

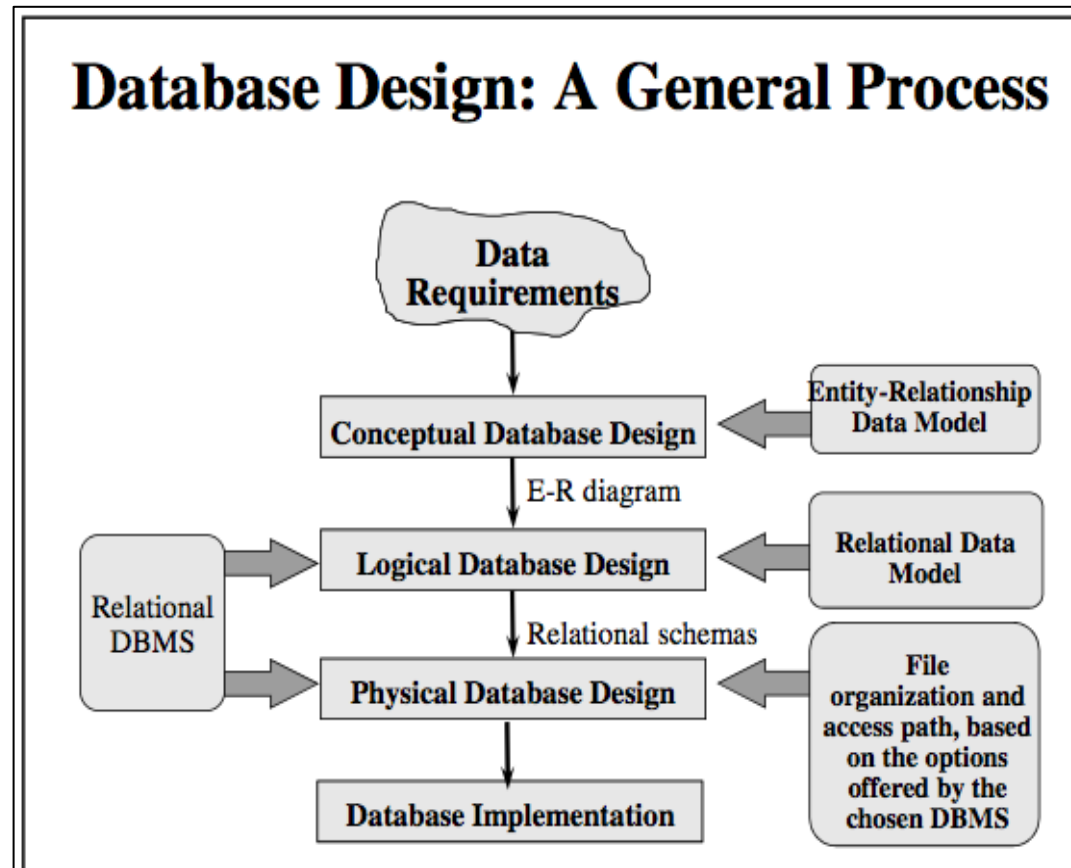
database

dB design steps

2024-2025

7. Database design

- Database Design and Application Development: How can a user describe a real-world enterprise (e.g., a university) in terms of the data stored in a DBMS? What factors must be considered in deciding how to organize the stored data?



1.1 Database Design Process

► The database design process can be divided into six steps. The E-R model is most relevant to the first three steps.

1. Requirements Analysis:

The very first step in designing a DB application is to understand what data is to be stored in the DB, what applications must be built on top of it, and what operations are most frequent and subject to performance requirements.

2. Conceptual Database Design: The information gathered in the requirements analysis step is used to develop a high-level description of the data to be stored in the DB, along with the constraints known to hold over this data. This step is often carried out using the E-R model.

3. Logical Database Design: We must choose a DBMS to implement our DB design, and convert the conceptual database design into a DB schema in the data model of the chosen DBMS.

4. Schema Refinement: The fourth step with DB's design is to analyze the collection of relations in our relational DB schema to identify potential problems, and to refine it (Normalization).

5. Physical Database Design: It describes the details of how data is stored. This step may simply involve building indexes on some tables and clustering some tables

6. Application and Security Design: Any software project that involves a DBMS must consider aspects of the application that go beyond the database itself. We must identify the entities (e.g., users, user groups, departments) and processes involved in the application. We must describe the role of each entity in every process that is reflected in some application task, as part of a complete workflow for that task.