
ORACLE
Academy

Database Design

8-2
Modeling Change: Time

ORACLE Academy

Objectives

This lesson covers the following objectives:

- Distinguish between using date as an attribute and DAY as an entity in a data model, depending on business requirements
- Solve the problem of keeping characteristics of a date by constructing a model that uses DAY as an entity
- Identify at least three time-related constraints that can result from a time-sensitive model
- Define and give an example of conditional non-transferability in a time-constrained model

Purpose

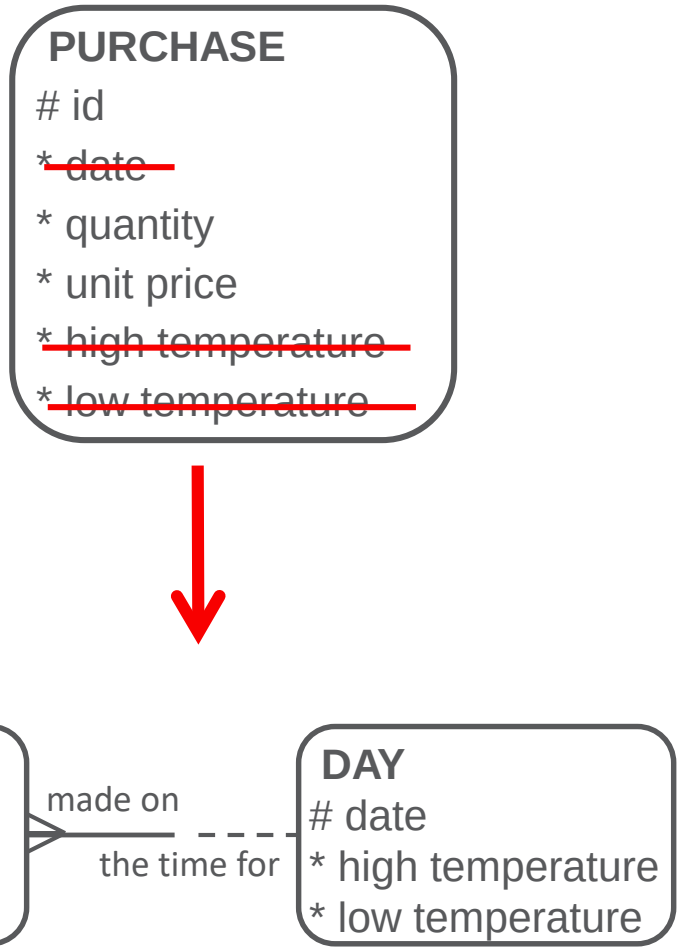
- Time plays a role in many business models.
- Historical data is often used by businesses to find trends that can point the way to more efficient ways of doing business.
- Modeling time in a business allows such data to be captured.
- Reports provide information that can be derived from the data.
- A well-designed report can provide valuable information that the business can use to improve its operations.

Entity DAY vs. Attribute Date

- Consider the entity PURCHASE.
- You would include an attribute “date” if you wanted to know when the item was purchased.
- However, if we want to identify trends -- such as purchasing coats vs. bathing suits vs. sneakers -- we may want to know the temperature during that time.
- If we add the temperature attributes to the PURCHASE entity it creates a problem.

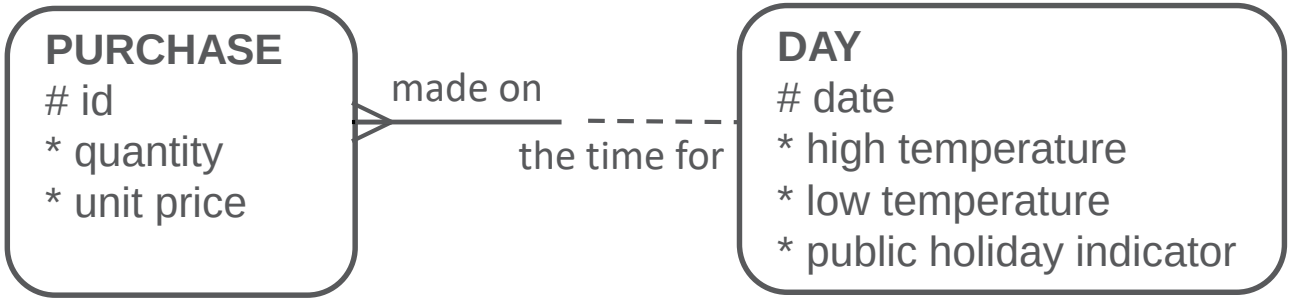
Entity DAY vs. Attribute Date

- Remember Third Normal Form: a non-UID attribute cannot have attributes of its own.
- Because high and low temperature are attributes of the date, we need a separate entity DAY.



Entity DAY vs. Attribute Date

- Having a separate DAY entity allows us to track more information that may be useful to a business, for example which days were public holidays.

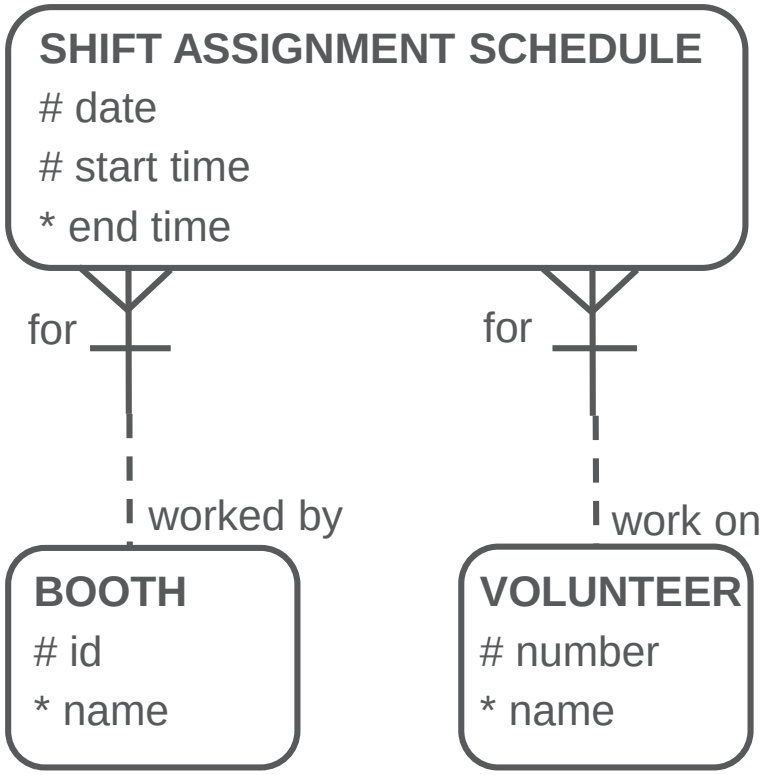


Time-related Constraints

- Be aware of constraints that can result from the need to track dates and times.
- Here is an example:
  - Consider a school fair that features several booths.
  - The manager signs up volunteers to work different shifts at different booths.
  - A booth is staffed by only one volunteer at a time.
  - Some volunteers can work for several hours; others can work fewer hours depending on their free time.
  - The schedule has to be determined in advance, so that the manager knows which times are not covered by any volunteers.

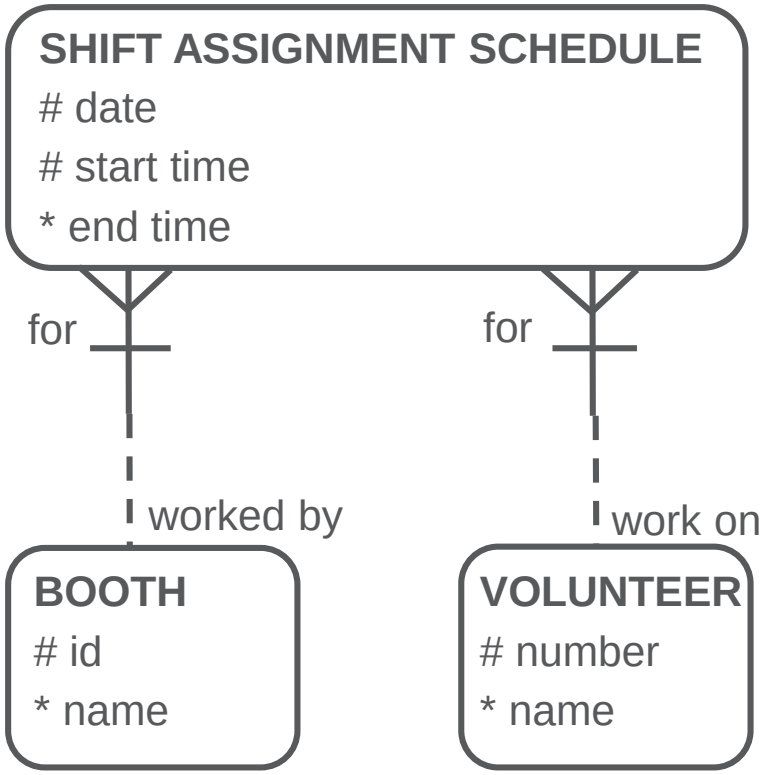
Time-related Constraints

- Here is a selection of time-related constraints that need to be considered for this model:
- The obvious one: shift “end time” must be later than shift “start time.”



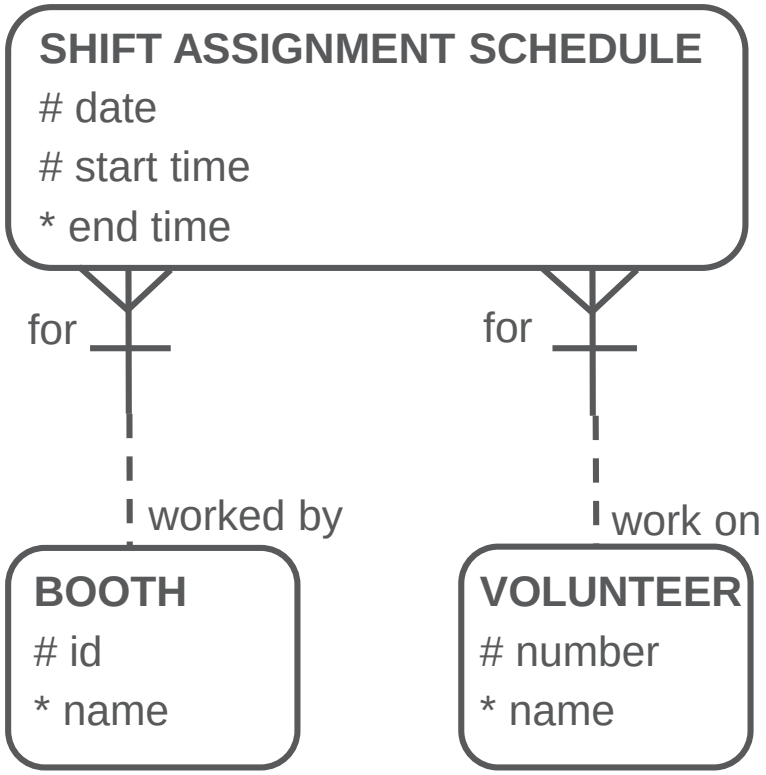
Time-related Constraints

- Shift times may not overlap.
- The “start time” for a shift for a volunteer may not be between any “start time” and “end time” of another volunteer on the same booth.
- The same is true for the “end time.”



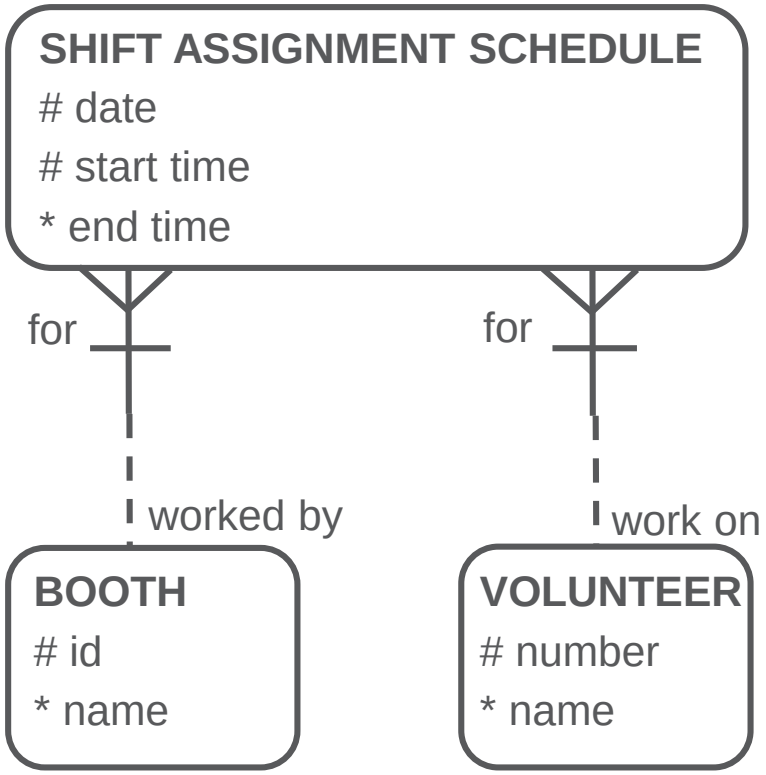
Conditional Non-transferability

- The “start time” for a shift may be updated to a later time, unless the shift has already begun.



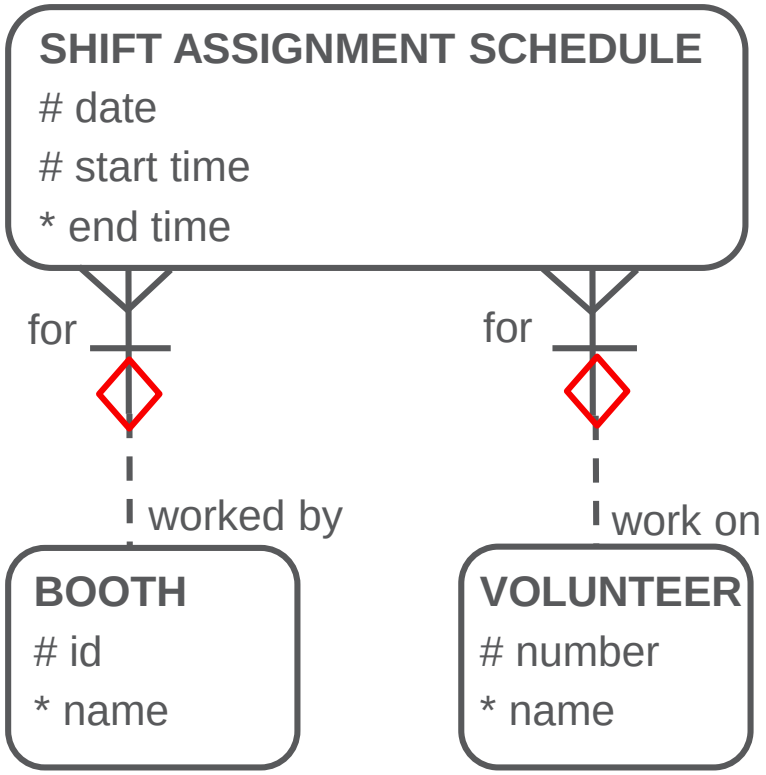
Conditional Non-transferability

- You probably would not allow a shift to be reassigned to another volunteer or another booth, unless the shift had not yet started.
- This is an example of conditional non-transferability.



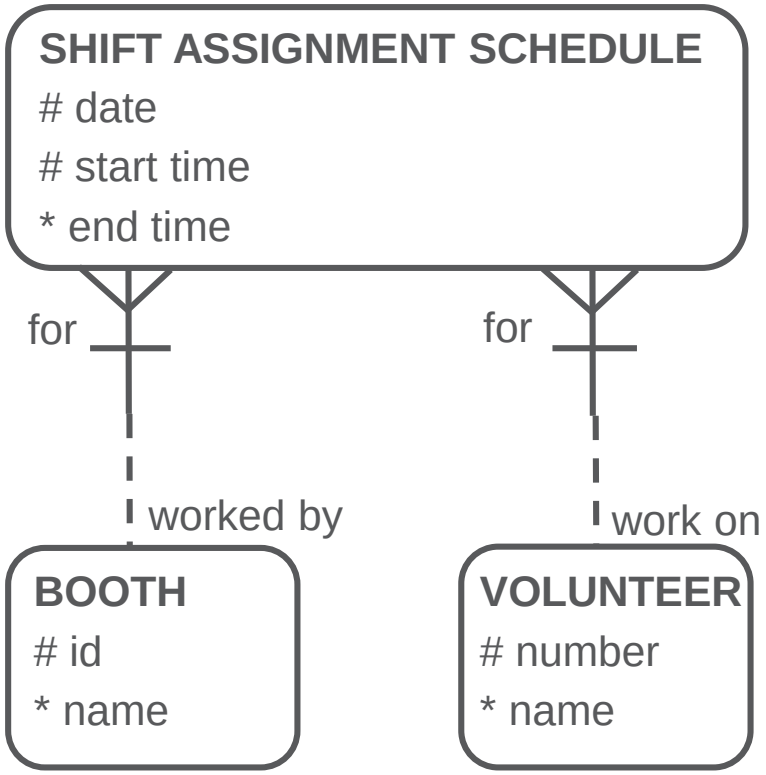
Conditional Non-transferability

- Non-transferability: a SHIFT ASSIGNMENT cannot be changed to another BOOTH (or to another VOLUNTEER).
- Nontransferable relationships are represented by a diamond in the ERD.



Conditional Non-transferability

- Conditional non-transferability: a SHIFT ASSIGNMENT can sometimes be changed – in this case, if the shift has not yet started.
- These relationships cannot be represented in the diagram, but must still be documented.



Terminology

Key terms used in this lesson included:

- Conditional non-transferability
- Non-transferability
- Time-related constraint

Summary

In this lesson, you should have learned how to:

- Distinguish between using date as an attribute and DAY as an entity in a data model, depending on business requirements
- Solve the problem of keeping characteristics of a date by constructing a model that uses DAY as an entity
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