

Welcome to Lesson 2 of Module 3 on the relational data model and the CREATE TABLE statement

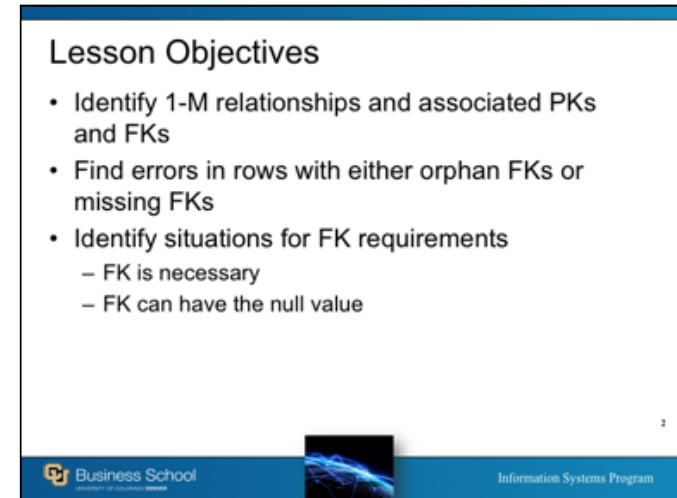
- This lesson continues our study of the relational data model and the SQL CREATE TABLE statement
- This lesson covers two major rules for storing rows in relational databases.

Opening question:

- What is the consequence of two taxpayers or customers with the same government identifier or customer identifier?
- What is the consequence of a shipment connected to the wrong order?

Relational databases are the dominant commercial standard

- Simplicity and familiarity with table manipulation
- Strong mathematical framework
- Lots of research and development



## Integrity Rules

- Entity integrity: primary keys
  - Each table has column(s) with unique values
  - No missing values for primary keys
  - Ensures traceable entities
- Referential integrity: foreign keys
  - Values of a column in one table match values from a source table
  - Ensures valid references among tables

3

### Informal definitions

#### Examples:

- Student rows are uniquely identified by StdSSN
- Offering rows are uniquely identified by OfferNo
- Enrollment rows are uniquely identified by the combination of StdSSN and OfferNo
- Enrollment.StdSSN refers to a valid StdSSN value in the Student table
- Enrollment.OfferNo refers to a valid OfferNo in the Offering table

## Integrity Rule Violations

Student		Offering	
StdNo	Std.LastName	OfferNo	CourseNo
123-45-6789	WELLS	1234	IS320
124-56-7890	KENDALL	4321	IS320
234-56-7890	NORBERT		
--	JONES		

Enrollment	
StdNo	OfferNo
123-45-6789	1234
234-56-7890	1234
123-45-6789	4321
124-56-7890	4321
234-56-7890	6789
--	4321

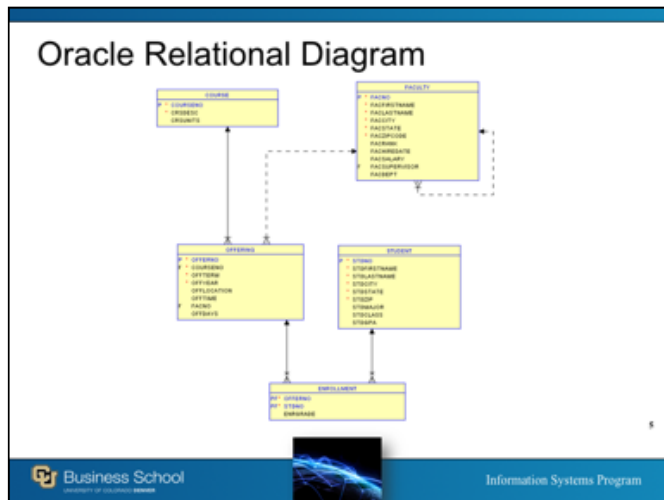
4

Missing value for PK of Student table (4<sup>th</sup> row)

Orphan row in Enrollment: 5<sup>th</sup> row with OfferNo 6789

Missing value of part of a PK for Enrollment (6<sup>th</sup> row)

Add in video quiz questions for the violations.

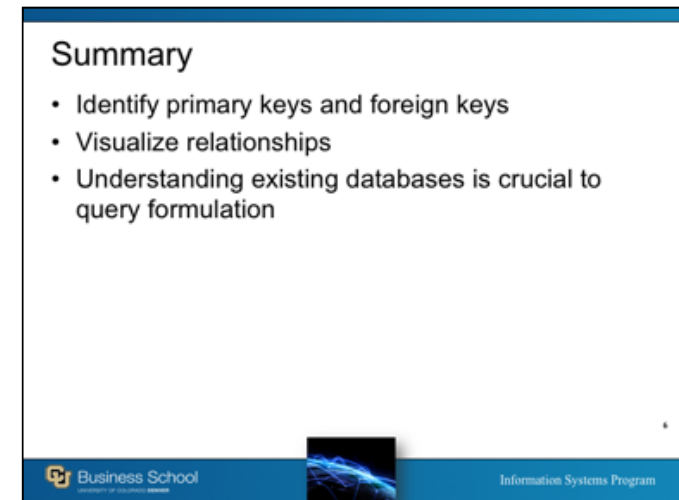


#### Oracle Relational Diagram

- Created in Oracle SQL Developer
- Select New Design in Data Modeler -> Browser
- Drag tables into design window
- View Details: show only columns in this diagram
- Can also show other details such as data types

#### Notation

- Solid line: mandatory relationship (NOT NULL constraint for FK)
- Dashed line: optional relationship (NULL values allowed)
- Cross: FK is part of PK



#### Valid reference problems

- Orders without a customer or incorrect customer
- Order without a shipment
- Missing reference values represent valid rows (internet order without an employee) or data entered later (offering with instructor reference later).

#### Understand a database is a prerequisite to query formulation

- How are rows identified? PKs and CKs
- What data can be compared? Data type knowledge
- How can tables be combined? Foreign keys and relationship details (1-M relationships)
- Visualization: show the direct and indirect connections among tables