

Data Analytics Project

17. Database Types & ERDs



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Introduction

A database is an **organized collection of structured information** stored electronically.

There are the following types of databases:

1. Flat File Databases
2. Relational Databases
3. NoSQL Databases



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Flat File Databases

1. It stores data in **plain text file** format.
2. Each **line** represents a record, with **fields** separated by delimiters.
3. It is **simple to understand & implement**, suitable for small projects.
4. It **lacks structure**, making **complex queries** difficult.
5. **Common challenges** include **data redundancy & inconsistency**.

Example: A **CSV file** containing customer information with fields for name, age, and email.



Relational Databases

1. It organizes data into tables with predefined relationships.
2. It allows complex queries and scalability for large datasets.
3. Designing and maintaining the relational databases can be complex.
4. Massive datasets may degrade the performance of relational databases.
5. Challenges include ensuring data integrity and managing normalization.

Example: A database for a library with tables for books, authors, and borrowers, linked by relationships.

NoSQL Databases

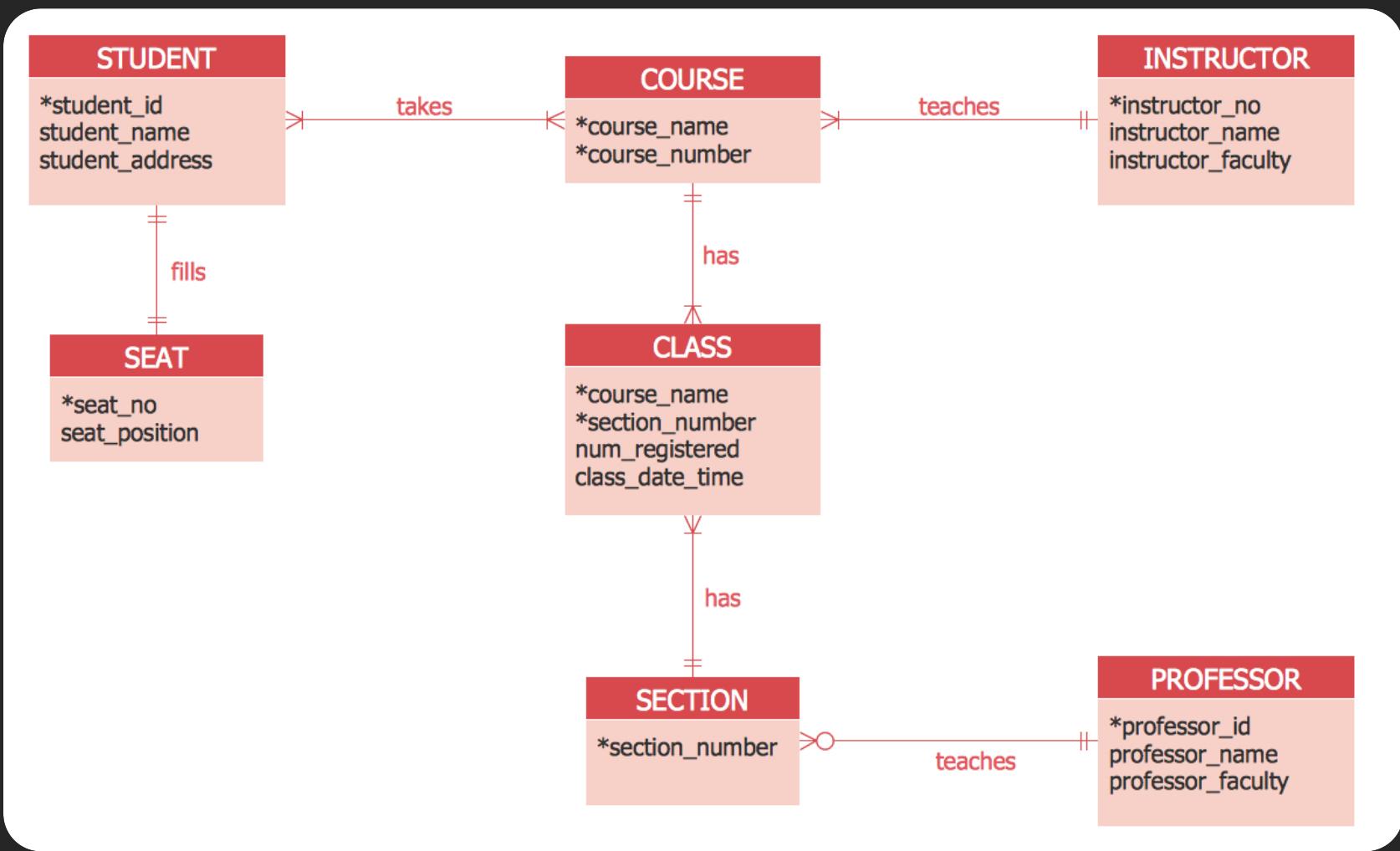
1. Designed for handling **large volumes of unstructured data**.
2. Provide **flexible schemas**, allowing for **easy scalability**.
3. Designing and maintaining the relational databases can be **complex**.
4. Ideal for **distributed** and **real-time applications**.
5. Common types include **document**, **key-value**, and **graph** databases.
5. **Challenges** include **lack of standardization** and potential for data inconsistency.

Example: A **document database storing social media posts** with varying fields for different post types.



ERDs: Entity Relationship Diagrams

ERD Eg.: Class, Students, Instructors, Courses



ERDs: Entity Relationship Diagrams

1. ERDs are visual representations of the relationships among entities in a database.
2. Entities represent real-world objects.
3. Relationships depict how entities interact with each other.
4. ERDs use symbols such as rectangles for entities, diamonds for relationships, and lines connecting them.
5. They aid in understanding and designing databases.
6. Primary and secondary keys ensure record uniqueness.



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