**Name: Hazem Sherif Mohamed Radwan**


## -What is the Database?

A **database** is just a **place to store information** in an organized way so that it's easy to find, use, update, or delete.

## -Why do we use databases?

Because they let us:

**1-** Save a lot of information in one place.

**2-** Quickly search for what we need.

**3-** Edit or delete data easily.

**4-** Protect data from getting lost or stolen.

## Types of Databases:

1. **Relational Databases** (like MySQL, PostgreSQL, Oracle):

- Store data in tables (rows and columns), like an Excel sheet.
- Good for structured, organized data.

2. **NoSQL Databases** (like MongoDB, Firebase):

- Store data in flexible formats, like documents or key-value pairs.
- Great for unstructured or changing data.

## -What is normalization? (1NF, 2NF, 3NF)

Normalization is a process used to organize data in a database so that:

1- There's no duplication (repeated data).

2- The data is logically grouped.

3- It’s easy to maintain and update.

Normalization happens in stages called **normal forms**: 1NF, 2NF, 3NF...

## - 1NF (First Normal Form)

Make sure each **column has atomic (simple) values** and **no repeating groups**.

## - 2NF (Second Normal Form)

1- Be in 1NF, and
**2- Remove partial dependencies** (when a non-key column depends on part of a composite key)

## - 3NF (Third Normal Form)

1- Be in 2NF, and
2- Remove **transitive dependencies** (a non-key depending on another non-key)

## Summary Table:

| Normal Form | Rule |
|---|---|
| 1NF | No repeating groups; only atomic values |
| 2NF | No partial dependencies (only applies if composite keys are used) |
| 3NF | No transitive dependencies (non-key should not depend on non-key) |