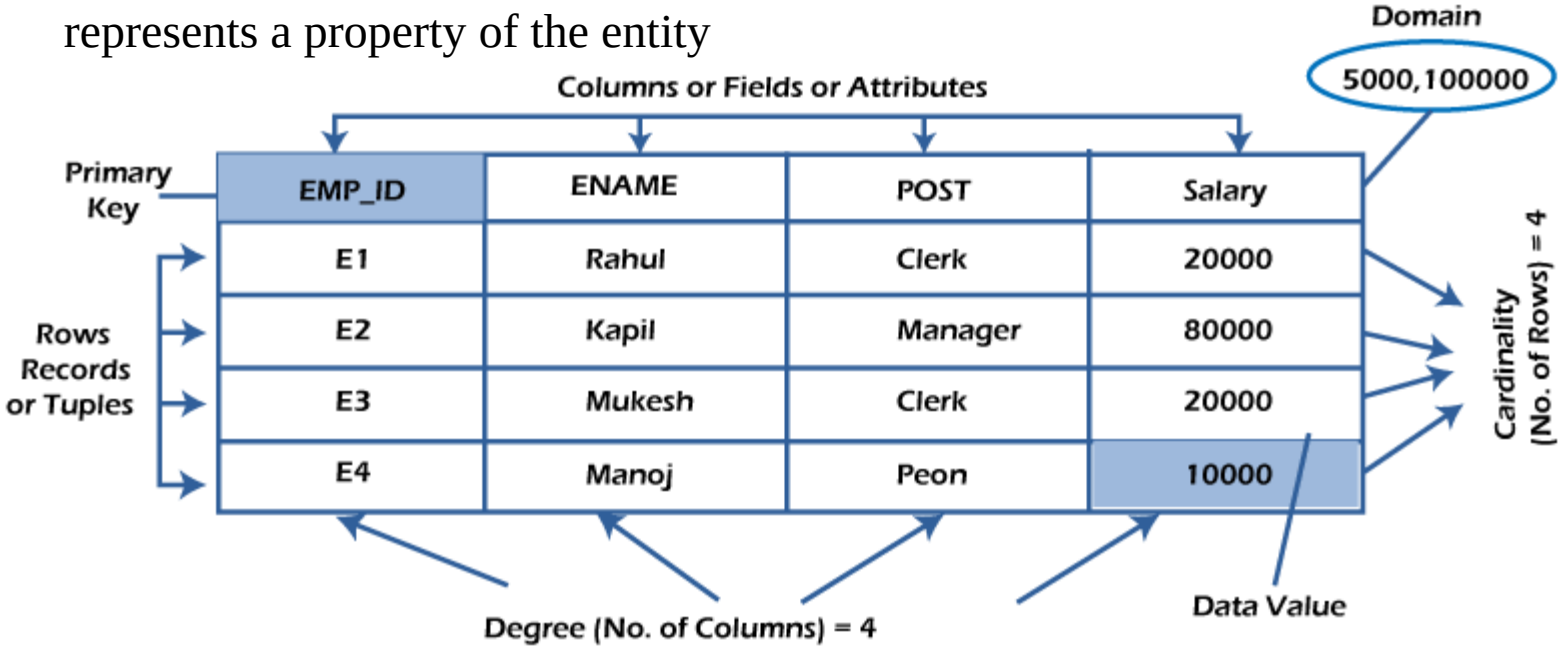
Understanding of:

- To get familiar with the Relational DBMS Architecture & its Concepts

- A **Relational Database Management System (RDBMS)** is a type of database management system that stores and provides access to data that is structured in **tables**.
- Each table consists of **rows** (records) and **columns** (fields or attributes), and the relationships between tables are defined through **keys**.
- RDBMSs are based on **relational models** proposed by E.F. Codd in 1970, which use **relations** (tables) to organize data.

Tables (Relations):

- A **table** represents an entity and consists of rows and columns.
- Each row is a **record** (also called a tuple), and each column is an **attribute** that represents a property of the entity



For example, a database for a bank might contain a table to store currency data, a table to store customer data, and a table for its accounts. These table s are obviously related: a customer can have one or more accounts, and an account can express its balance in a particular currency. However, the existe nce of these relationships is not a defining characteristic of a relational database. The only reason for a DBMS to be called **relational** is that it store s its data in tables, regardless of whether or not these tables are related to one another.

Relationships Between Tables:

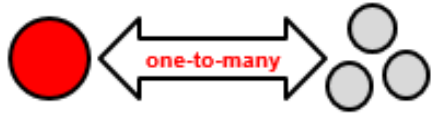
- **One-to-One (1:1)**: A record in one table is associated with exactly one recor d in another table.
- **One-to-Many** : A record in one table is associated with multiple records in a nother table. (Most common)
- **Many-to-Many:** Multiple records in one table are associated with multiple r ecords in another table. (Often implemented with a join or association table)

Example:
One-to-Many: A **Student** can enroll in many **Courses**, but each **Course** can ha ve many **Students** enrolled in it.

Relationship categories and examples:

Relationship between one car and one engine

Relationship between many animals and one zoo



Relationship between one bank customer and many accounts

Relationship between many students and many courses

Row-Column Relationship

- **Rows** are a collection of values that describe an entity (such as a bank account).
- **Columns** are a collection of similar data among rows (such as customer surname s). Each column has a name and a data type.
- The intersection of row and column contains individual data items called **values**. Values are always atomic, that is, each position in a table may contain only one d atum (piece of data). If you have ever used a spreadsheet, you have used a table o f data.
- It is common to present data in a simple two-dimensional table form. The relation al model stipulates that a relation must have unique **tuples**—no two entities can b e identical or you would not be able to distinguish one from the other. There must be some combination of columns (possibly, all columns) called a **key**, whose valu es uniquely identify each tuple.