Database Summary : Week 1

* **Database** is a collection of structured data in an organized way. Data in it can be stored and retrieved for any application.
* The main two types of Databases are:
  + **Relational Databases**: Data stored in a specific way which is tables. Tables can have relations with each other. A table consists of rows/entities(e.g., user, student, etc.) and columns/attributes(e.g., name, age, etc.),
  + **Non-Relational Databases**: Data stored in any specific structure but not as table such as document structure or graphs.
* In **Designing a database:**
  + we specify what data will be stored and how it’ll be logically stored depending on the database model. One of the database models is The Relational Model. Which defines the table structure for data, where all data stored in rows/tuples, grouped into tables(relations).
  + To design a safe and well-structured relational model, we define some conditions called constraints, these constraints have to be checked before performing any query operation in the database. It includes:
    - **Key Integrity**: every table in the database should have at least one column that defines a unique attribute for every tuple. This attribute is called key. E.g., user\_id. If we considered user\_id as a key, then every user has his unique user\_id.
    - **Domain Constraints**: An attribute can only take values that in its domain range. For example, If we applied password<10 in user table, then it’ll result in failure if the user inserted a password with 11 chars.
    - **Referential integrity**: when there’s a relationship between tables. One attribute will only take its value from another attribute in another table.
* We can store and retrieve data from database by using **Database Management System**(DBMS). Which is a software for managing databases. With Relational Databases, we use RDBMS for that purpose. Examples of it are MySQL, SQLite, PostgreSQL and SQL Server.
* **SQL**(Structured Query Language) is a computer language used to manage, organize and manipulate relational databases. Each order written in SQL is called Query. DBMS processes SQL queries then manage the database depending on it.
* **SQL Syntax**
  + Data Definition Language (DDL): A set of statements that allow user to define or modify data structures and objects, such as tables.
  + Data Manipulation Language (DML): Allows us to manipulate the data in the tables of a database.
  + Data Query Language (DQL): Allows us to retrieve data from the tables from database.
  + Data Control Language (DCL): Allows us to manage the rights users have in database.
* SQL Notes:
  + Not case-sensitive
  + SQL quest ends with semicolon
  + SQL keywords cannot be variables