

Database Fundamentals



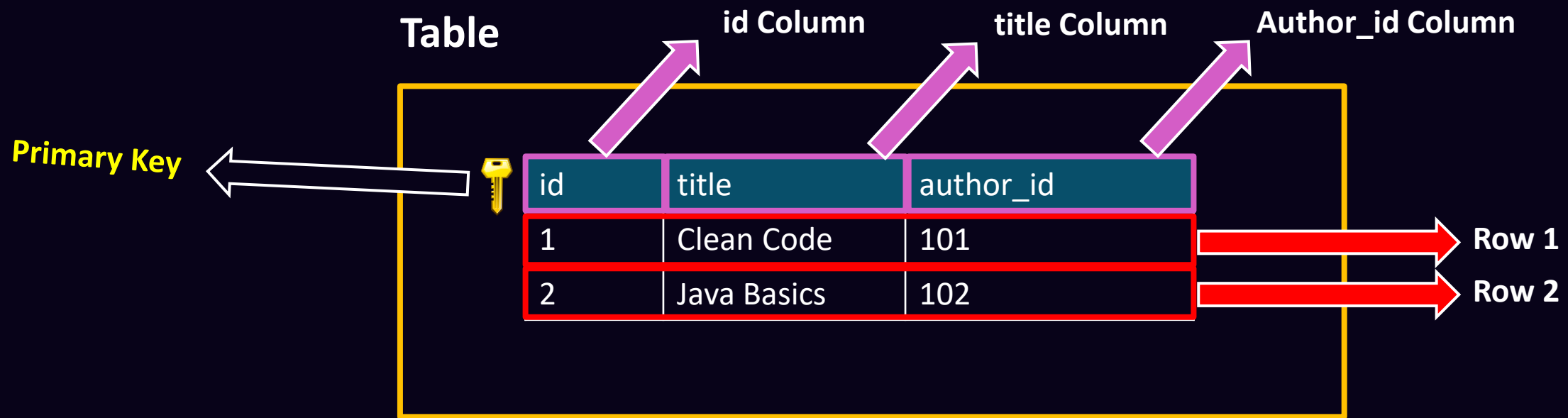
What is Database?

A **database** is a place where data is stored in an organized way so it can be easily accessed and managed by software or users.

Types of Databases:

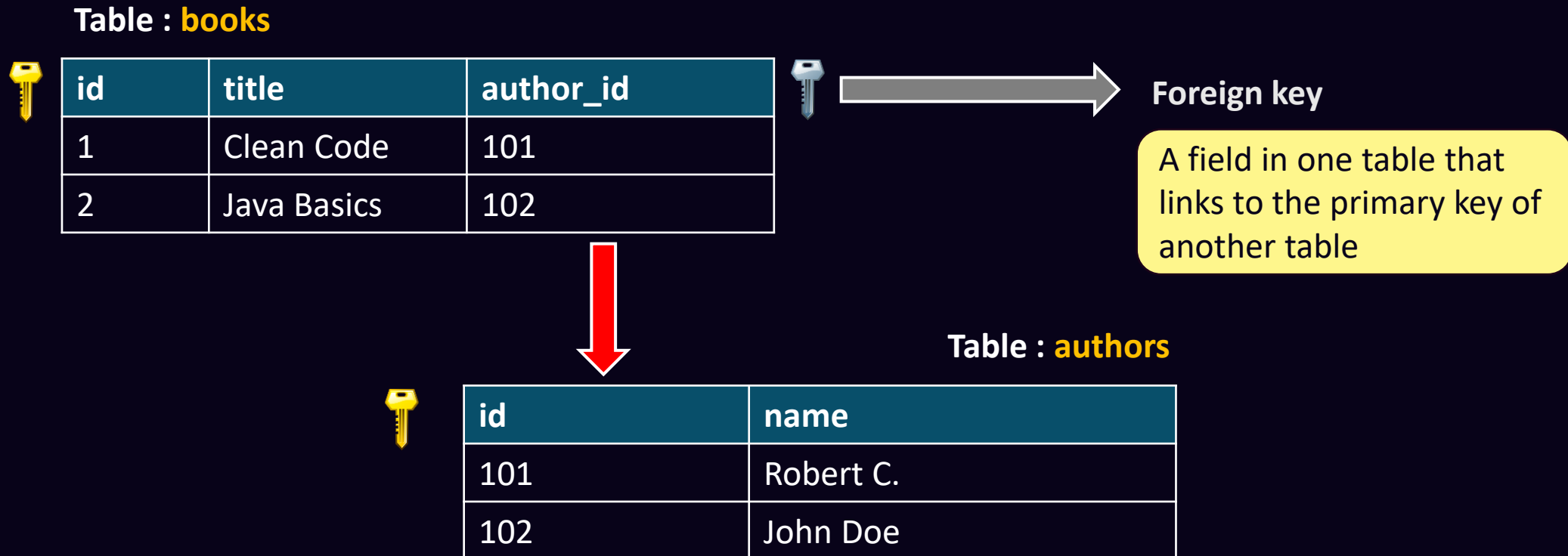
- Relational (SQL): MySQL, PostgreSQL, Oracle
- Non-relational (NoSQL): MongoDB, Firebase
- In-memory: Redis
- Cloud databases: Amazon RDS, Google Cloud SQL

What is Table, Row and Column?



What is Relational Database?

A **relational database** is a database that organizes data into **tables and links them using relationships based on keys.**



Jordanian Nationality

🔑 nId : 9941901949

Name : ABD



Jordanian Nationality

🔑 nId : 8523677450

Name : ABD



Table : users



🔑 car_no : 96251

🔑 nId : 9941901949



🔑 car_no : 51236

🔑 nId : 9941901949



🔑 car_no : 77423

🔑 nId : 8523677450



🔑 car_no : 36987

🔑 nId : 9941901949



🔑 car_no : 11236

🔑 nId : 8523677450

Table : cars

Key Concepts

Term	Meaning
Primary Key	Uniquely identifies each record in a table
Foreign Key	A field in one table that links to the primary key of another table
SQL	Structured Query Language used to interact with relational databases
Normalization	Organizing tables to reduce redundancy and improve integrity

SQL

SQL (Structured Query Language) is a standard programming language used to manage and manipulate **relational databases**. It allows users to **create**, **read**, **update**, and **delete** (often abbreviated as **CRUD**) data stored in database systems.

Querying data

```
SELECT * FROM users WHERE age > 18;
```

Inserting data

```
INSERT INTO users (name, age) VALUES ('Alice', 25);
```

Updating data

```
UPDATE users SET age = 26 WHERE name = 'Alice';
```

Deleting data

```
UPDATE users SET age = 26 WHERE name = 'Alice';
```

Creating tables

```
CREATE TABLE users (  
  id INT PRIMARY KEY,  
  name VARCHAR(100),  
  age INT  
);
```

Joining tables

SQL lets you connect related data across different tables using JOIN operations.

SQL, Operations Types

- DQL – Data Query Language
- DDL – Data Definition Language
- DML – Data Manipulation Language
- DCL – Data Control Language
- TCL – Transaction Control Language

Category	Purpose	Key Commands
DQL	Query data	SELECT
DDL	Define structure	CREATE, ALTER, DROP, TRUNCATE
DML	Manipulate data	INSERT, UPDATE, DELETE
DCL	Control access	GRANT, REVOKE
TCL	Control transactions	COMMIT, ROLLBACK, SAVEPOINT

CRUD

Create, Read, Update, Delete

DML - INSERT

INSERT INTO users (name, age) VALUES ('Abd', 35);



INSERT INTO users (name, age) VALUES ('Khaled', 44);

id	name	age
1	Abd	35
2	Khaled	44

DQL - SELECT

Where clause

SELECT * FROM users WHERE id = 1

id	name	age
1	Abd	35
2	Khaled	44

