First Session

Minders
Backend

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01

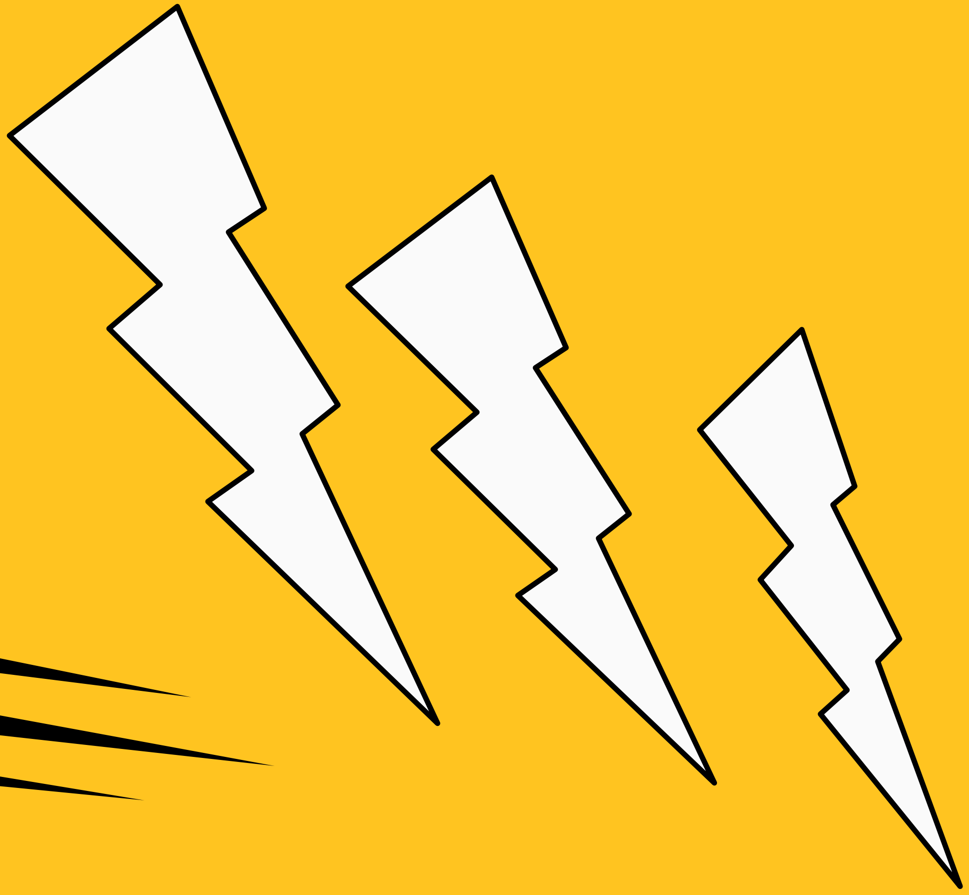
Framework VS Library

FrameWork VS Library

- Think of a library as a **toolbox** where you can pick tools as needed to perform specific tasks. You decide how and when to use those tools.

- On the other hand, a framework is like a **construction site** where the blueprint is already laid out.

- You follow the predefined structure and guidelines to build your application.



02

DATA & Information

Data and Information

Data :	Information:
Individual puzzle pieces	Completed puzzle picture
No benefits.	Fulfill a specific purpose or need.
The raw material	Derived through processing, analysis, and interpretation.

03

Database

Definition

Database: a collection of related data

- represents some aspect of the real world
- logically coherent collection (not a random collection)
- designed, built & populated for a specific purpose

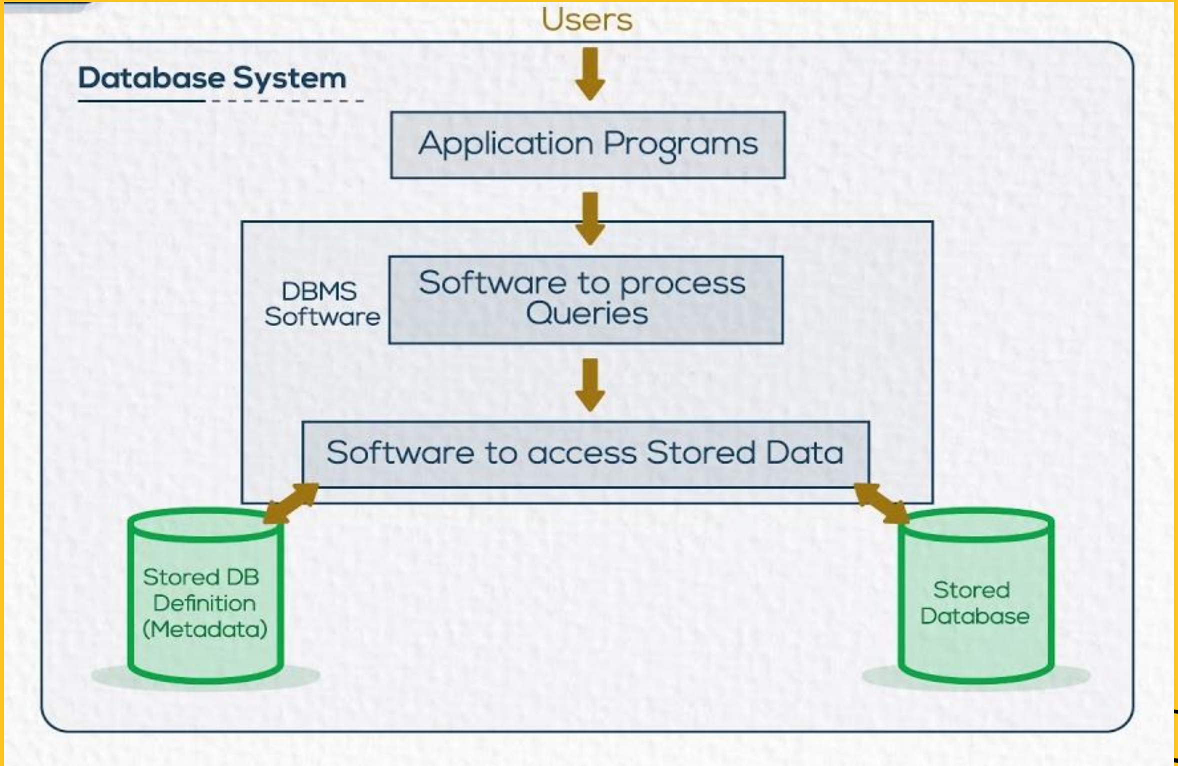
Definition

Database Management System (DBMS):

- The software that manages the data.

Database & DBMS are called Database System.

Definition


Users
Database System
Application Programs
DBMS
Software
Software to process
Queries
Software to access Stored Data
Stored DB
Definition
(Metadata)
Stored
Database

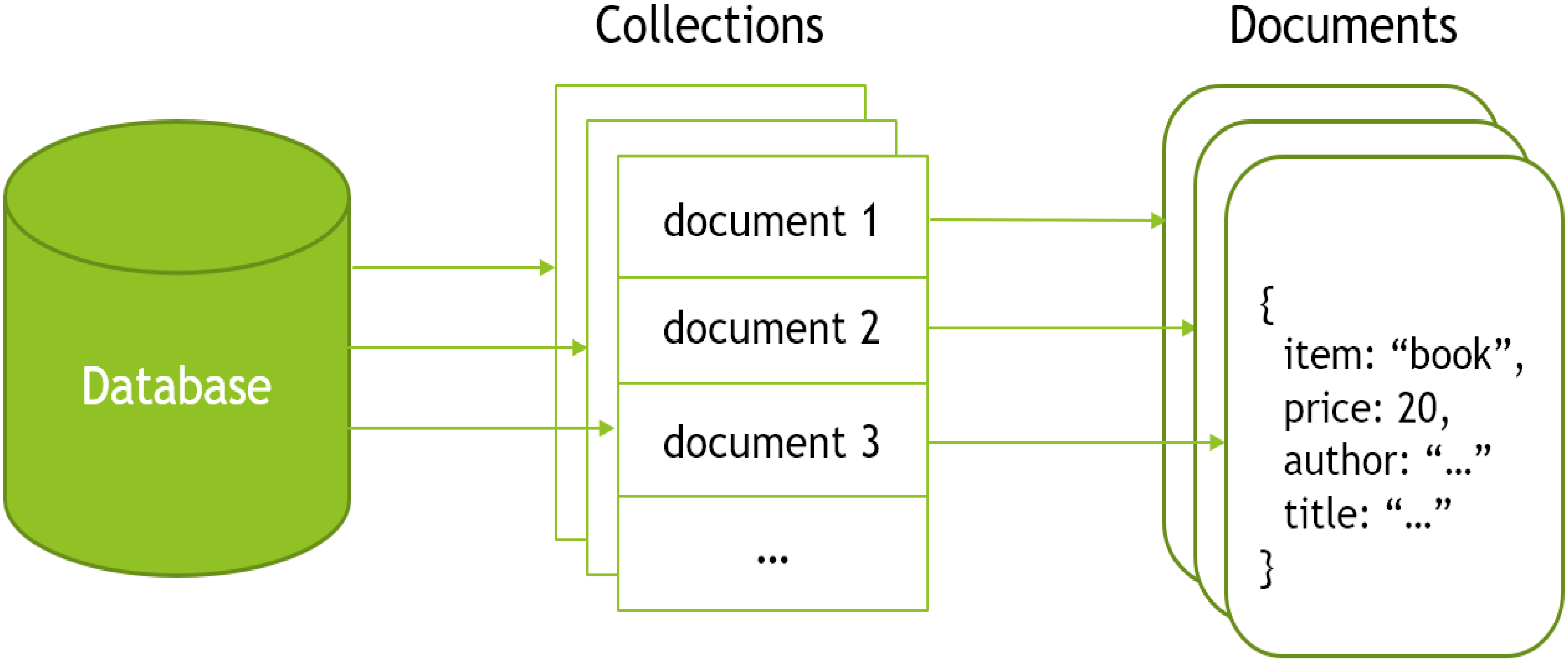
Database Types

SQL

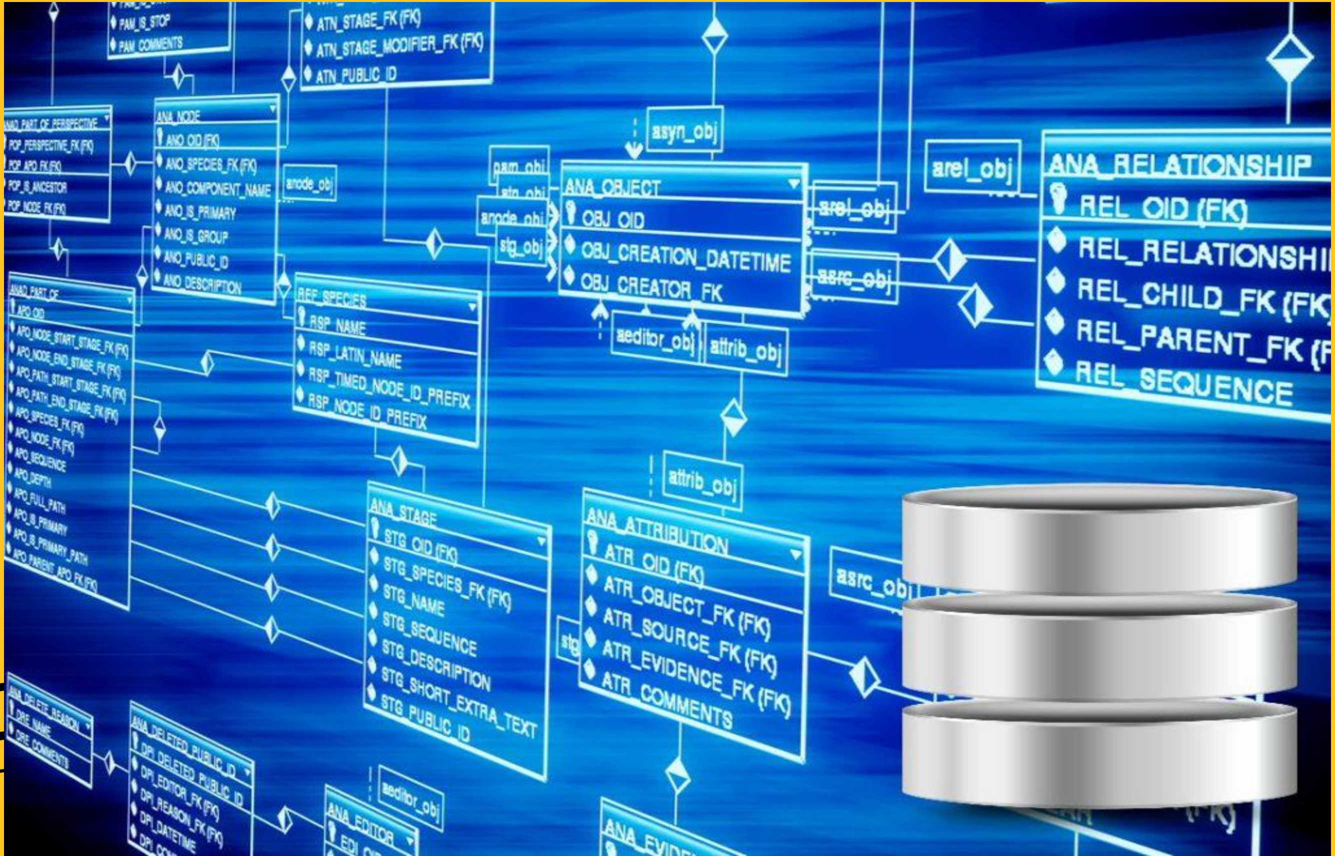
NoSQL

GraphQl

NoSQL


Collections
Documents
Database
document 1
document 2
document 3
...
{
item: “book”,
price: 20,
author: “...”
title: “...”
}

SQL



PAM_IS_STOP
PAM_COMMENTS
ATN_STAGE_FK (FK)
ATN_STAGE_MODIFIER_FK (FK)
ATN_PUBLIC_ID
ANO_PART_OF_PERSPECTIVE
POP_PERSPECTIVE_FK (FK)
POP_APO_FK (FK)
POP_IS_ANCESTOR
POP_NODE_FK (FK)
ANA_NODE
ANO_OID (FK)
ANO_SPECIES_FK (FK)
ANO_COMPONENT_NAME
ANO_IS_PRIMARY
ANO_IS_GROUP
ANO_PUBLIC_ID
ANO_DESCRIPTION
anode_obj
asyn_obj
pam_obj
atn_obj
anode_obj
stg_obj
ANA_OBJECT
OBJ_OID
OBJ_CREATION_DATETIME
OBJ_CREATOR_FK
arel_obj
asrc_obj
aeditor_obj
attrib_obj
arel_obj
ANA_RELATIONSHIP
REL_OID (FK)
REL_RELATIONSHI
REL_CHILD_FK (FK)
REL_PARENT_FK (F
REL_SEQUENCE
ANAD_PART_OF
APO_OID
APO_NODE_START_STAGE_FK (FK)
APO_NODE_END_STAGE_FK (FK)
APO_PATH_START_STAGE_FK (FK)
APO_PATH_END_STAGE_FK (FK)
APO_SPECIES_FK (FK)
APO_NODE_FK (FK)
APO_SEQUENCE
APO_DEPTH
APO_FULL_PATH
APO_IS_PRIMARY
APO_IS_PRIMARY_PATH
APO_PARENT_APO_FK (FK)
REF_SPECIES
RSP_NAME
RSP_LATIN_NAME
RSP_TIMED_NODE_ID_PREFIX
RSP_NODE_ID_PREFIX
ANA_STAGE
STG_OID (FK)
STG_SPECIES_FK (FK)
STG_NAME
STG_SEQUENCE
STG_DESCRIPTION
STG_SHORT_EXTRA_TEXT
STG_PUBLIC_ID
attrib_obj
ANA_ATTRIBUTION
ATR_OID (FK)
ATR_OBJECT_FK (FK)
ATR_SOURCE_FK (FK)
ATR_EVIDENCE_FK (FK)
ATR_COMMENTS
asrc_obj
ANA_DELETE_REASON
DRE_NAME
DRE_COMMENTS
ANA_DELETED_PUBLIC_ID
DPI_DELETED_PUBLIC_ID
DPI_EDITOR_FK (FK)
DPI_REASON_FK (FK)
DPI_DATETIME
aeditor_obj
ANA_EDITOR
ANA_EVIDE

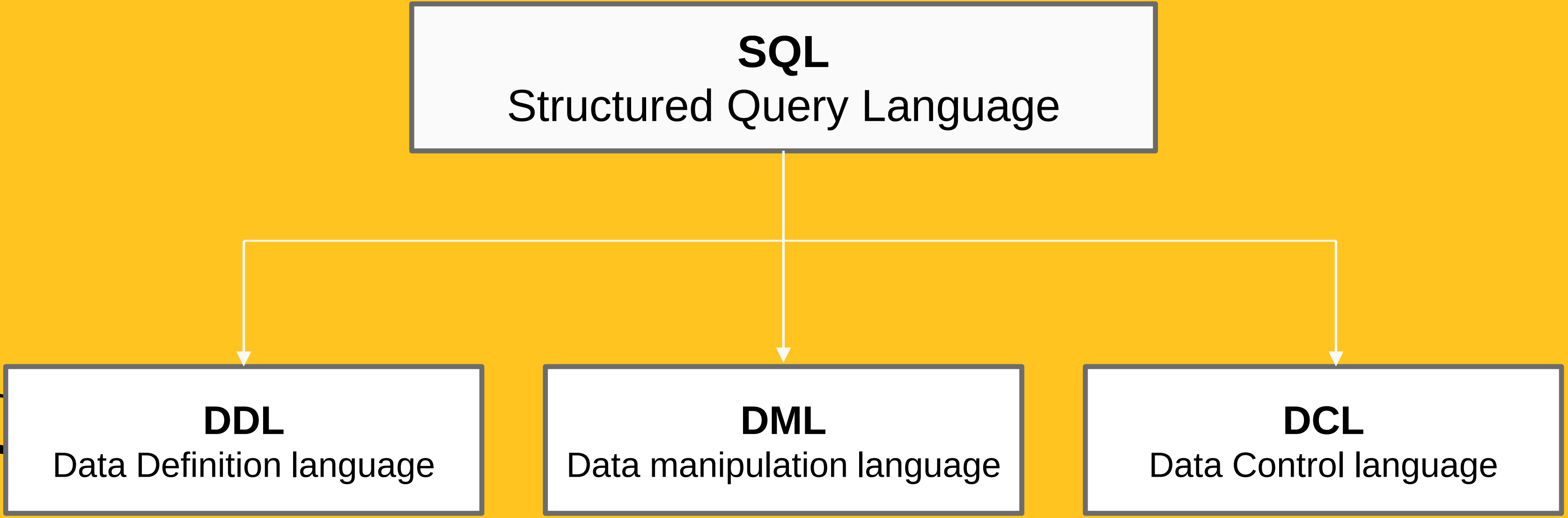
SQL VS Excel

Faster	Easier
More Reliable	Handle Large data
Use good Data structure	

04

SQL

SQL is a....



SQL
Structured Query Language

DDL
Data Definition language

DML
Data manipulation language

DCL
Data Control language

SQL is a....

- Data Definition Language (DDL)

  - Create, Alter, Drop

- Data Manipulation Language (DML)

  - Insert, Delete, Update

- Data Control Language (DCL)

  - Triggers

Data Definition Language (DDL)

is used to **create**dna **modify** the structure of objects**.**
Includes statements like:

- CREATE: Creates a new table or any other database object.
- ALTER: Modifies an existing database object, such as a table.
- DROP: Removes an entire table or any other object in database.

Create Tables: Syntax

```
CREATE TABLE table_name (
column1 data type,
column2 data type constraint,
column3 data type constraint_1 constraint_2,
 );
```

Data Types of Table Attributes:

1- Numeric: integer number (INTEGER, INT, AND SMALLINT), and floating number (FLOAT, REAL, and DOUBLE).

2- Character: data types are either fixed length (CHAR (n), where n is the number of character) or variable length (VARCHAR(n)).

3- Boolean: TRUE or FALSE.

4- Timestamp

Create Table : Constraints

- PRIMARY Key (PK): A Constraint that uniquely identify each row/record in a database table (NOT NULL + UNIQUE + Stable + minimum # of attribute).

- FOREIGN KEY (FK): A Constraint that ensures referential integrity. A foreign key from one table to another is used link a tuple in the 1st table to a unique tuple
- NOT NULL: A Constraint that ensures that a column cannot have NULL value.

- DEFAULT: A Constraint that provides a default value for a column when none is specified.

- UNIQUE: A Constraint that ensures that all values in a column are different.

in the 2nd table.

- CHECK: A constraint that ensures that all values in a column satisfy a certain condition.

Example

Student(SSN, Name, City, Age, Major):

```
CREATE TABLE Student(
SSN INT Primary Key,
Name VARCHAR(45),
Age INT,
City VARCHAR(15) DEFAULT ‘CAIRO’,
Major VARCHAR(5) ,
);
```

Department(DeptCode, Name)

```
CREATE TABLE Department(
DeptCode INT IDENTITY(1,1) PRIMARY KEY,
Name VARCHAR (15) NOT NULL
);
```

Altering Table: Syntax

```
ALTER TABLE <table name>
    ADD <column name><datatype>


ALTER TABLE <table name>
    DROP COLUMN  <column name>


ALTER TABLE <table name>
    ALTER COLUMN  <column name><new datatype>
```

Altering Table: Syntax

```
ALTER TABLE <table name>
       ADD CONSTRAINT <CONSTRAINT Syntax>


ALTER TABLE <table name>
       ADD CONSTRAINT <CONSTRAINT Name><CONSTRAINT Syntax>


ALTER TABLE <table name>
      DROP CONSTRAINT < CONSTRAINT Name>
```

Example

Alter Table : Examples

```
ALTER TABLE Registered
ADD PRIMARY KEY (SSN, CrsCode);
```

Or

```
ALTER TABLE Registered
ADD CONSTRAINT PK1 PRIMARY KEY (SSN,CrsCode);
```

--- constraint name is unique across database ---

Alter Table : Examples

```
ALTER TABLE STUDENT
    ADD CONSTRAINT FK_1 FOREIGN KEY (Major)
    REFERENCES Department (DeptCode)

    ON DELETE SET NULL

    ON UPDATE CASCADE;
```

Alter Table : Examples

```
 ALTER TABLE STUDENT
ADD CONSTRAINT UQ_Std_Name unique (Name);
```

```
ALTER TABLE STUDENT
DROP CONSTRAINT UQ_Std_Name;
```

Drop Table

Example

---> DROP TABLE Student;

Summary

Advice

THANKS

Do you have any questions?