



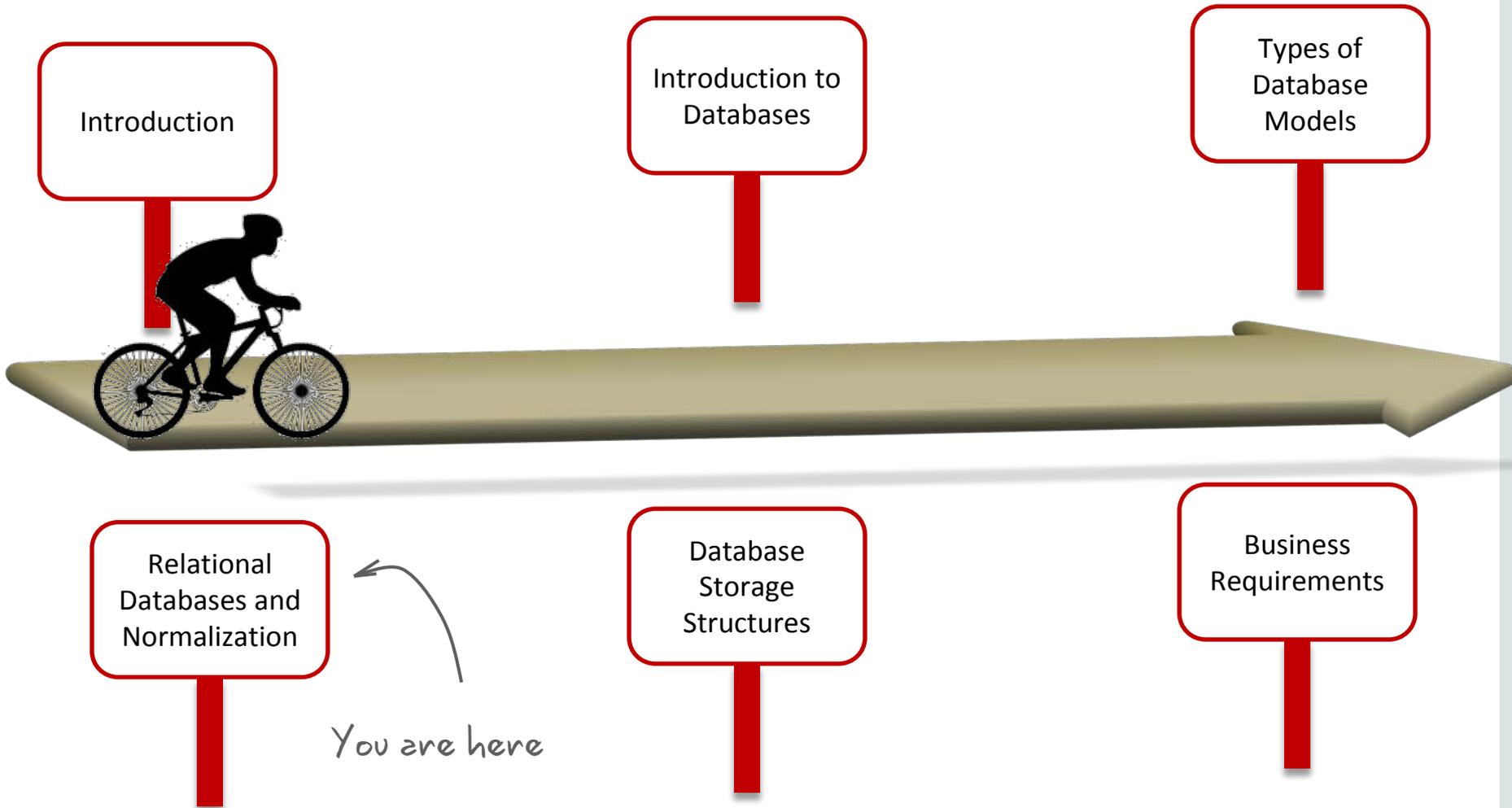
# Database Foundations

1-4

Relational Databases and Normalization



# Roadmap



# Objectives

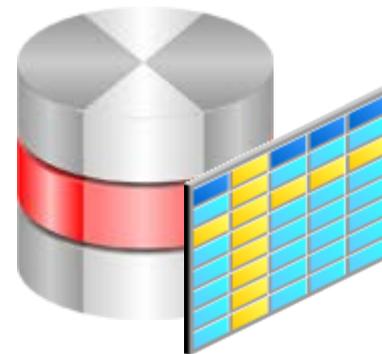
This lesson covers the following objectives:

- Describe the features of a relational database
- Explain the rules of a relational database
- Explain the objectives of normalization
- Describe the types of normalization



# Introduction to Relational Databases

- A relational database stores information in tables with rows and columns.
- A table is a collection of records.
- A row is called a record (or instance).
- A column is referred to as a field (or attribute).



# Relational Database Example

**Order Detail Table**

Order Detail ID	Order Details	Customer ID

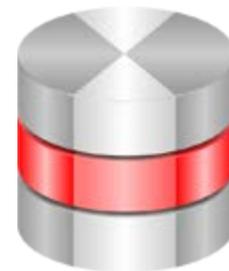
**Customer Table**

Customer ID	Customer Name	Customer Address

A relational database consists of tables that are linked by a common attribute.

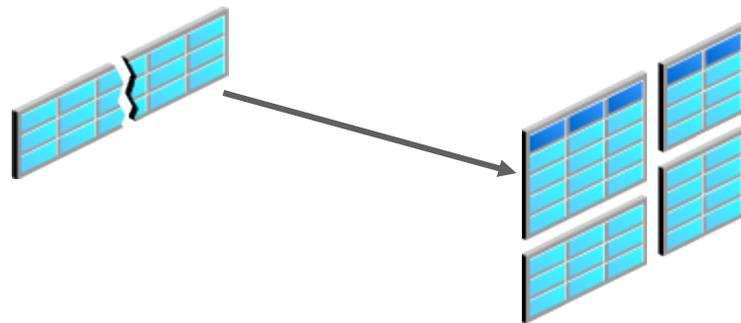
# Rules for Relational Databases

- Each table has a distinct name.
- Each table may contain multiple rows.
- Each table has a value to uniquely identify the rows.
- Each column in a table has a unique name.



# Normalization

- Is the process of organizing the attributes and tables of a relational database to minimize redundancy.
- Helps in handling insert, update, and delete anomalies, ensuring a better performance of the database.



# Objectives of Normalization

- To free the collection of tables from undesirable insertion, update, and deletion dependencies
- To reduce the need for restructuring the collection of relations, as new types of data are introduced, and thus increase the life span of application programs
- To make the relational model more informative to users
- To make the collection of tables neutral to the query statistics, where these statistics are liable to change as time goes by

  
As specified by E.F. Codd

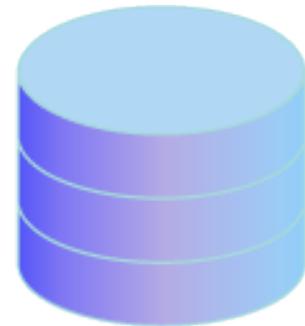
# Advantages of a Relational Database

- Avoids duplication of data
- Ensures consistency of the data that is stored as records
- Easier to modify data and data format
- Easier to insert and delete data
- Easier to maintain security of data



# Data Integrity

- Data integrity is a very essential function of relational databases.
- Data integrity:
  - Ensures that data is accurate.
  - Ensures that data is consistent.
  - Is achieved through normalization, defined business rules, and validated data.



# Quiz

Data integrity ensures the accuracy of information.

- a. True
- b. False

# Summary

In this lesson, you should have learned how to:

- Describe the features of a relational database
- Explain the rules of a relational database
- Explain the objectives of normalization
- Describe the types of normalization



