



# MIS 3504

# Digital Design and Innovation

Entities and Data Elements

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Photo: Installation by Jenny Holzer, US Pavillion, Venice Biennale 1990

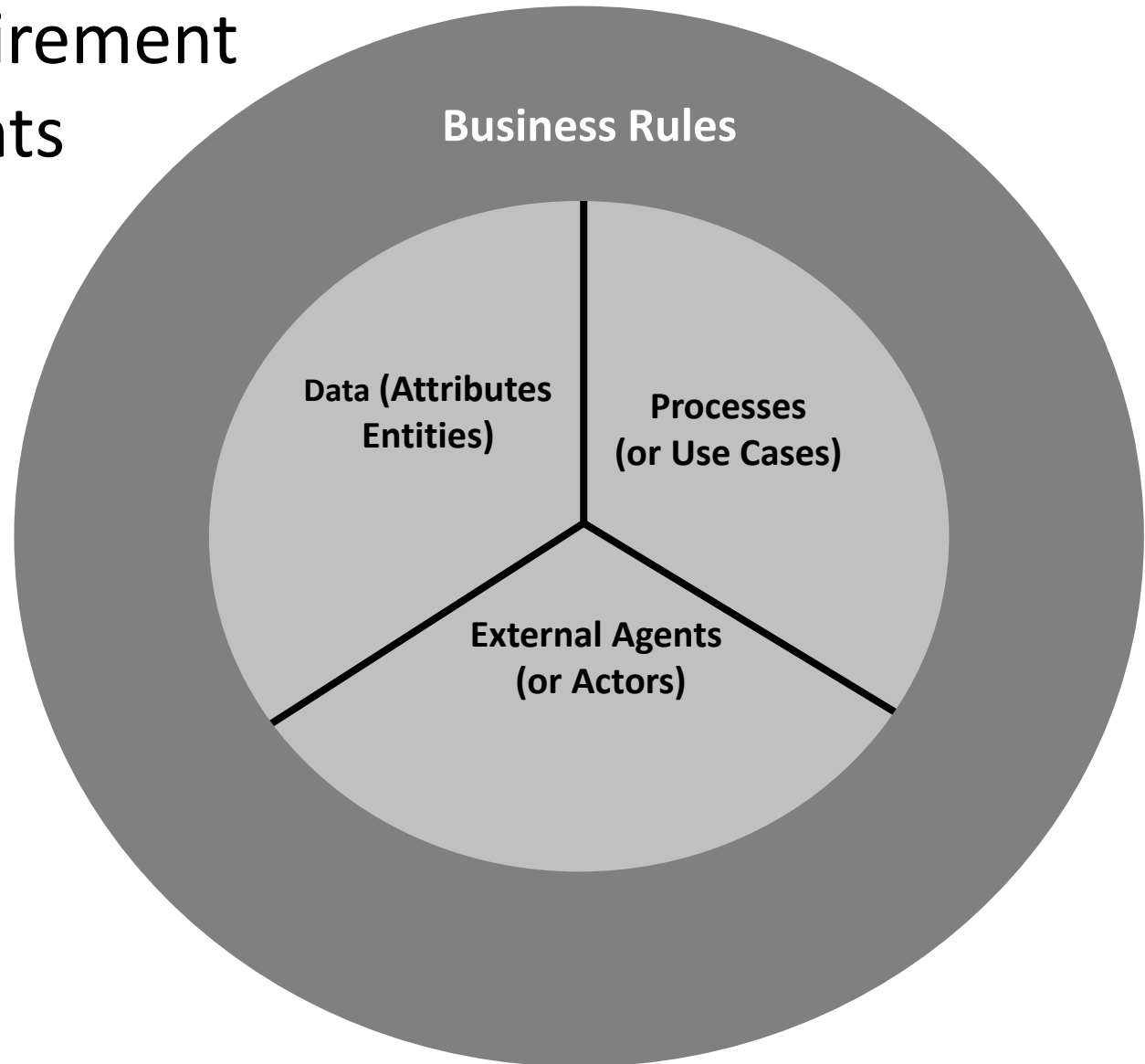
**DATA**

Understanding **DATA**  
needed in a  
business context

What is **DATA**



# Core Requirement Components



# data:

1: factual information (as measurements or statistics) **used as a basis for reasoning, discussion, or calculation** <the *data* is plentiful and easily available — H. A. Gleason, Jr.>  
<comprehensive *data* on economic growth have been published — N. H. Jacoby>

2: information output by a sensing device or organ that includes both useful and irrelevant or redundant information and **must be processed to be meaningful**

3: information in numerical form that can be **digitally transmitted or processed**

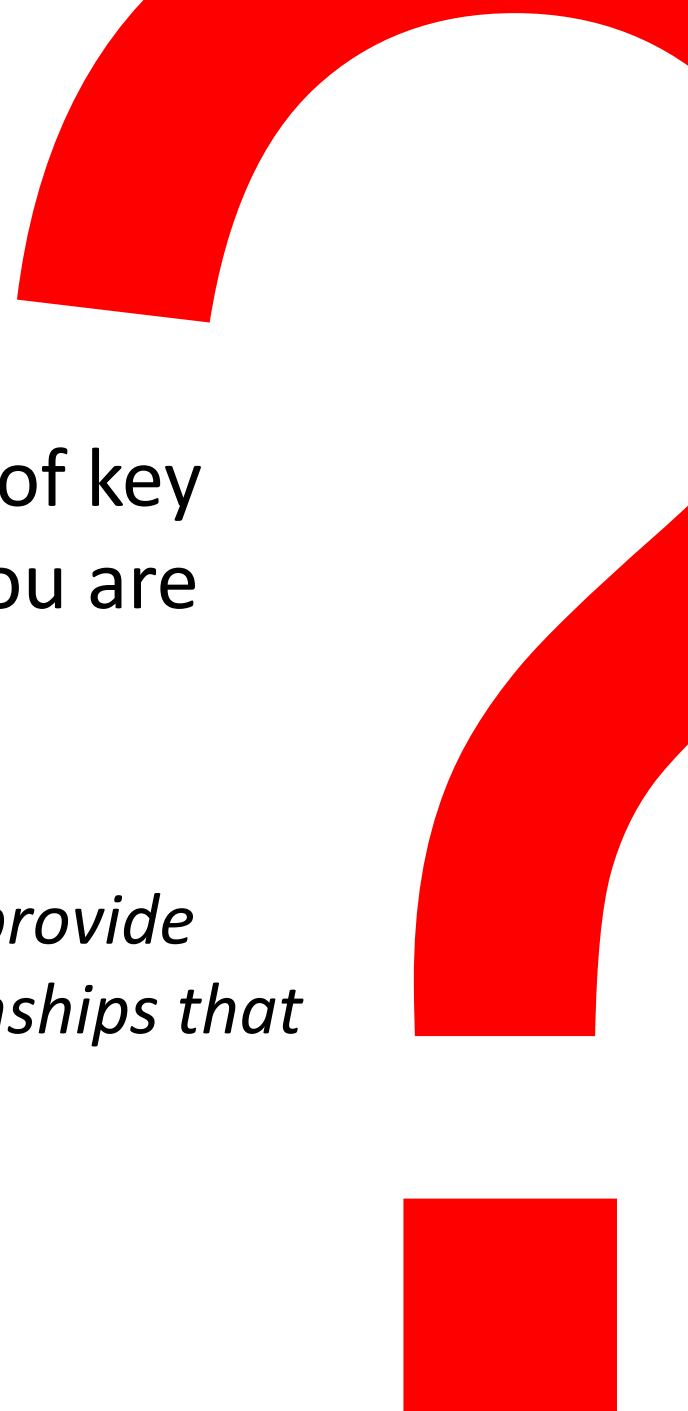
from <http://www.merriam-webster.com/dictionary/data>

[How can data be used](#)

# Defining Data

Once you have good definitions of key terms involved in your project you are done with data. Right?

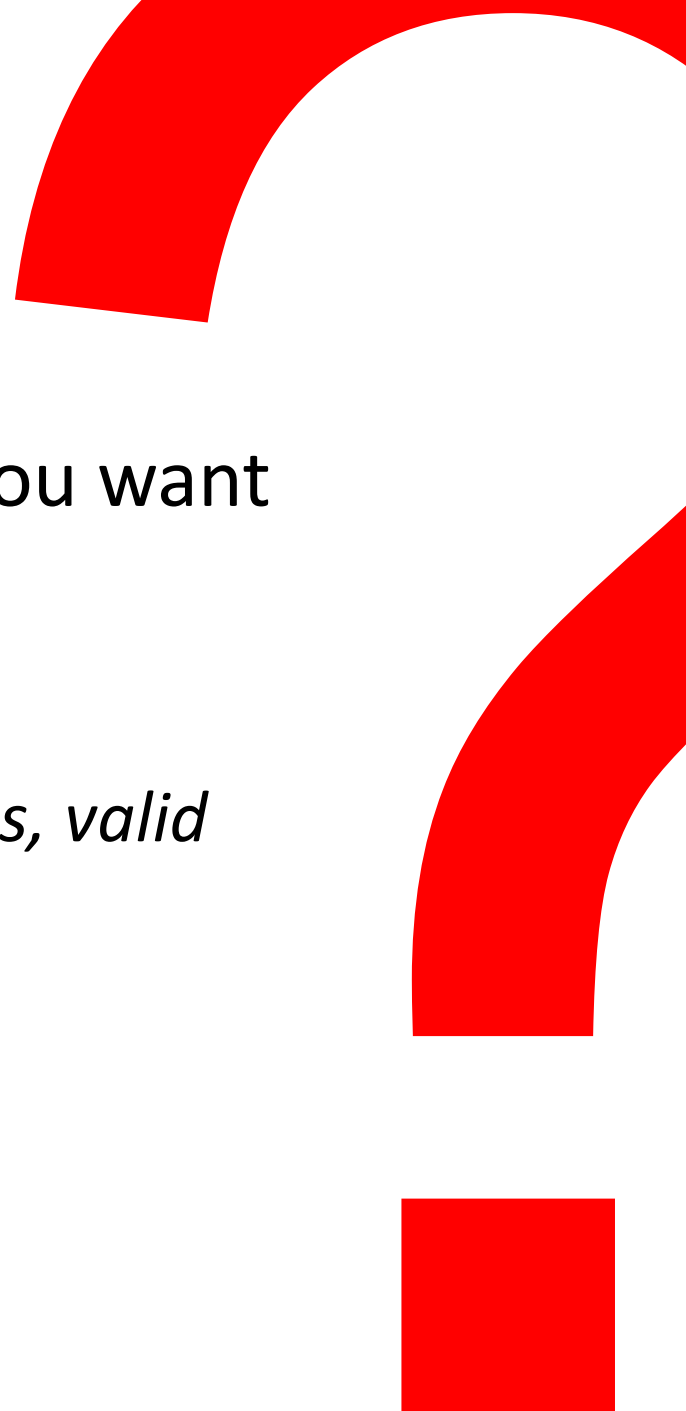
*No, a common definition doesn't provide details about attributes or relationships that are important to your application*



# Defining Data

What other information might you want about your data?

*unique identifier, owner, data types, valid values, relationships, etc.*





# Defining Data

## Logical vs. Physical

*Business structure and actual structure  
User view/database view.*

*One is more technical than the other and therefore can be much more confusing to a non-IT person. Get the details right on the business version, let the tech team design the database*



# Steps to Defining Data

- Create a **Glossary** (list) of items that have been identified during requirements gathering and interviews
- From the glossary identify the **Entities**, *not all items in the list are considered to be entities.*
- Fill in the key **Attributes** (data elements) of the entities, *these may be on the glossary list as well*
- Identify **Relationship** between the entities, *they typically represent business rules*

# Entities

- **What is an entity?**

*It is a data object that has at least one attribute (type) and is manipulated by a system.  
Simple/complex created/stored/transmitted, etc.*

- **Where would you look for them?**

*Each entry in your glossary is a likely entity, although some may be attributes of another entity.*

- **What might you want to know about them?**

*Name, unique identifier, owner, relationships, etc.*



# Attributes

- What is an attribute?

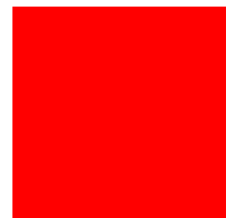
*Further information about a data entity*

- Where would you look for them?

*May be in the glossary but more likely need to ask SME's about properties or characteristics of an entity*

- What might you want to know about them?

*Could be anything but there are some standards – data type, length, valid values, default, owner, etc.*



# Relationships

- What are the real world relationships between data entities?
- Try describing them in a sentence.

A customer places an order.

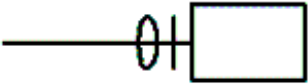
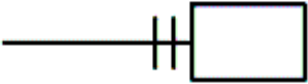
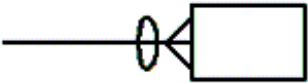
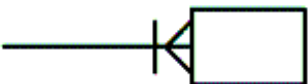


# Relationships (continued)

- What is the **multiplicity** of the relationship?
  - One to one
    - A Temple student has one TUID number and a TUID number identifies only one student.
  - One to many
    - A doctor sees many patients.
  - Many to many
    - A library has many publication and a publication can be in many libraries.

# Relationships (continued)

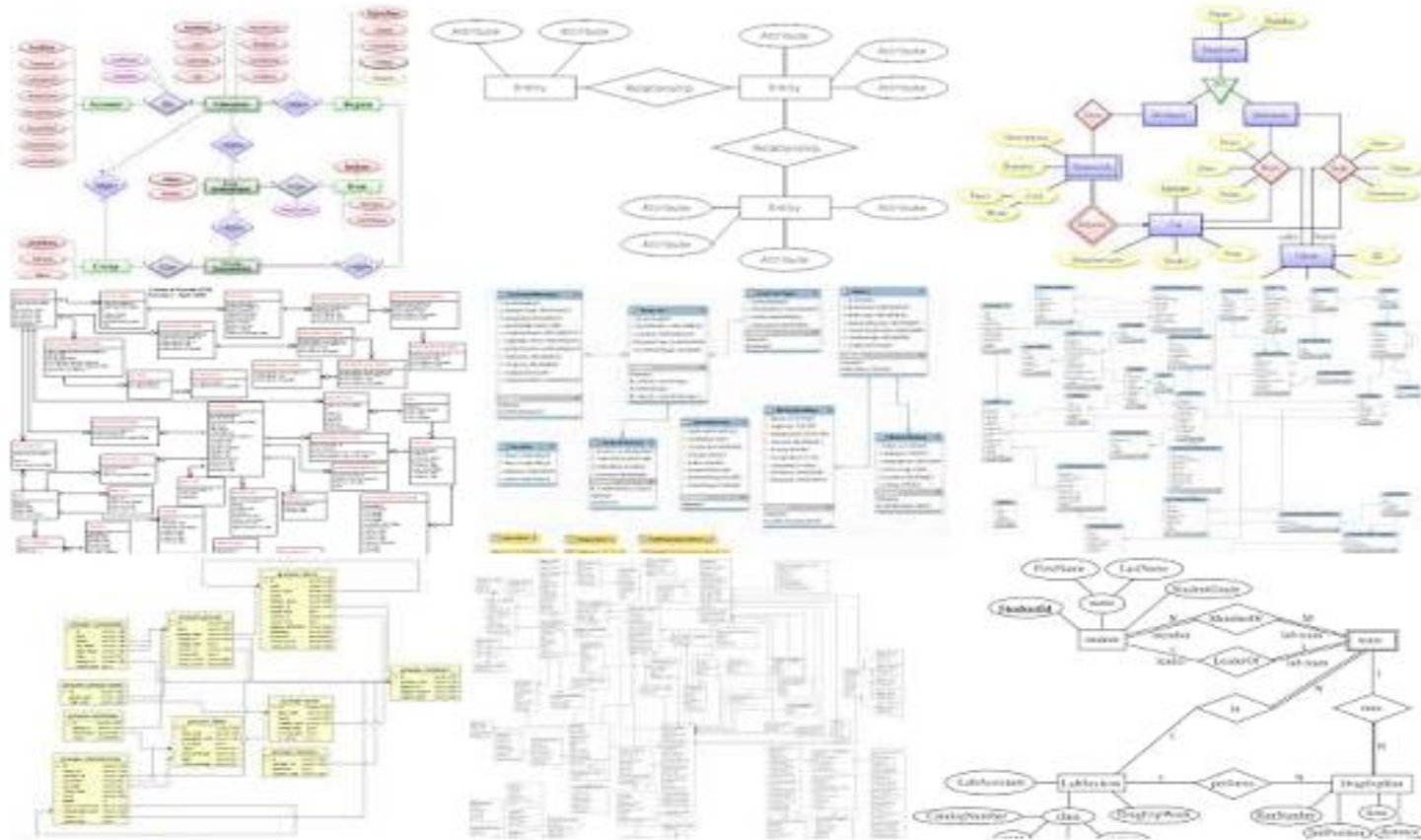
- What is a data schema?
- What relationship notation should you use?

Notation	Information Engineering
<u>Multiplicities:</u>	
- Zero or one	
- One only	
- Zero or more	
- One or more	

# Relationship Diagrams

Images for entity relationship

Report images

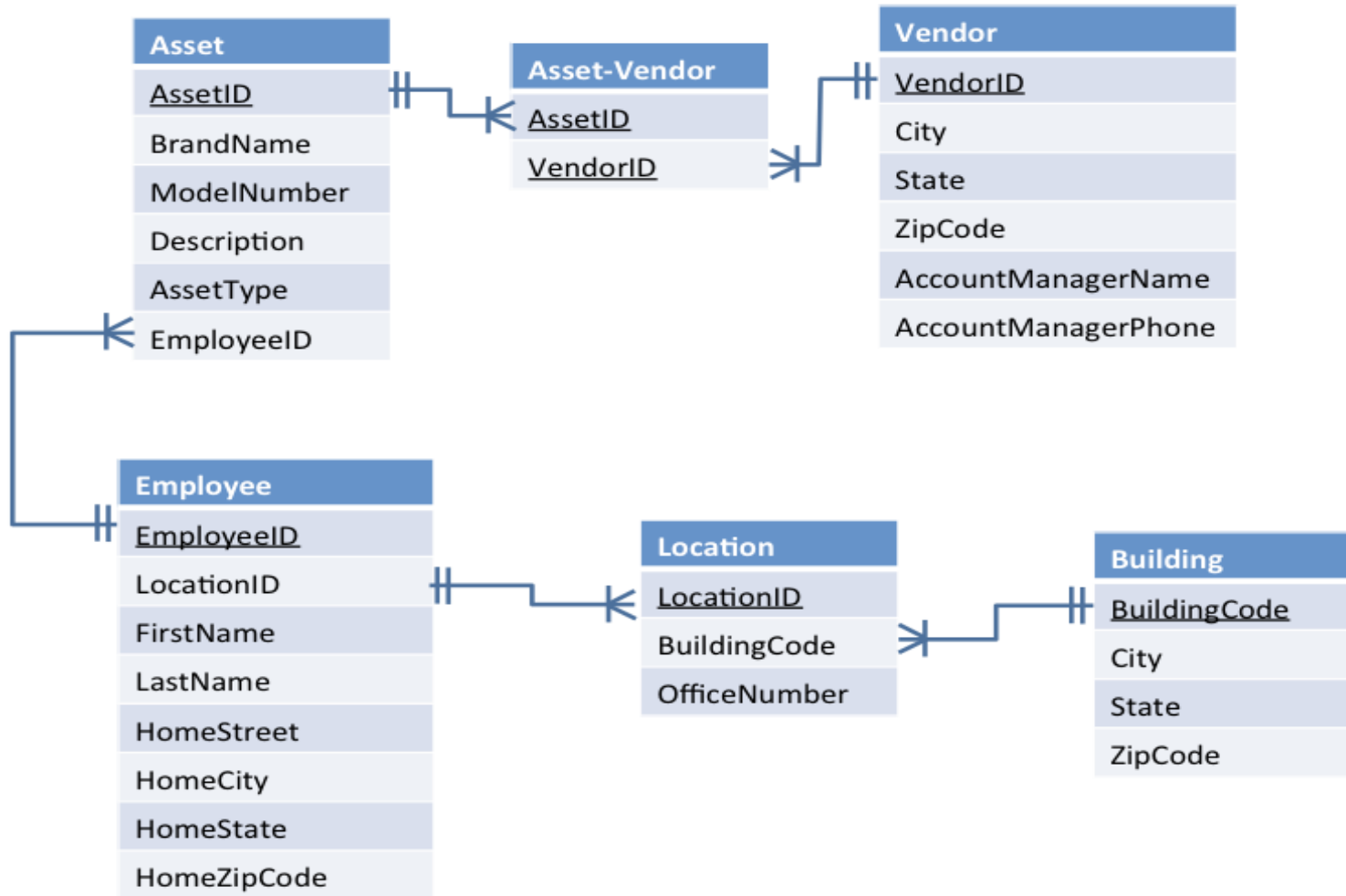


[Sample Links](#)



# Asset Management Sample

(Assets are purchased from Vendors and assigned to Employees)



# **Class Challenge:**

The school is interested in implementing a course enrollment solution which keeps track of the classes that a student enrolls in, the instructors that are teaching them and the resulting grades from the courses completed.

Let walk through the process

**GLOSSARY:** using the case, your personal experience and quick research, what are the key concepts and information needed by the Course Tracking Solution?

Write out a glossary of these terms

# Glossary: Results

- Students
- Instructors
- Grades
- Sections
- Class
- Start Time
- End Time
- Start Date
- End Date
- Meeting Day

Case: (15 minutes)

**ENTITIES:** using your glossary, what are the entities needed for the Solution?

Write out a list of these entities.

How many do you have?

Are any related?

# ENTITIES: Results

- Classes
- Instructors
- Sections
- Students
- Registrations ???

Case: (15 minutes)

**ATTRIBUTES:** using your list of entities, what are the attributes of each of your entities?

Write out a list of these entities.

How many do you have?

Are any related?

# Entity/Attributes: Results

Classes	Instructors	Sections	Registrations	Students
Class ID	Instructor ID	Section ID	Registration ID	Student ID
Class Title	First Name	Start Date	Student ID	First Name
Category	Last Name	Start Time	Section ID	Last Name
Credits	Street	Instuctor ID	Grade	Neighborhood
Description	Apt	Fee		Street
	City	Class Id		City
	State	Live Models		State
	zip	Meeting Day		zip
	Phone			Phone
				Birth Date
				Discount



Case: (15 minutes)

**Relationships:** using your list of entities, what are the relationships between each of your entities?

Write a sentence to describe each relationship.

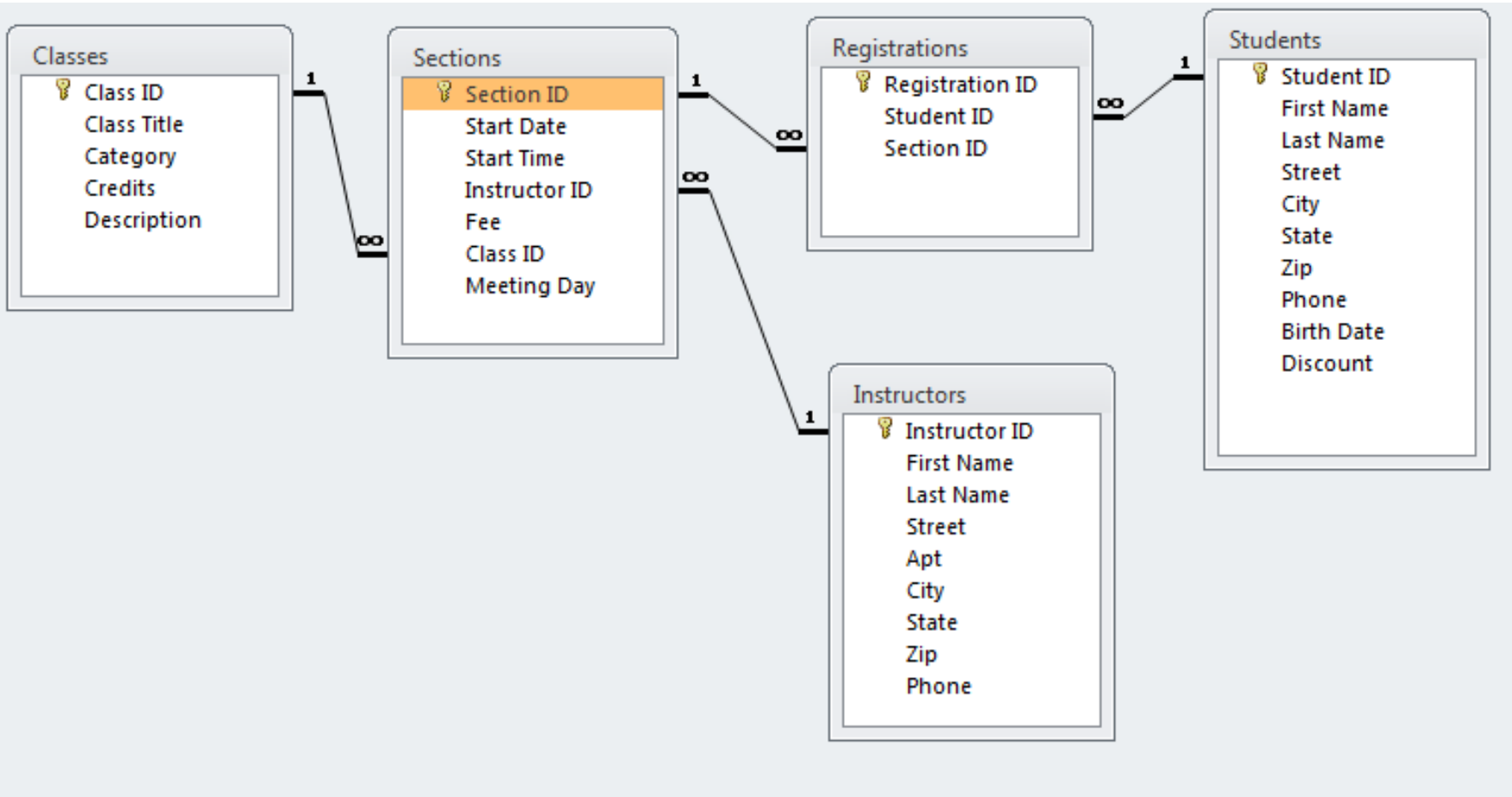
What are the multiplicities of the relationships?

# Relationship: Results

- A Course can have multiple sections
- Instructors teach multiple sections
- Students register for a section
- Students get a grade for specific course section
- A class can only have one primary instructor
- Students can register for many courses
- Students can not register for two sections of the same course in the same semester

# Relationship: Results

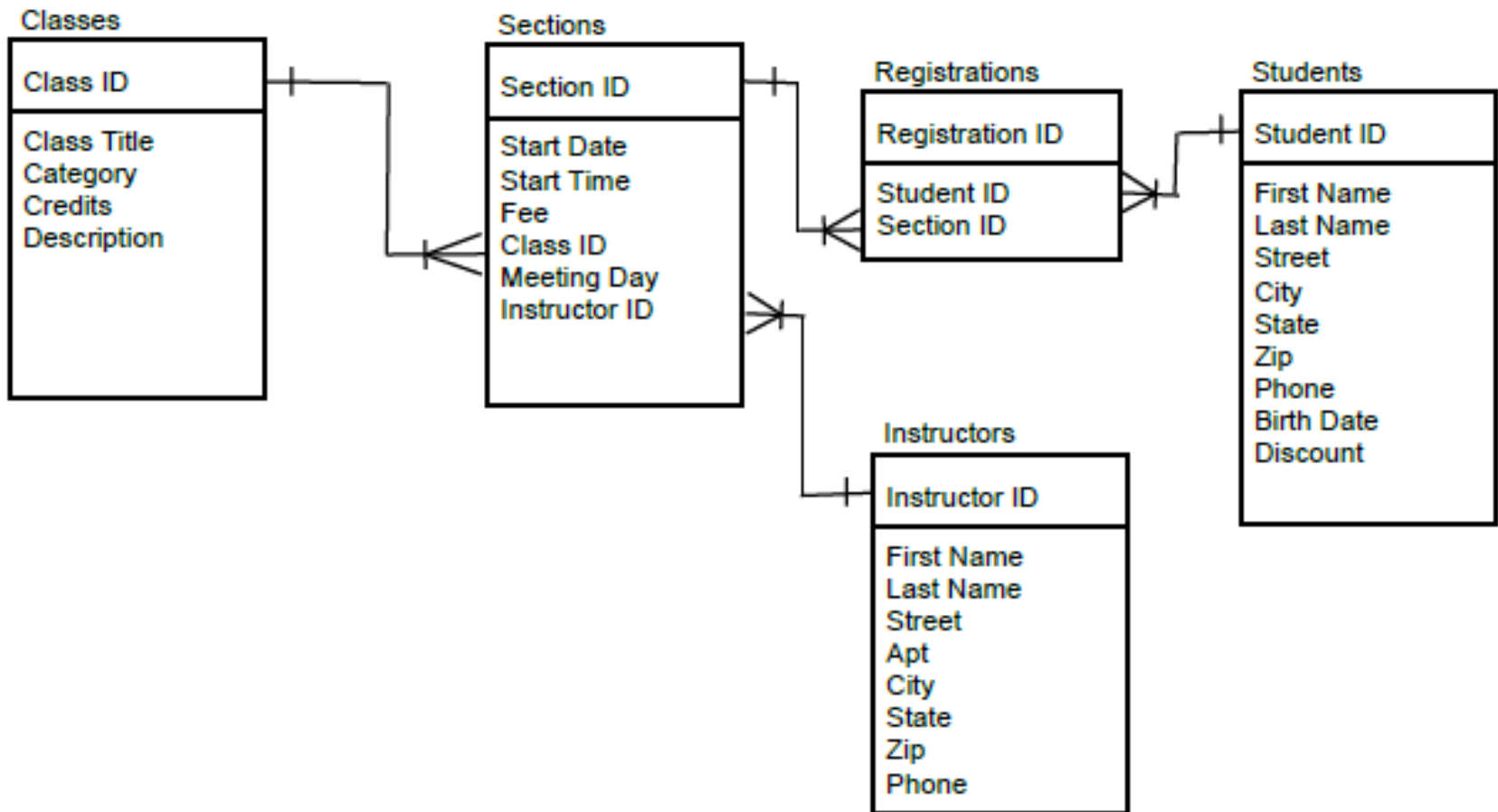
(MS Access)



# Relationship: Results

(Google Docs)

Student Class ER Diagram



# Entity/Attributes: Results

(Justinmind tools)

The screenshot displays the Justinmind Prototyper interface for a 'Student Class Data Master'. A 'Data Master Details' dialog box is open, showing the configuration for the 'Classes' entity. The dialog includes a 'Name\*' field with the value 'Classes', a 'Data Master Fields' table, and a 'Generate Maintenance Screens' section with checkboxes for 'New', 'Delete', 'Modify', 'View Details', and 'Data Grid'. The background shows the prototyping tool's workspace with a 'Widgets' panel on the left and a 'USER INTERFACE' panel on the right.

Student Class Data Master - Justinmind Prototyper

File Edit View Simulate Widgets Share Teamwork Plug-Ins Help

USER INTERFACE SIGN IN

Templates Variables

1

Widgets

Basic

Label Rich Text Image

Masters Data Masters

Classes

- Class ID
- Class Title
- Category
- Credits
- Description

Instructors

- First Name
- Last Name
- Street
- Apt
- City
- Phone

Registrations

Sections

- Section ID
- Start Date

Events Comments R

No item selected

### Data Master Details

Data Master properties View and edit records

Name\*

Classes

Data Master Fields

Name	Type
<input type="radio"/> Class ID	Text
<input type="radio"/> Class Title	Text
<input type="radio"/> Category	Text
<input type="radio"/> Credits	Text
<input type="radio"/> Description	Text

Generate Maintenance Screens

New  Delete  Modify  View Details  Data Grid

Ok Cancel

10:17 PM 9/30/2014

# Challenge

## Review:

1. How did it go?
2. What does the list of entities, attributed and relationships look like?
3. What confused you?
4. What follow-up questions do you have?
5. What problems or opportunities should you be looking for?

# Data Evaluation

1. How well does the schema describe the data involved in the client's problem?
2. How completely does they cover the client's situation?
3. Does it accurately reflect what data the client is using?
4. Is it an appropriate tool for the client's situation?

# Individual Challenge:

**Night Owl Case Study**

**Due Class 6, May 28, 2015**

**[Night Owl Case link](#)**

**[Google Doc ER Template](#)**

**[Excel Sample Template](#)**



# Night Owl Case Material

## New Music Venue Case

You are working for the Night Owl, a new music venue located in North Philadelphia. The Night Owl wants to sell tickets to Temple students directly rather than through a service like Ticketmaster. You are part of the team defining the data requirements for their web service.

*The Night Owl's plan is to take credit cards for payment and to create a customer loyalty program for those customers who want to take advantage of it. The customer loyalty program will track each visit the customer makes to Night Owl and will give them a free ticket to an upcoming show for every 10 tickets they buy. The Night Owl also wants to use the customers' email addresses to advertise upcoming shows.*

Your job is to define the logical data elements that must be kept for each customer in Night Owl's database.

Use what you know about credit card sales and customer loyalty programs to do the following:

## The Deliverables:

Use the Excel Template Sample to:

1. Create a Glossary of terms from the case
2. Identify all the data entities that the Night Owl database will need.
3. For each entity, identify all of the attributes that must be collected. Include information about each entity's type, range if any, default value, and special requirements.
4. Indicate the relationships between the different entities.

Use the tool of your choice (Google docs, MS Access, Word, or Sketch on Paper) to create an ER Diagram

Step 1:

**GLOSSARY:** using the case, your personal experience and quick research, what are the key concepts and information needed by the Night Owl?

Write out a glossary of these terms

Step 2:

**ENTITIES:** using your glossary, what are the entities needed by the Night Owl's application?

Write out a list of these entities.

How many do you have?

Are any related?

Step 3:

**ATTRIBUTES:** using your list of entities, what are the attributes of each of your entities?

Write out a list of these entities.

How many do you have?

Are any related?

Step 4:

**Relationships:** using your list of entities, what are the relationships between each of your entities?

Write a sentence to describe each relationship.

What are the multiplicities of the relationships?

Develop an ER Diagram depicting the relationships