



# Database Foundations

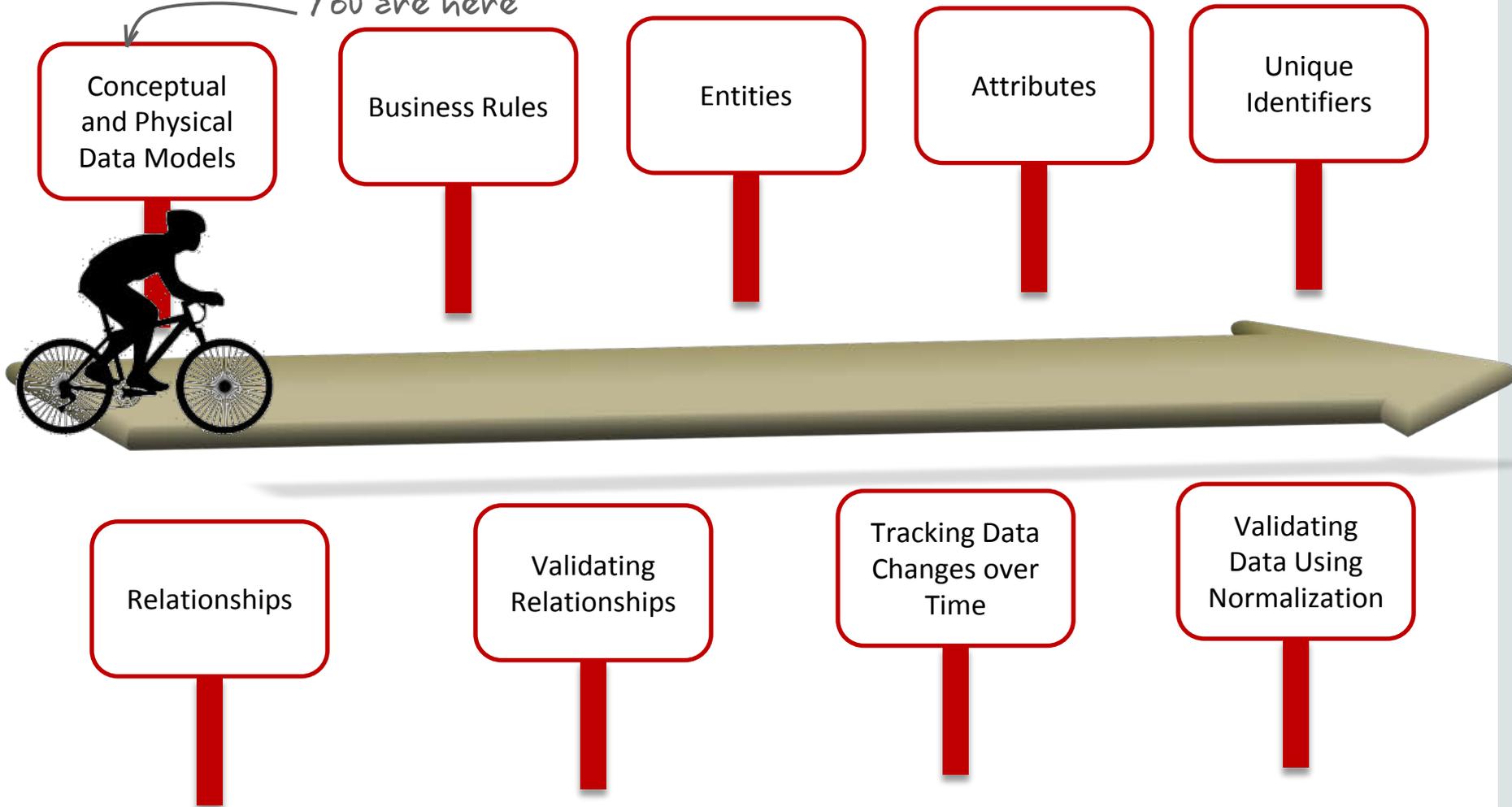
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## Conceptual and Physical Data Models



# Roadmap

*You are here*



# Objectives

This lesson covers the following objectives:

- Describe a conceptual data model
- Describe a logical data model
- Describe a physical data model
- Analyze the similarities and differences between conceptual and physical data models



# What Is a Conceptual Model?

- Captures the functional and informational needs of a business.
- Is based on current needs, but may reflect future needs.
- Addresses the needs of a business (what is conceptually ideal), but does not address its implementation (what is physically possible).
- Identifies important entities and relationships among them.
- Does not specify primary keys.

# What Is a Logical Model?

- Includes all entities and relationships among them.
- Is called an entity relationship model (ERM).
- Is illustrated in an ERD.
- Specifies all attributes for each entity.
- Determines attribute optionality.
- Determines relationship optionality and cardinality.

# What Is a Physical Model?

- Is an extension to a logical data model.
  - Defines table definitions, data types, and precision.
  - Identifies views, indexes, and other database objects.
- Describes how the objects should be implemented in specific database.
- Shows all table structures, including columns, primary keys, and foreign keys.

# Steps to Create a Physical Data Model

**Model entities as tables**

**Model relationships as foreign keys**

**Model attributes as columns**

**Modify the physical data model based on physical constraints and requirements**

# Conceptual and Physical Models

- The art of planning, developing, and communicating produces a desired outcome.
- Data modeling is the process of capturing the important concepts and rules that shape a business and depicting them visually in a diagram. This diagram becomes the blueprint for designing the physical thing.
- The client's dream (conceptual model) becomes a physical reality (physical model).

# Conceptual/Logical Model: Case Scenario



**Faculty**

Matt, I would like you to create a simplified library database to store the book details in our department.

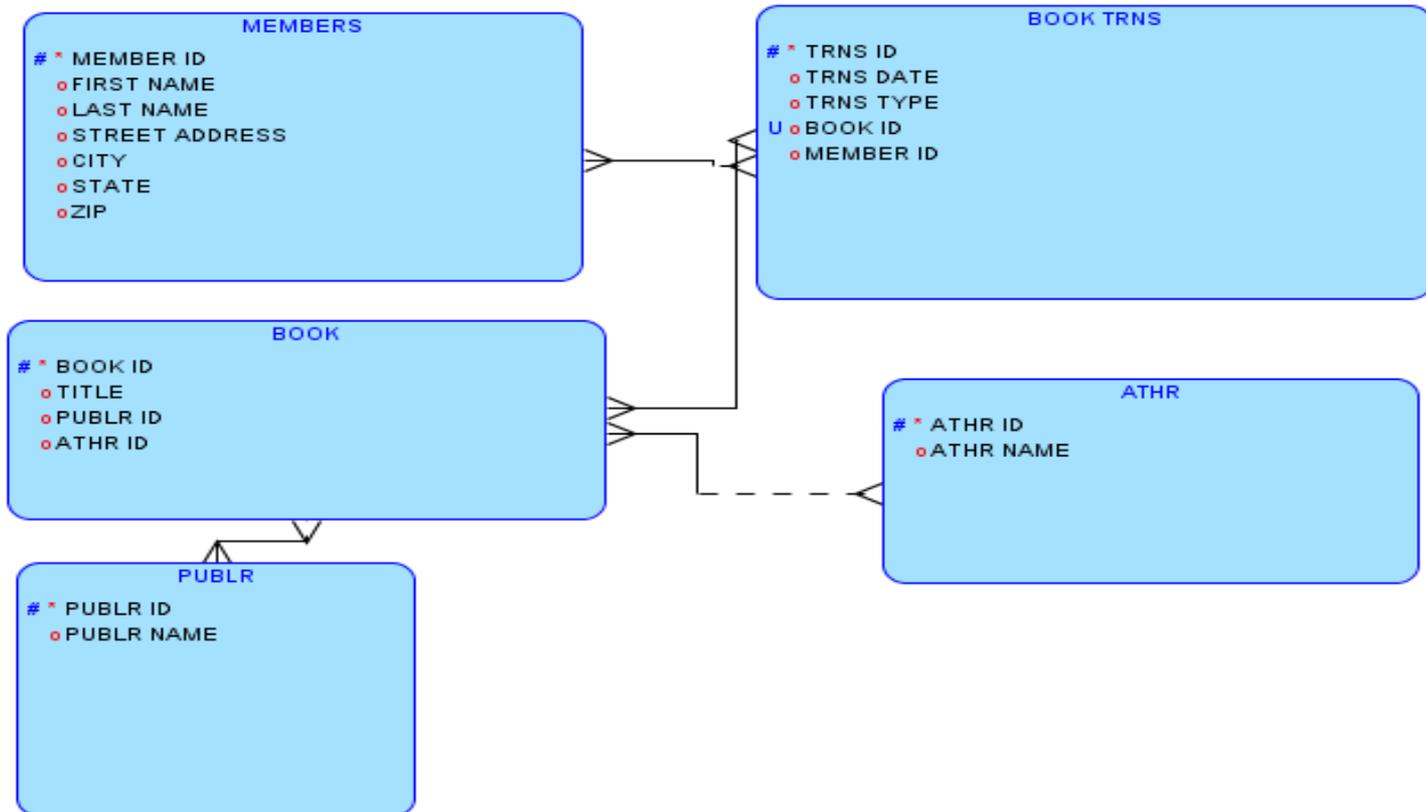
Sure. I will start by identifying the entities and attributes and their relationships.



**Matt**

# Case Scenario: Creating a Conceptual/Logical Model

A logical data model documents the information requirements of the business.



# Physical Model: Case Scenario



**Faculty**

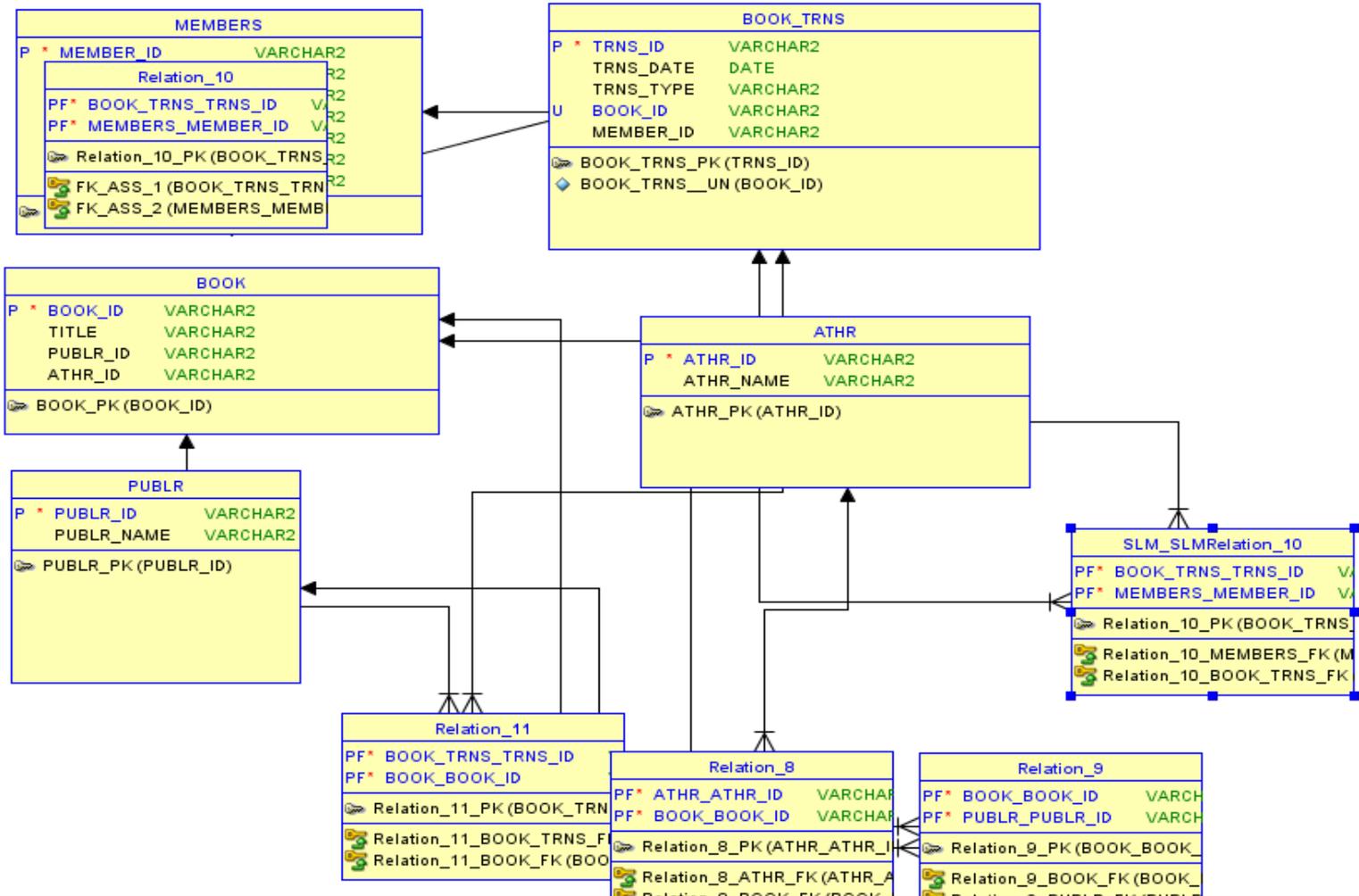
Matt, I want to know the specifications for all tables and columns required in the simplified library database.

Sure. I will convert the entities and their attributes into tables and columns.



**Matt**

# Case Scenario: Creating a Physical Model



# Summary

In this lesson, you should have learned how to:

- Describe a conceptual model
- Describe a logical model
- Describe a physical model
- Analyze the similarities and differences between conceptual and physical data models



