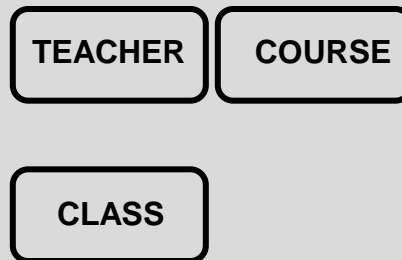# Database Design

Matrix Diagrams

# Objectives

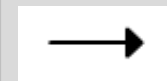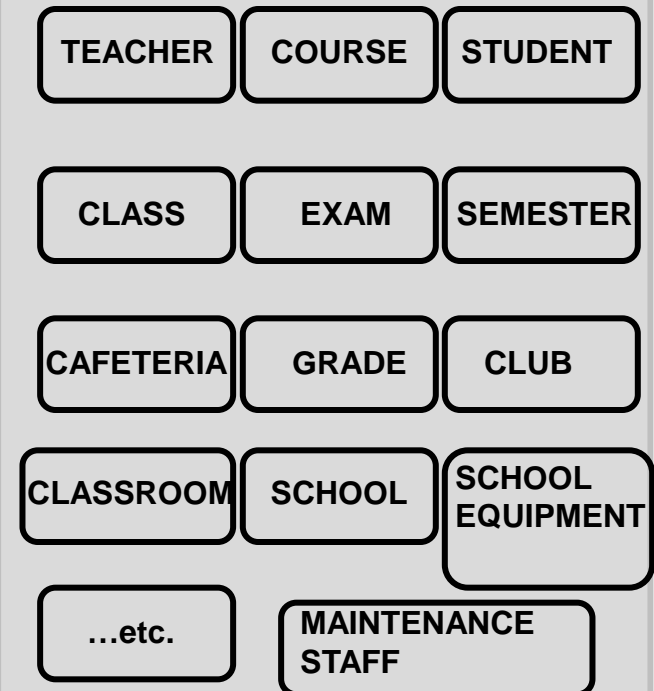This lesson covers the following objectives:

- Identify relationships using a matrix diagram
- Draw an ERD from a matrix diagram

# Purpose

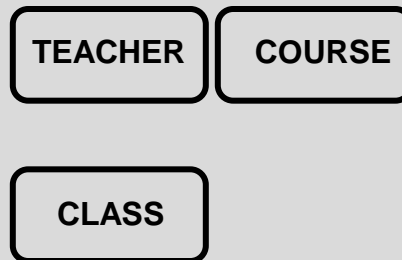It is useful to know more than one way to discover relationships.

| | |
|---|---|
| **TEACHER** | **COURSE** |
| **CLASS** | |

It may be simple enough to identify relationships given three entities.

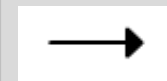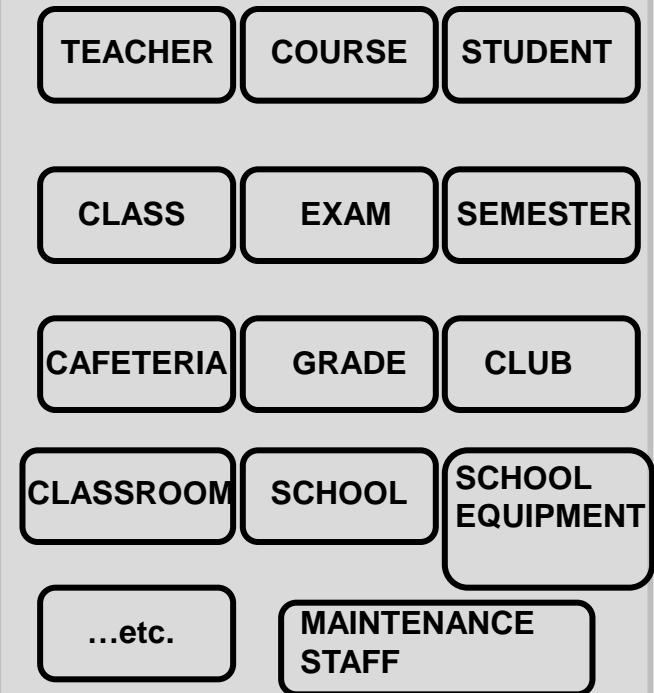| | | |
|---|---|---|
| **TEACHER** | **COURSE** | **STUDENT** |
| **CLASS** | **EXAM** | **SEMESTER** |
| **CAFETERIA** | **GRADE** | **CLUB** |
| **CLASSROOM** | **SCHOOL** | **SCHOOL EQUIPMENT** |
| **…etc.** | **MAINTENANCE STAFF** | |

⟶ But what about finding relationships when you have thirteen or more entities?

# Purpose (cont.)

Using a matrix diagram, especially when you are dealing with many entities, is a good way to make sure that you haven't missed any relationships.

| TEACHER | COURSE |
|---------|--------|
| CLASS   |        |

It may be simple enough to identify relationships given three entities.

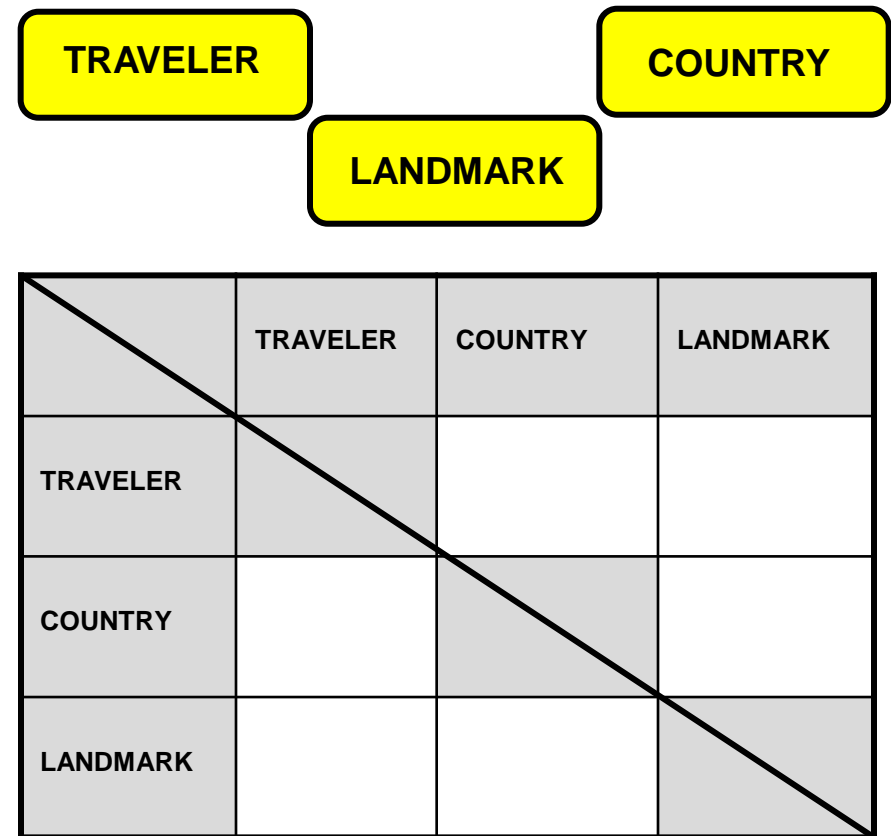| TEACHER | COURSE | STUDENT |
|---------|--------|---------|
| CLASS | EXAM | SEMESTER |
| CAFETERIA | GRADE | CLUB |
| CLASSROOM | SCHOOL | SCHOOL EQUIPMENT |
| …etc. | MAINTENANCE STAFF | |

→ But what about finding relationships when you have thirteen or more entities?

# Business Scenario

"I work for a travel agency. I keep a record of the countries that our customers have visited and the landmarks they've seen in each country. It helps us customize tours for them."
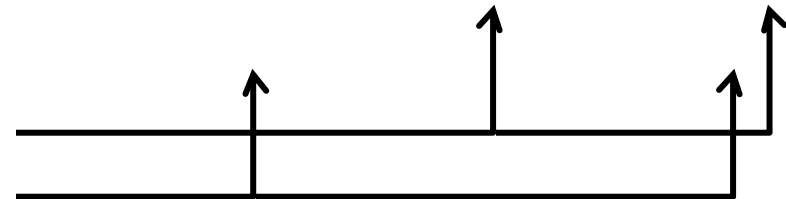
We can use the matrix diagram to uncover relationships.

| | TRAVELER | COUNTRY | LANDMARK |
|---|---|---|---|
| TRAVELER | | | |
| COUNTRY | | | |
| LANDMARK | | | |

**MATRIX DIAGRAM**

# Matrix Diagrams

Relationships discovered via the matrix diagram are drawn on the ERD.

| | TRAVELER | COUNTRY | LANDMARK |
|---|---|---|---|
| TRAVELER | | visit | have seen |
| COUNTRY | visited by | | the location of |
| LANDMARK | seen by | located in | |

To avoid confusion, be consistent in writing to and reading from the matrix only in one direction.
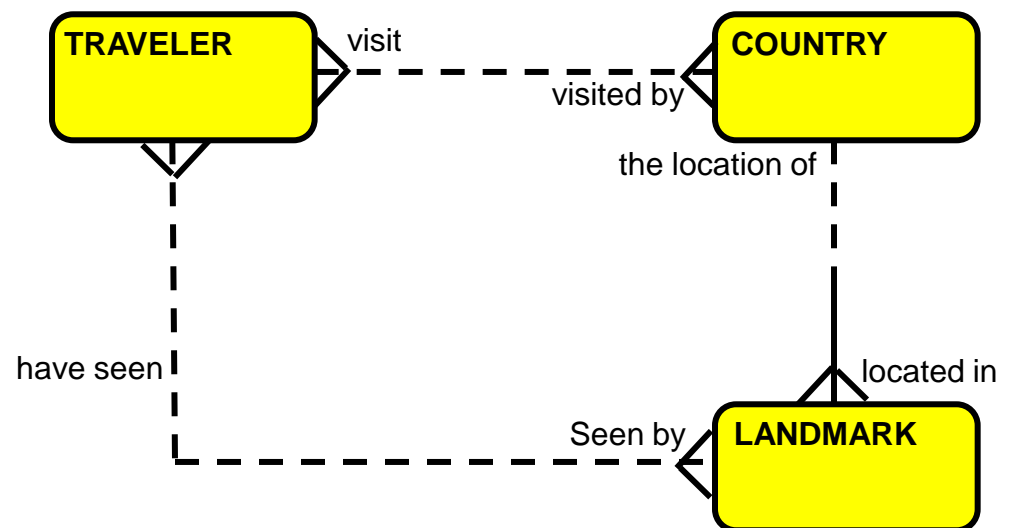
correct: COUNTRY visited by TRAVELER

incorrect: TRAVELER visited by COUNTRY

# Matrix Diagrams (cont.)

Relationships discovered via the matrix diagram are drawn on the ERD.

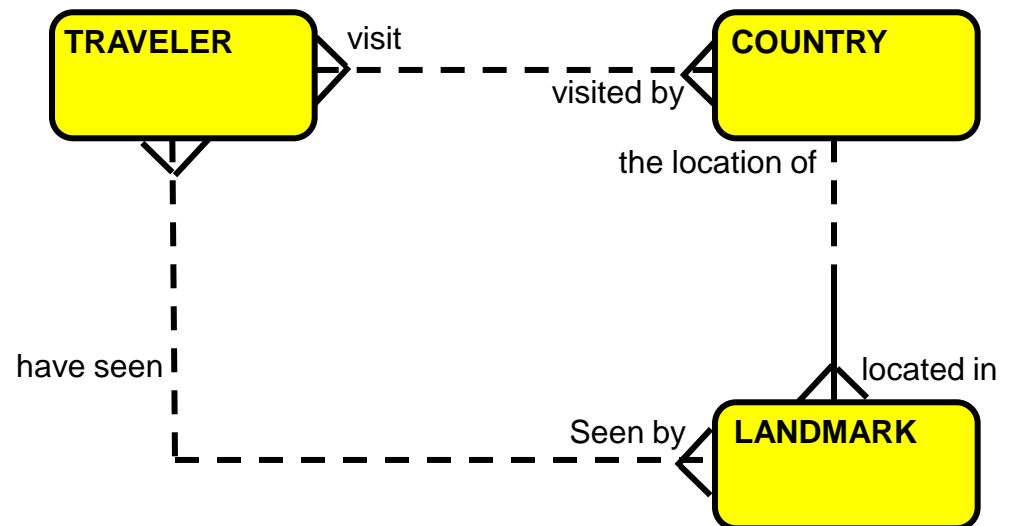|  | TRAVELER | COUNTRY | LANDMARK |
|---|---|---|---|
| TRAVELER | — | visit | have seen |
| COUNTRY | visited by | — | the location of |
| LANDMARK | seen by | located in | — |

Matrix diagrams do <u>not</u> show optionality and cardinality.

# Matrix Diagrams (cont.)

"Each COUNTRY may be visited by one or more TRAVELERs".

|  | TRAVELER | COUNTRY | LANDMARK |
|---|---|---|---|
| TRAVELER | —— | visit | have seen |
| COUNTRY | visited by | —— | the location of |
| LANDMARK | seen by | located in | —— |

# **Terminology**

Key terms used in this lesson included:

- Matrix diagram

# **Summary**

In this lesson, you should have learned how to:

- Identify relationships using a matrix diagram
- Draw an ERD from a matrix diagram