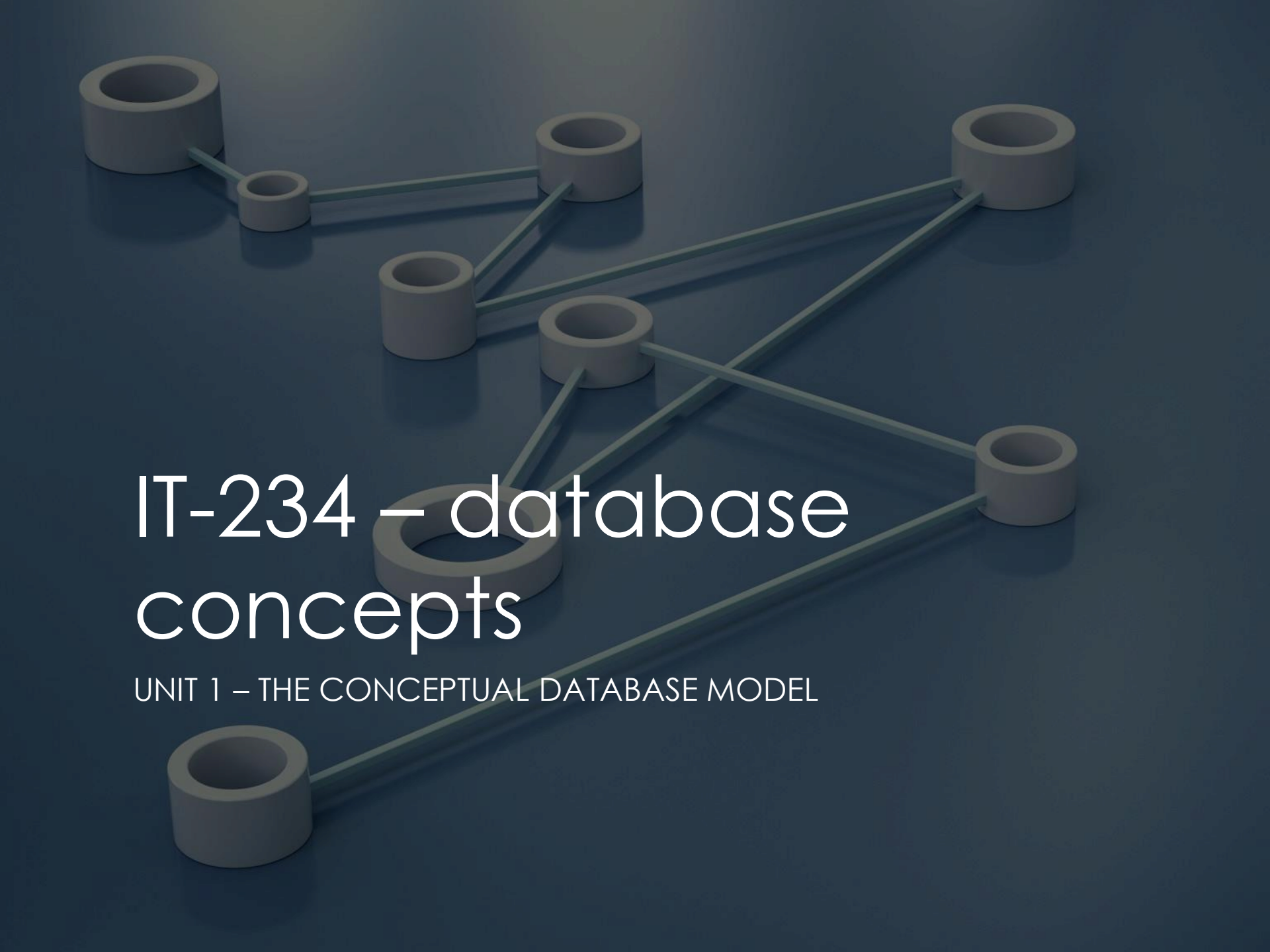


IT-234 – database concepts

UNIT 1 – THE CONCEPTUAL DATABASE MODEL

overview

There are three levels to data modeling.

Each level exposes another layer of detail.

The conceptual data model, which this unit examines, only deals with entity names and entity relationships.

overview

The logical data model adds attributes, primary keys, and foreign keys.

Finally, the physical data model adds table names, column names, and column data types.

overview

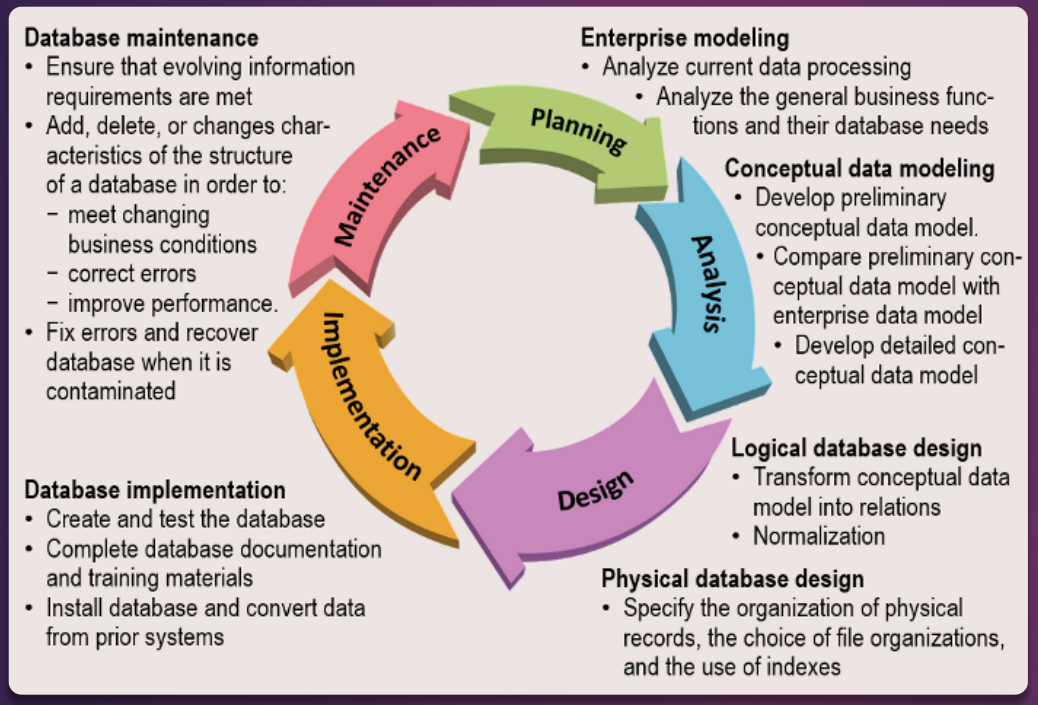
- Aimed at a business audience, the conceptual model is a summary level data model and is very abstract.
- It takes a very high-level view of the problem.
- It is designed to be independent of any specific database management system or vendor.

overview

After completing this unit, you should be able to:

- Create a conceptual model for a database that has three or more tables.
- Identify entities.
- Recognize relationships.

Database life cycle



What is Data Modeling?

Data modeling is the process of creating a data model for the data to be stored in a database.

This data model is a conceptual representation of data objects, the associations between different data objects, and the rules.

What is Data Modeling?

Data modeling helps in the visual representation of data and enforces business rules, regulatory compliances, and government policies on the data.

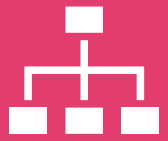
Data models ensure consistency in naming conventions, default values, semantics, security while ensuring quality of the data.

Data Model

The data model is defined as an abstract model that organizes data description, data semantics, and consistency constraints of data.

The data model emphasizes on what data is needed and how it should be organized instead of what operations will be performed on data.

Data Model



A data model is a specification of the data structures and business rules representing business requirements.

The data model is like an architect's building plan, which helps to build conceptual models and set a relationship between data items.

Data Model

- One of the first things you do when developing an application is talk to the business group about their requirements, then document them.
- The data model provides a method to visually communicate the data that is needed, collected, and used by an organization.

Data Model

The data model's primary job is to be the data design specification for an IT application

The team meets and develops the reporting or application specifications for the code.

Application code needs to operate on data.	The data model is the data design specification for that portion of the application.

Why use A Data Model?

Ensures that all data objects required by the database are accurately represented.

Omission of data will lead to creation of faulty reports and produce incorrect results/outputs.

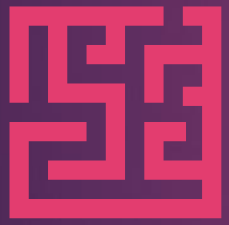
A data model helps design the database at the conceptual, physical and logical levels.

Why use A Data Model?

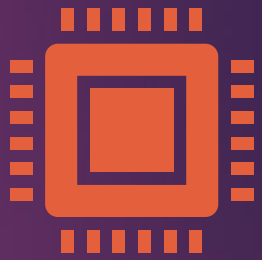
Data Model structure helps to define the relational tables, primary and foreign keys and stored procedures.

It provides a clear picture of the base data and can be used by database developers to create a physical database.

Why use A Data Model?



It is also helpful to identify missing and redundant data.



Though the initial creation of data model is labor and time consuming, in the long run, it makes your IT infrastructure upgrade and maintenance cheaper and faster.

Types of Data Models

There are mainly three different types of data models:

- Conceptual Data Model
- Logical Data Model
- Physical Data Model

The data models are used to represent the data and how it is stored in the database and to set the relationship between data items.

Types of Data Models

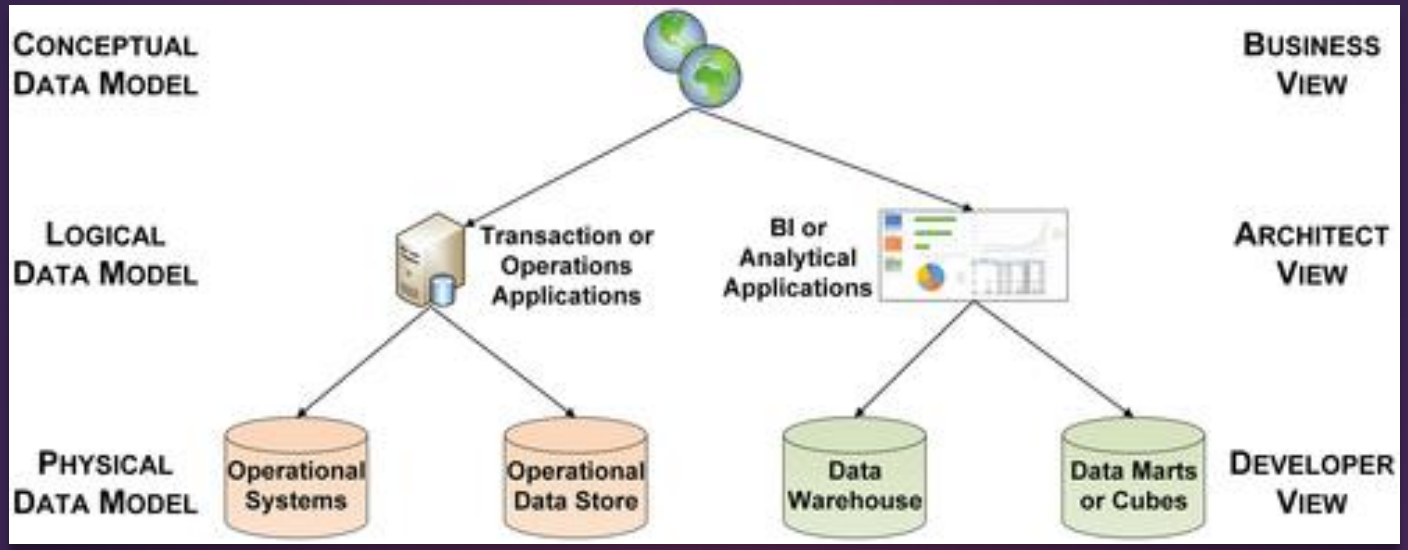
- ***Conceptual Data Model***
  - This Data Model defines WHAT the system contains.
  - This model is typically created by Business stakeholders and Data Architects.
  - The purpose is to organize, scope and define business concepts and rules.

Types of Data Models

- ***Logical Data Model***
  - Defines HOW the system should be implemented regardless of the DBMS.
  - This model is typically created by Data Architects and Business Analysts.
  - The purpose is to developed technical map of rules and data structures.

Types of Data Models

- ***Physical Data Model***
  - This Data Model describes HOW the system will be implemented using a specific DBMS system.
  - This model is typically created by DBA and developers.
  - The purpose is actual implementation of the database.



Types of Data Models

Conceptual Database Model

A Conceptual Data Model is an organized view of database concepts and their relationships.

The purpose of creating a conceptual data model is to establish entities and relationships.

Conceptual Database Model

IN THIS DATA MODELING LEVEL, THERE IS HARDLY ANY DETAIL AVAILABLE ON THE ACTUAL DATABASE STRUCTURE.

BUSINESS STAKEHOLDERS AND DATA ARCHITECTS TYPICALLY CREATE A CONCEPTUAL DATA MODEL.

Conceptual Database Model Basic Tenants

- The two basic tenants of the Conceptual Data Model are:
  - ***Entity***: A real-world thing
  - ***Relationship***: Dependency or association between two entities

Conceptual Database Model Example

- *Customer* and *Product* are two entities
- *Purchase* is the relationship between the customer and product
  - "A customer purchases zero, one, or more products."
  - "A product is purchased by zero, one, or more customers."

Conceptual Database Model Characteristics

Offers organization-wide coverage of the business concepts.

This type of Data Models are designed and developed for a business audience.

Conceptual Database Model Characteristics

- The conceptual model is developed independently of hardware specifications like data storage capacity, location or software specifications like DBMS vendor and technology.
  - The focus is to represent data as a user will see it in the "real world."

Unit 1 To Do!


Reading & Videos
Discussion Forum
Seminar (or Alternative)
Assignment

UNIT 1 ASSIGNMENT

UNIT 1 ASSIGNMENT

Purpose:

When designing databases, you create three models: conceptual, logical, and physical.

The assignment for Unit 1 asks you to create a conceptual data model based on a movies dataset.

You will identify entities and relationships between the entities.

Data models are used in a variety of business scenarios to describe the organizations data.

UNIT 1 ASSIGNMENT

- Assignment Instructions:

  - Given a Movies Dataset, you will conceptualize a database solution using three or more tables.
  - Based on the data analysis, you will then create a conceptual model using Microsoft® Visio®, which can be obtained at no cost from the Microsoft Azure Dev Tools for Teaching site.

UNIT 1
ASSIGNMENT

Assignment Instructions:

- Download and use the Movies Dataset for your analysis.
- Identify the entities for the conceptual data model, and then determine which entities are related.

UNIT 1
ASSIGNMENT

Assignment Instructions:

- In a Word document, write a list of the entities, and explain your choices. In this same document, describe the relationships that exist between these entities, and using a few sentences, explain why they are related.

UNIT 1 ASSIGNMENT

- Assignment Instructions:
  - In Visio (or within the same Word document), create a conceptual database model that shows the entities and their relationship.
    - Refer to the Unit 1 learning activity for an example.
  - If you created the conceptual model in Visio, embed the Visio diagram in the Word document so that you have a single document for submission.

UNIT 1 ASSIGNMENT

- Assignment Instructions:
  - What sources did you refer to while working on this Assignment?
  - Cite these sources within the body of the paper and annotate those as your references at the end of the paper.

UNIT 1
ASSIGNMENT

Assignment Requirements:

Compose your Assignment in a Word document and be sure to identify yourself, your class, and unit Assignment at the top of your paper.	Copy the design diagram(s) into your Word document.	Be sure to use appropriate APA format and cite your textbook or other sources that you used in the assignment.

UNIT 1 ASSIGNMENT

- Directions for Submitting Your Assignment:

- Name your assignment document according to this convention: IT234_<YourName>_Unit1.docx (replace <YourName> with your full name).
- Submit your completed assignment to the Unit 1 Assignment Dropbox by the final day of the Unit 1 week.
- Review the Unit 1 Assignment Rubric before beginning this activity.

Any Questions?