

# DATA BASES MODELS AND MER

## DataBase Foundations

Author: Eng. Carlos Andrés Sierra, M.Sc.

cavirguezs@udistrital.edu.co

Lecturer

Computer Engineer

School of Engineering

Universidad Distrital Francisco José de Caldas

2024-III



1 Databases Types

2 Entity-Relation Model (MER)



# Outline

## 1 Databases Types

## 2 Entity-Relation Model (MER)



# Relational DataBases I — Structured Data

product ~~~~~  
 ~~~~~  
 ~~~~~  
 ~~~~~  
 ~~~~~

quantity ~~~~~  
 ~~~~~  
 ~~~~~  
 ~~~~~  
 ~~~~~

pk

id	product	quantity	price

↙

~~~~~

~~~~~



# Relational DataBases II — Tables & Keys

students

PK

name	email	career
Aria	a@odm..	1
Bob	b@odm..	3
Charlie	c@odm..	1
Dennis	d@odm..	2

career

id	name
1	Ing de S. Sist.
2	Ing. Catastral
3	Ing. Electrónica

"rosa" == "rose" ?

2M #1 hola  
2 rose

id	name
1	hola
2	rose



# Semi-Structured Data



Unstructured

PDFs, JPEGs,  
MP3, Movies, ...



Structured

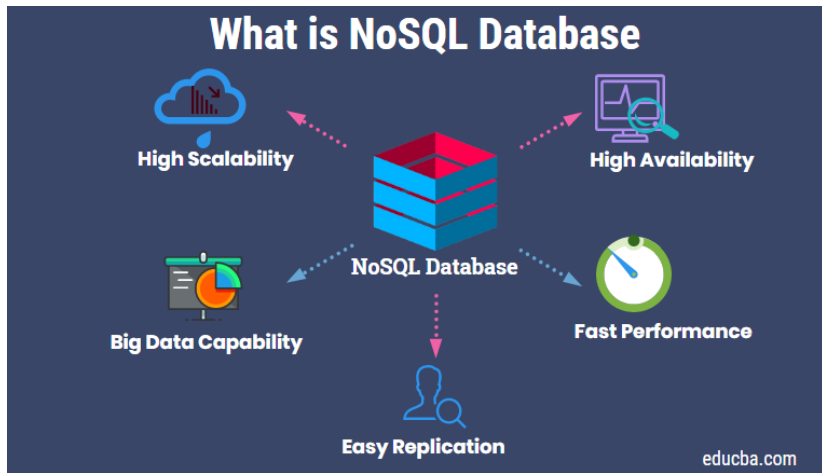
Oracle, MSSQL,  
MySQL, DB2, ...

Semi-structured

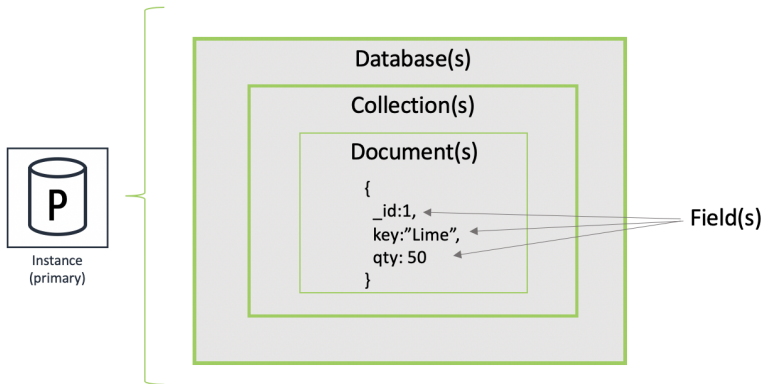
CSV, JSON, XML,  
MongoDB, ...



# NoSQL Databases



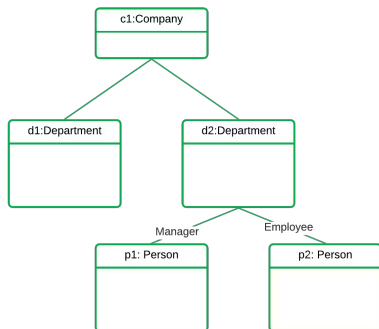
# Document-Based NoSQL



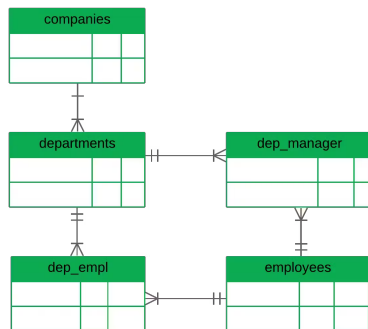


# Object-Oriented NoSQL

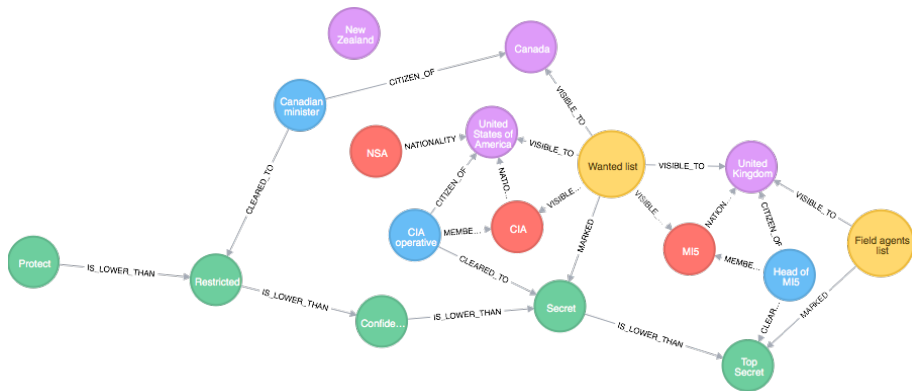
Object-Oriented



Relational



# Graph-Based NoSQL



# Outline

1 Databases Types

2 Entity-Relation Model (MER)



# Basic Concepts

- **Entity:** A thing or **object** in the real world that is **distinguishable** from other **objects**.
- **Attribute:** A **property** or characteristic of an **entity**.
- **Relationship:** An **association** between entities.
- **Cardinality:** The number of **instances** of an **entity** that can be associated with another entity.
- **Degree:** The number of entities that participate in a relationship.



# Basic Concepts

- **Entity:** A thing or **object** in the real world that is **distinguishable** from other **objects**.
- **Attribute:** A **property** or characteristic of an **entity**.
- **Relationship:** An **association** between entities.
- **Cardinality:** The number of **instances** of an **entity** that can be **associated** with **another entity**.
- **Degree:** The number of entities that participate in a **relationship**.



# Basic Concepts

- **Entity:** A thing or **object** in the real world that is **distinguishable** from other **objects**.
- **Attribute:** A **property** or characteristic of an **entity**.
- **Relationship:** An **association** between entities.
- **Cardinality:** The number of **instances** of an **entity** that can be **associated** with **another entity**.
- **Degree:** The **number of entities** that participate in a **relationship**.



# Basic Concepts

- **Entity:** A thing or **object** in the real world that is **distinguishable** from other **objects**.
- **Attribute:** A **property** or characteristic of an **entity**.
- **Relationship:** An **association** between entities.
- **Cardinality:** The number of **instances** of an **entity** that can be **associated** with **another entity**.
- **Degree:** The **number of entities** that participate in a **relationship**.



# Basic Concepts

- **Entity:** A thing or **object** in the real world that is **distinguishable** from other **objects**.
- **Attribute:** A **property** or characteristic of an **entity**.
- **Relationship:** An **association** between entities.
- **Cardinality:** The number of **instances** of an **entity** that can be **associated** with **another entity**.
- **Degree:** The **number of entities** that participate in a **relationship**.





# Step 1. Define Components



## Step 2. Define Entities



# Step 3. Define Attributes per Entity



# Step 4. Define Relationships



# Step 5. Define Relationships Types



# Step 6. First Entity-Relationship Draw



# Step 7. First Split Many-to-Many Relationships



# Step 8. Second Entity-Relationship Draw





# Step 9. Get Data-Structure E-R M



# Step 10. Define Constraints and Properties of Data



# Outline

1 Databases Types

2 Entity-Relation Model (MER)



# Thanks!

## Questions?



Repo: <https://github.com/EngAndres/ud-public/tree/main/courses/databases-foundations>

