Database Design

Arcs

Objectives

This lesson covers the following objectives:

- Define the term "constraint" as it applies to data modeling
- Identify an exclusive OR relationship in a business scenario
- Diagram an arc constraint to represent an exclusive OR relationship
- Distinguish between the use of an arc and a subtype in the data model

Purpose

Arcs in data modeling help designers clarify an exclusive OR across relationships. The more explicitly you can define the client's requirements, the more accurate your final implementation will be.

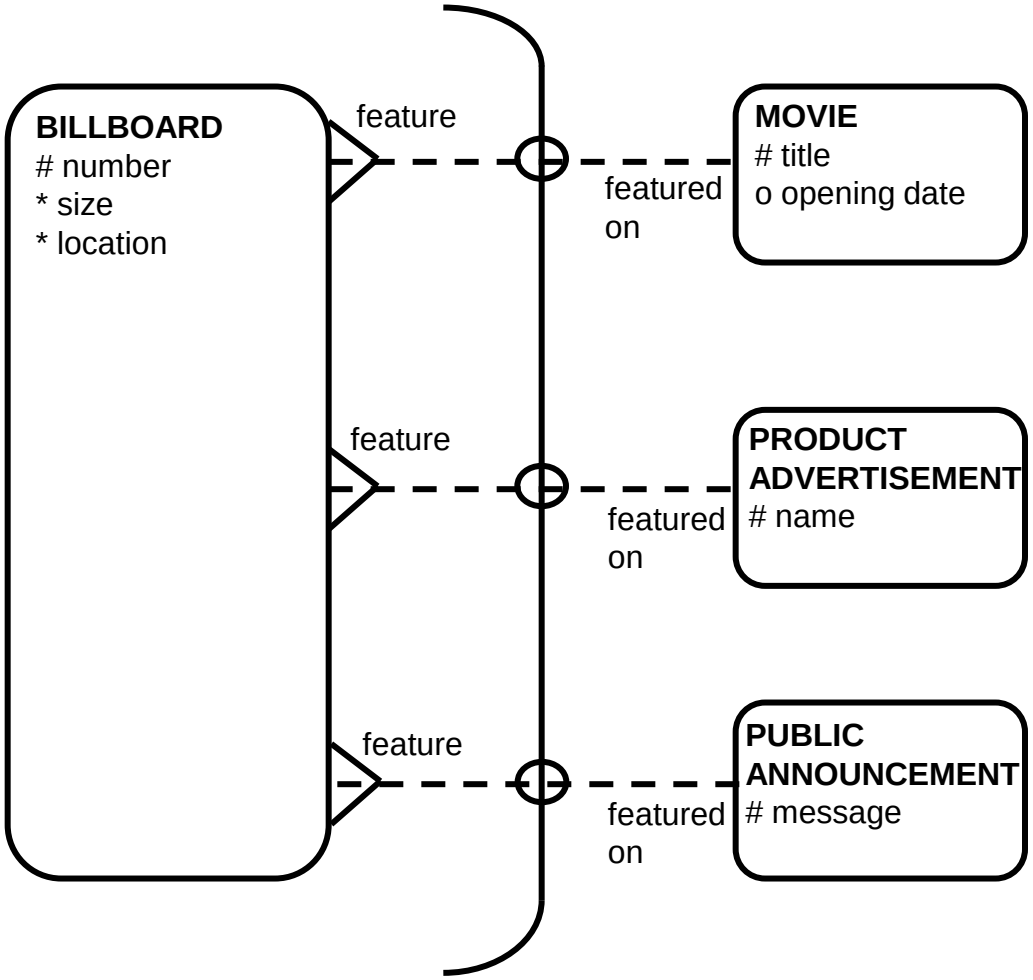
What is a Constraint?

Every business has restrictions on which attribute values and which relationships are allowed. These restrictions are called constraints. They may refer to a single attribute of an entity, or to relationships between entities.

We already know about several kinds of constraints; for example, every EMPLOYEE must work in one and only one DEPARTMENT. In this lesson, we will see another kind of constraint—an exclusive OR constraint.

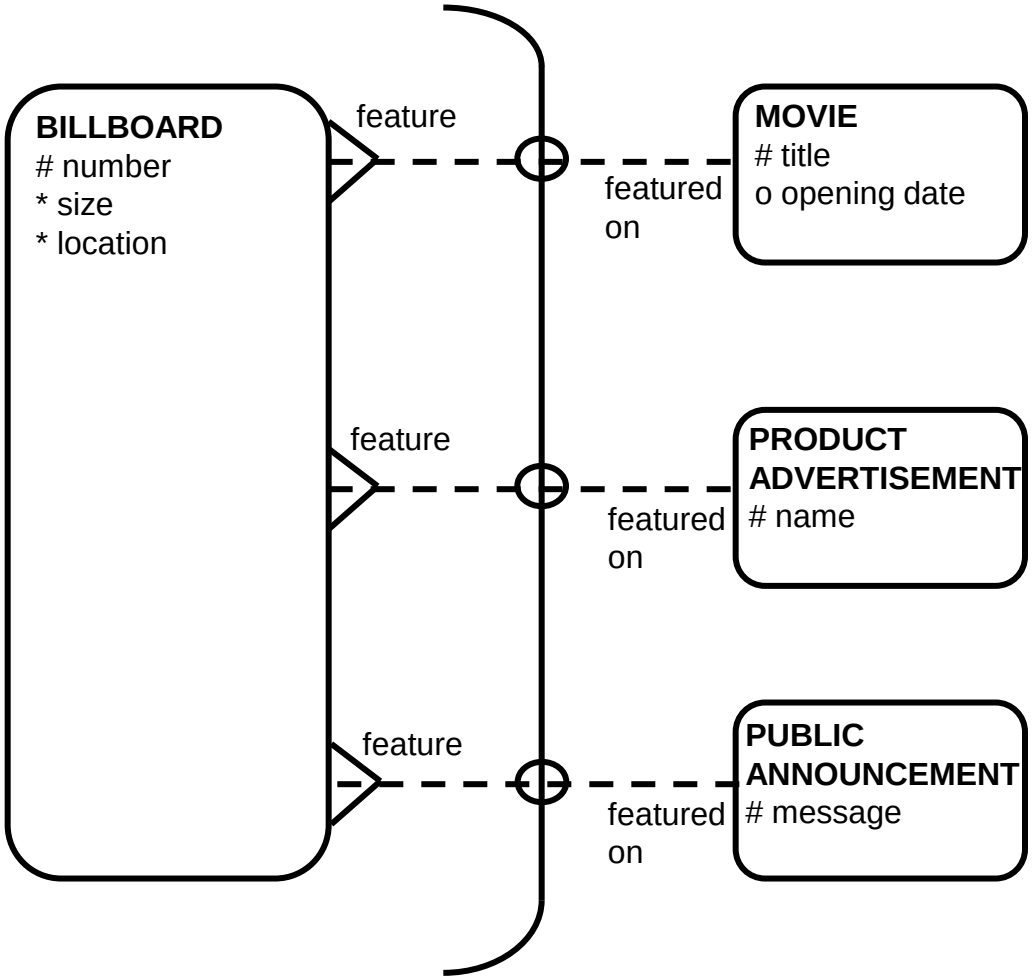
Exclusive OR Relationship

Mutually exclusive relationships (sometimes called "exclusive OR" * relationships) often exist.



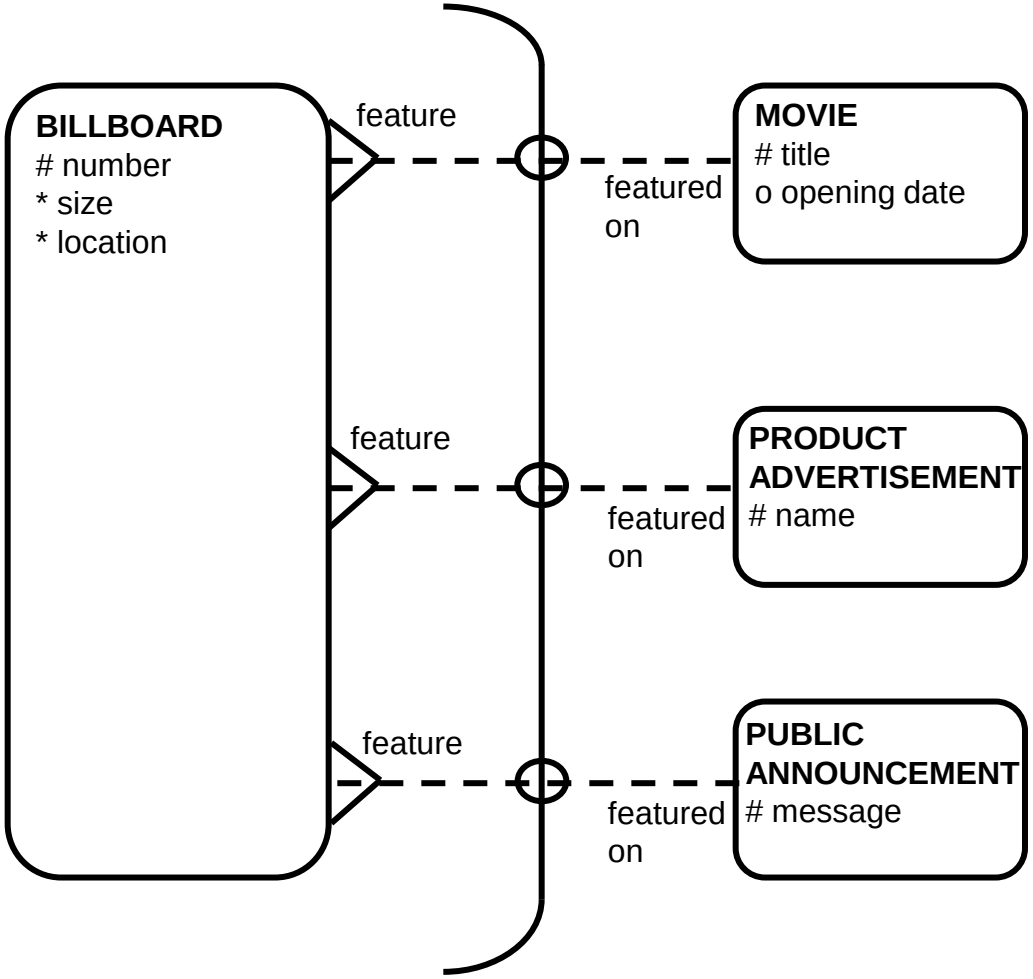
Exclusive OR Relationship (cont.)

For example: A billboard is an advertising space that can feature a movie, a product, or a public announcement. It may contain advertising about only one of these at a time.



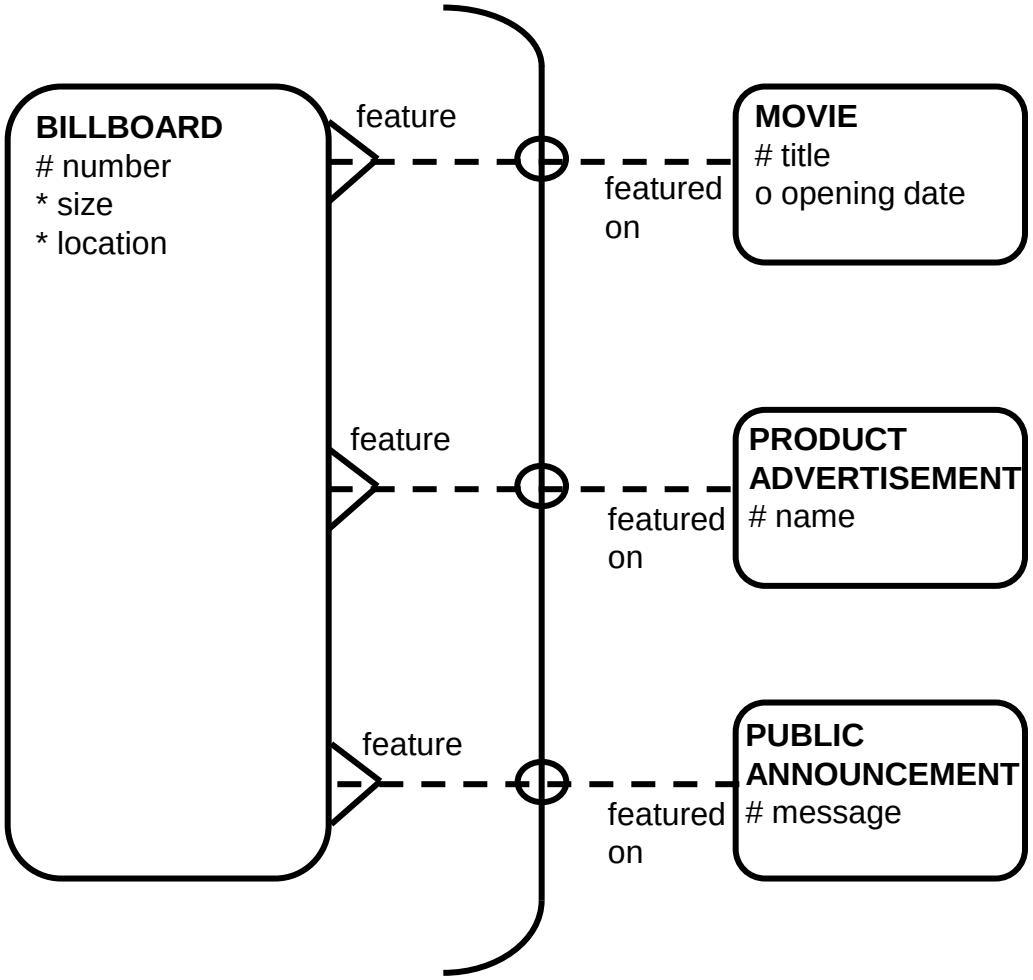
Exclusive OR Relationship (cont.)

Each “feature” has its own characteristics or attributes. * In many programming languages, exclusive OR is a logical operator that returns a true value if one, but not both, of its operands is true.



Exclusive OR Relationship (cont.)

* In many programming languages, exclusive OR is a logical operator that returns a true value if one, but not both, of its operands is true.



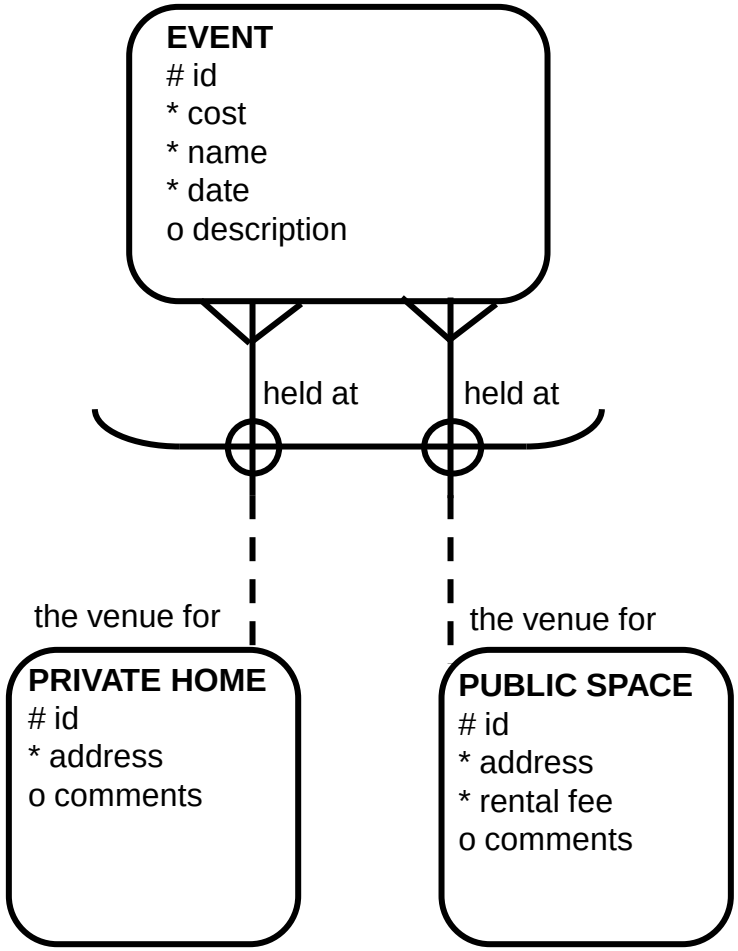
DJs on Demand Business Scenario

The DJ business has a mutually exclusive relationship between EVENT and VENUE.

Representing Exclusive OR Relationships in the ERD

Arcs are a way to represent mutually exclusive relationships in the ERD.

The arc represents the exclusive OR relationship -- each EVENT must be held at one PRIVATE HOME or must be held at one PUBLIC SPACE, but not both.



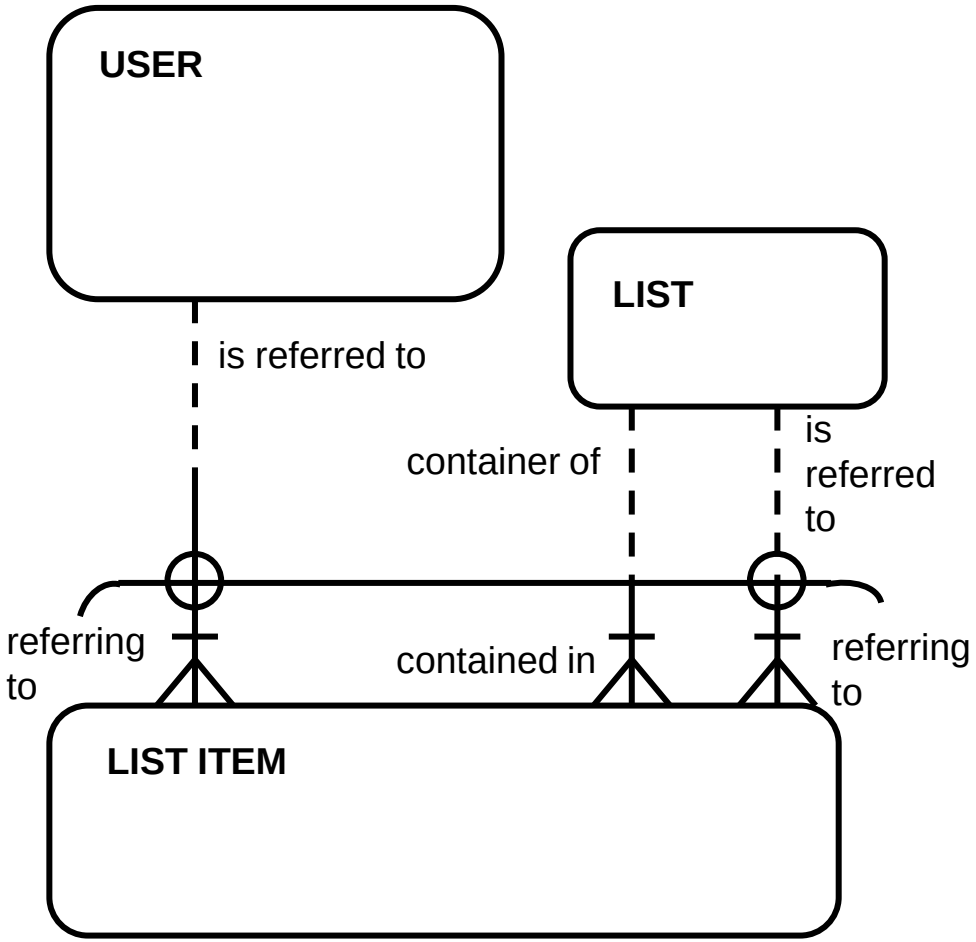
Arcs

- An arc always belongs to one entity.
- Arcs can include more than two relationships.
- Not all relationships of an entity need to be included in an arc.
- An entity may have several arcs.
- An arc should always consist of relationships of the same optionality.

Arcs (cont.)

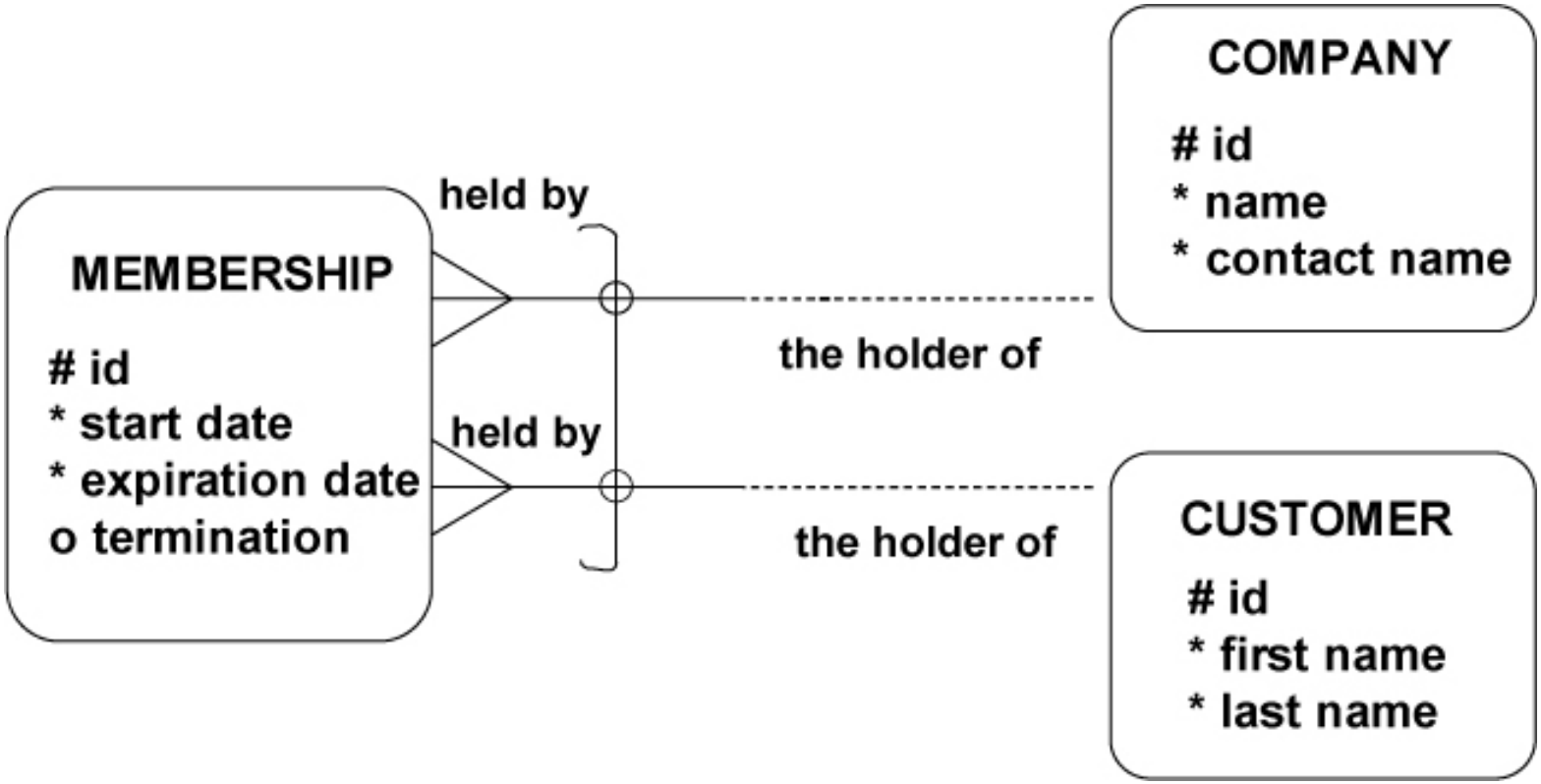
- All relationships in an arc must be mandatory or all must be optional.
- Relationships in an arc may be of different cardinality, although this is rare.

Arcs (cont.)



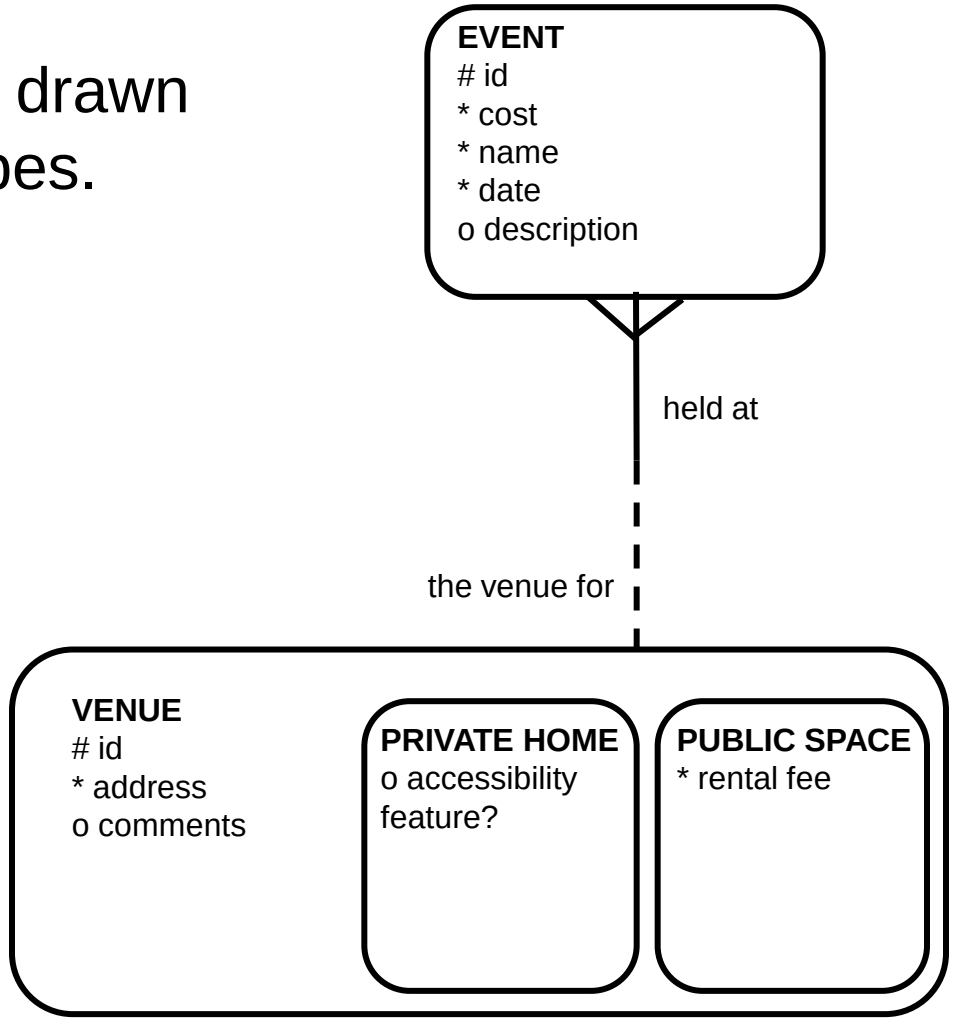
Arcs (cont.)

Examine the following example.



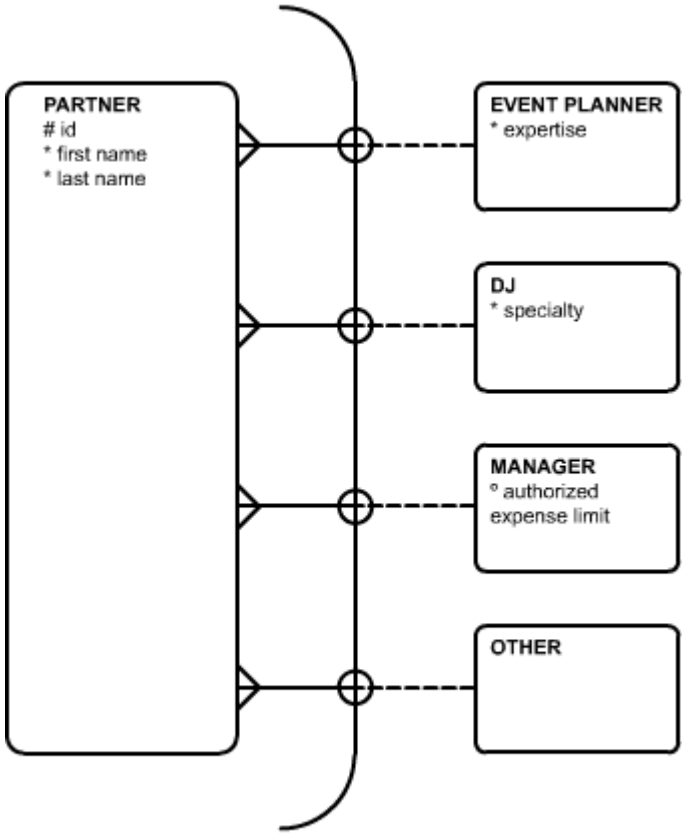
Arcs, Supertypes, and Subtypes

Arcs can sometimes be drawn as supertypes or subtypes.



Arcs, Supertypes, and Subtypes (cont.)

Supertypes and subtypes can sometimes be drawn as arcs. The supertype PARTNER in the DJ model is represented as an arc in this diagram.



Terminology

Key terms used in this lesson included:

- Arc
- Constraint
- Exclusive OR relationship
- Mutually exclusive relationship

Summary

In this lesson, you should have learned how to:

- Define the term "constraint" as it applies to data modeling
- Identify an exclusive OR relationship in a business scenario
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- Distinguish between the use of an arc and a subtype in the data model