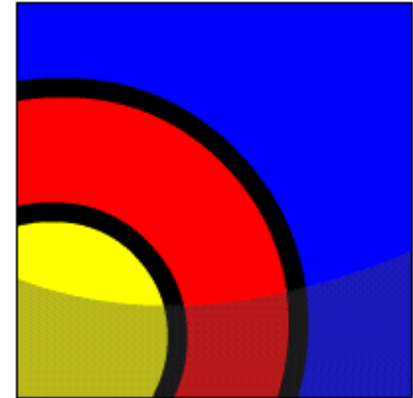


Modeling Change: Time

What Will I Learn?

In this lesson, you will learn 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
- 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





Why Learn It?

Time plays a role in many business models.

For example: A book may be checked out from the library several times, by different people, or by the same person. The model may need to track a history of borrowing for a book. Think about a florist-supply company or a city police department. How could time play a role in their information needs?





Why Learn It?

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.





Tell Me / Show Me

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 wanted to identify trends -- such as when do people buy coats vs. bathing suits vs. sneakers? -- we may want to know the temperature during that time.

What is wrong with the revised entity shown here?

PURCHASE

- # id
- * date
- * quantity
- * unit price

PURCHASE

- # id
- * date
- * quantity
- * unit price
- * high temperature
- * low temperature

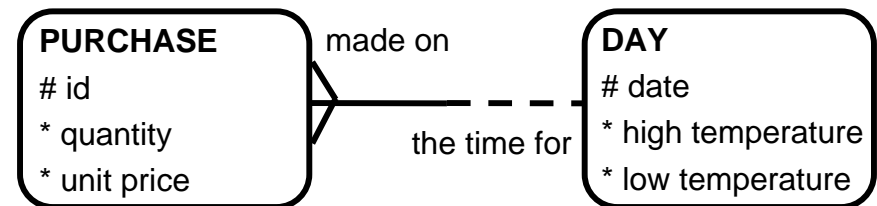
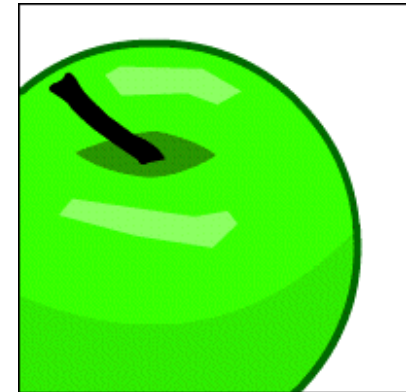
Tell Me / Show Me

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.

Can you think of a useful report that the business could produce from this data?

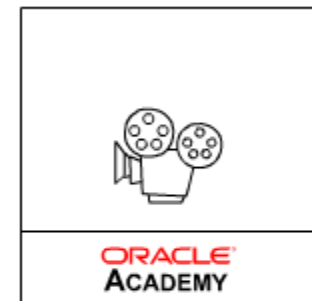


Tell Me / Show Me

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.



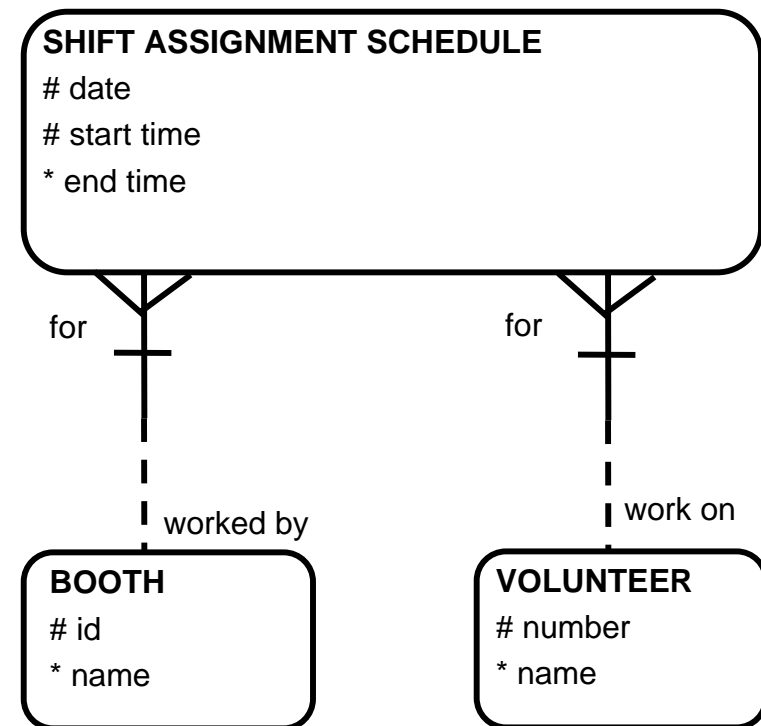


Tell Me / Show Me

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.”

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.”



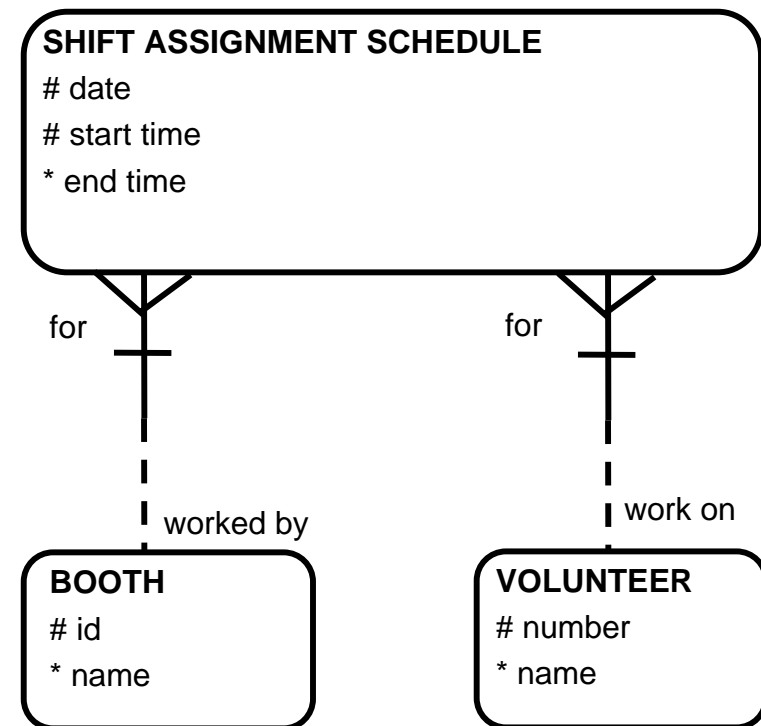


Tell Me / Show Me

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

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

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 nontransferability.

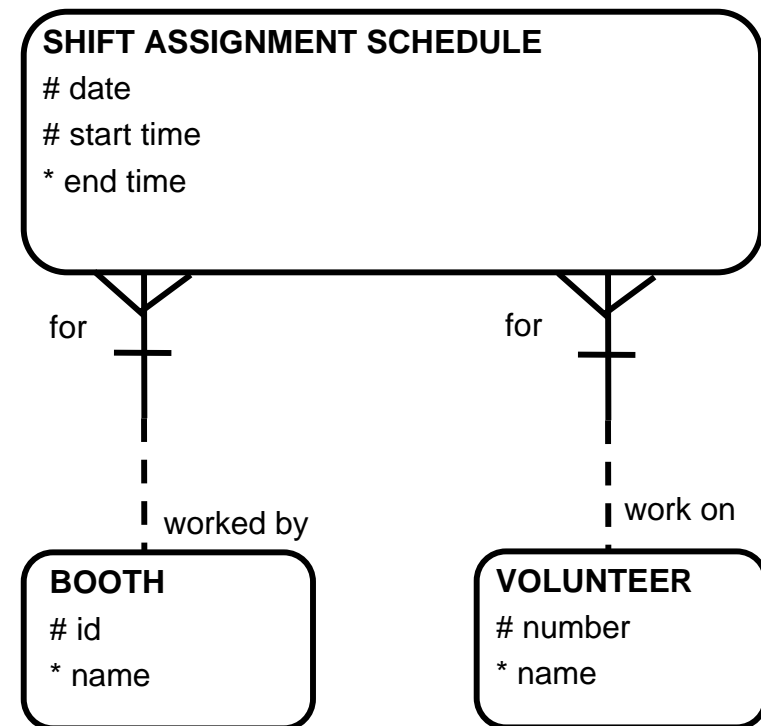


Tell Me / Show Me

Conditional Nontransferability

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

Conditional nontransferability: 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.



Tell Me / Show Me

Terminology

Key terms used in this lesson include:

Conditional nontransferability

Nontransferability

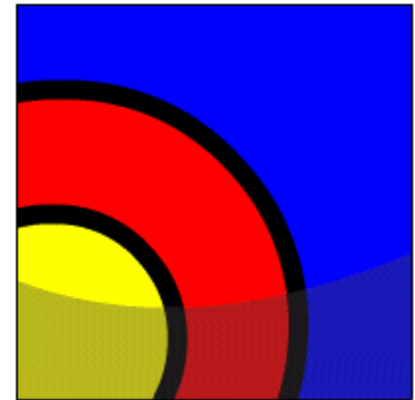
Time- related constraint



Summary

In this lesson, you have learned 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
- 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



Summary

Practice Guide

The link for the lesson practice guide can be found in the course outline.

