Hello my Friend , Did you Asked once time How we can store the data ? and How we can organize or access or query or do anything on the data , This question must you thought about before and now I will explain the answer through along journey to get acquainted with the principles and basics of **Database**.

First, what is data?

Data is a collection of information about a specific object may be organized or not and it hasn't any constrains about it.

Obviously , what do you think about where we can store the data?

You thought may be in paper or great record or in your mind and in the age of technology you think you can store data in files in computer ,But is this a best way to store data?

Of course no , Because this ways have a lot of disadvantages and risks on the data Such as:

Data Integrity :

Which mean how do you sure data correctness and consistency and what happen when there is duplicated data or when you delete some data.

Implementation:

How do you find a particular record? (It's very hard)

What if you want to create a new app that uses the same database (has a lot of time).

Durability:

What if the machine crashes while updating a record.

What if we want to replicate the data on multiple machines (take a lot of effort).

So, we search for the best way to store the data until we find Database.

In the beginning of talk about database we must know the basic concept on it.

Database: is a organized collection of interrelated data that models some aspect of real world, And it the core of the most computer app.

Note : there are two concepts very important data model and schema

A Data model: is a collection of concepts for describing the data in database.

A Schema : is a description of particular collection of data, using a given data model.

Note that database a lot of model to store data , the most used and efficient is Relational Model: has a lot of features

. Store database in simple data structure (almost tables).

.Access data through high-level language, DBMS figure out best strategy.

.physical storage left up to the DBMS implementation.

.Ensure the database's content satisfy constrains .

NOW , Some of definition for the structure of Table.

.A tuple: is a set of attribute value .also know as row , entity or domain.

.Primer key: uniquely identifies a single tuple.

.Foreign key: specifies that an attribute from one relation has to map to a tuple in another relation.

The question now how we can store and retrieve and interact with database?

First, we have a very important concept in database called DBMS.

DBMS : is a software that allow app to store and analysis information in a database .

The general purpose of DBMS is designed to allow the definition , creation , querying ,update

And administration of database.

YOU know some people love to interact and select how the store and retrieve with database

By using Relational Algebra which is a fundamental operation to retrieve and manipulate in relation . and it based on set algebra.

There are 7 operators , we discussing it now.

1-SELECT

Choose the subset of tuples from a relation that satisfies a selection predicate.

2-PROJECTION

Generate a relation with tuples that contain only the specified attribute.

3-UNION

Generate a relation that contain all tuples that appear in either only one or both input relation.

4-INTERSECTION

Generate a relation that contain only tuples that appear in either only one or both input relation

5-DIFFERENCE

Generate a relation that contain only tuples that appear in the first and not the second of the input relations.

6-PRODUCT

Generate a relation that contain all possible combination of tuples from the input relations

7-JOIN

Generate a relation that contain all tuples that are combination of two tuples.