
ORACLE
ACADEMY

Database Design

8-1
Modeling Historical Data

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Objectives

This lesson covers the following objectives:

- Identify the need to track data that changes over time
- Construct ERD models that incorporate elements of “data over time”
- Identify the UID of an entity that stores historical data; explain and justify the choice of UID

Purpose

- How tall were you at age 5? How tall were you at age 10? How tall are you right now?
- If your parents wrote this down when you were young, they were keeping track of historical data.
- Most businesses need to track some historical data.
- This helps them find trends and patterns that are the basis for business innovations or process improvements.
- For example, rental history of a movie is useful to a video store. It tells managers which movies are popular and which should be moved to the back shelf.

Model Data Over Time

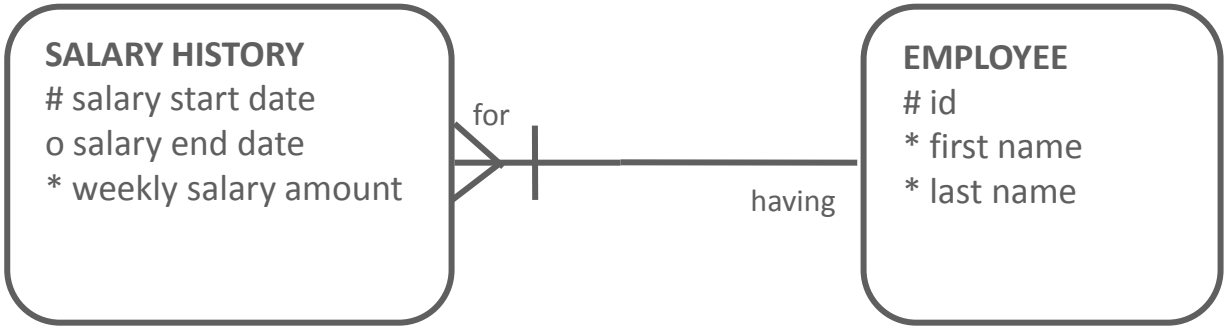
- When is it necessary to model data over time?
- Ask your client:
  - Is an audit trail required?
  - Can attribute values change over time?
  - Can relationships change over time?
  - Do you need to produce reports on older data?
  - Do you need to keep previous versions of the data? If so, for how long?

Data Over Time Example

- An organization needs to keep data about employees' salaries.
- All employees are paid weekly.
- Initially, the following EMPLOYEE entity was modeled.
- Additional requirements now specify that the organization needs to keep a historical record of how and when employees' salaries have changed during their employment.

Model Salary Changes

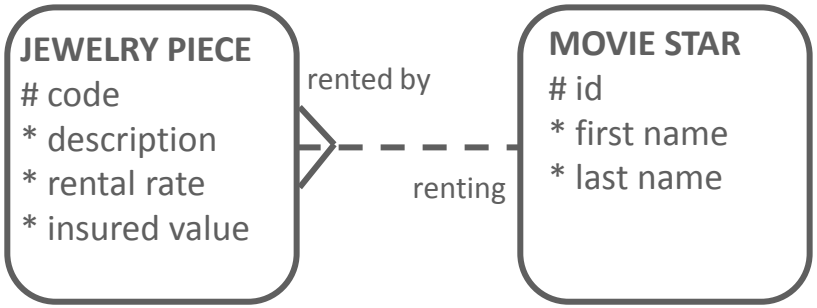
- To model salary changes over time, add a SALARY HISTORY entity.



- The UID of the SALARY HISTORY entity is the related EMPLOYEE id and the salary start date.

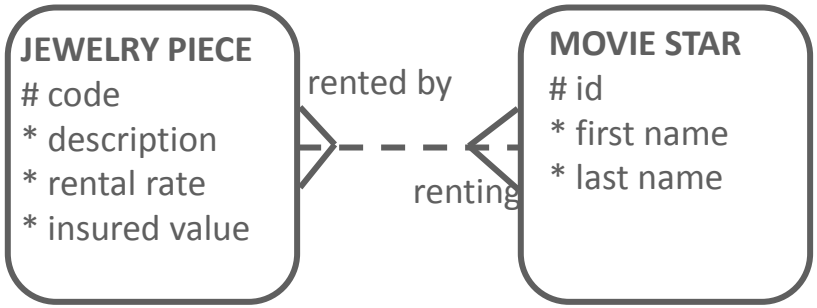
Model Rental Over Time

- A jewelry store rents pieces (necklaces, bracelets and so on) to movie stars for special occasions, such as award ceremonies or movie premieres.
- They would like to track the rental history of a jewelry piece.
- The following ER model will only track the current renter of a piece of jewelry.
- How would you revise the relationship to track history?

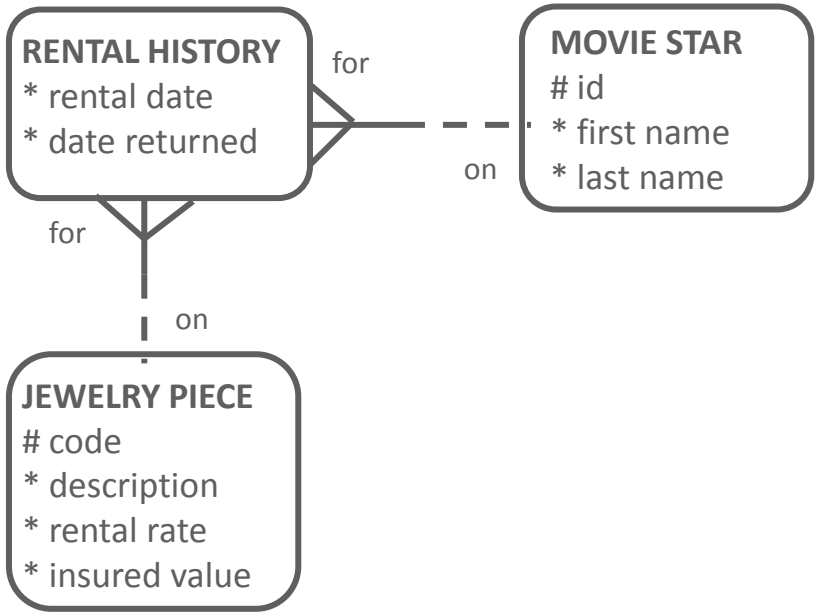


Resolve M:M

- The relationship between JEWELRY PIECE and MOVIE STAR should be revised to a M:M, which is then resolved with an intersection entity RENTAL HISTORY.
- Next we need to determine the UID of RENTAL HISTORY.

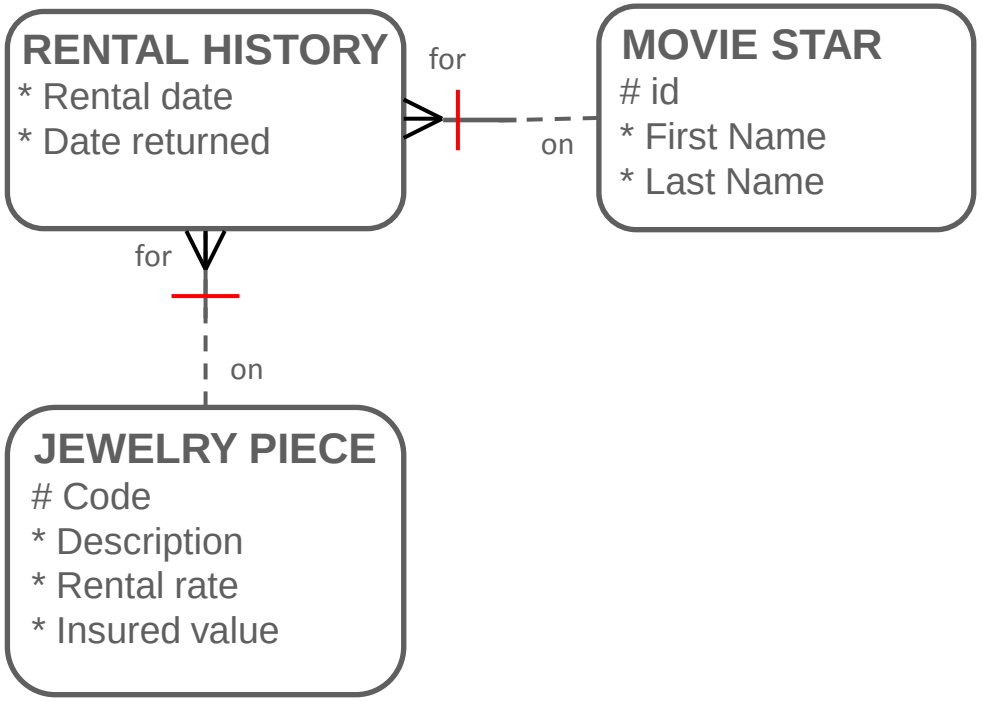


The M:M relationship is resolved with an intersection entity.



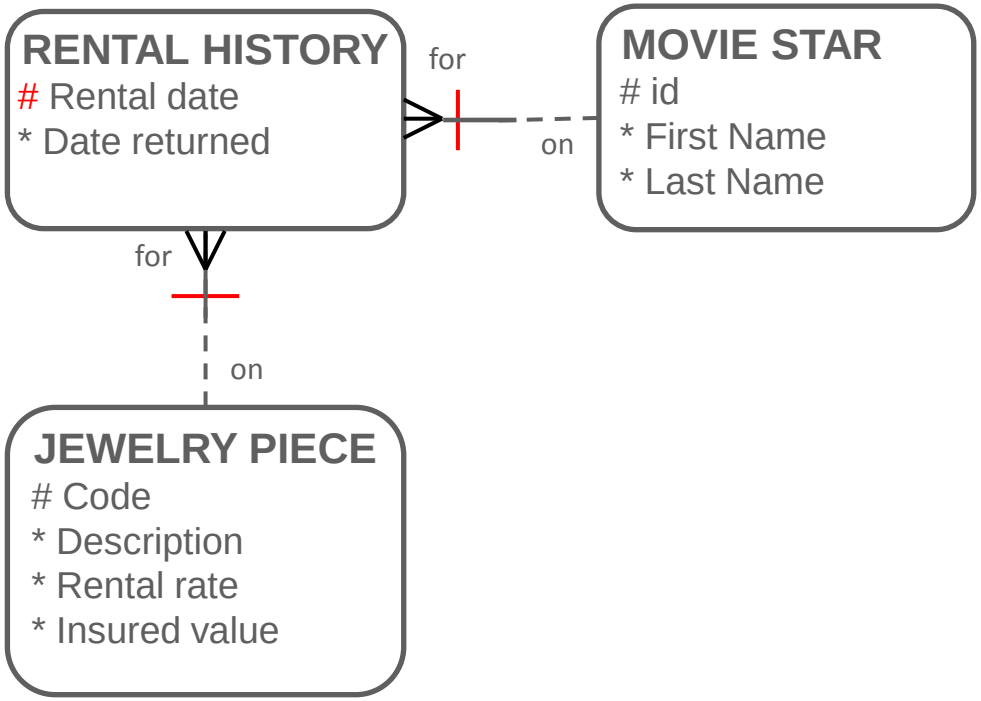
Determine UID

- Option 1: Barred relationship.
- Drawing a Barred relationship is not a suitable UID here, as this would not allow a MOVIE STAR to rent the same JEWELRY PIECE on different dates



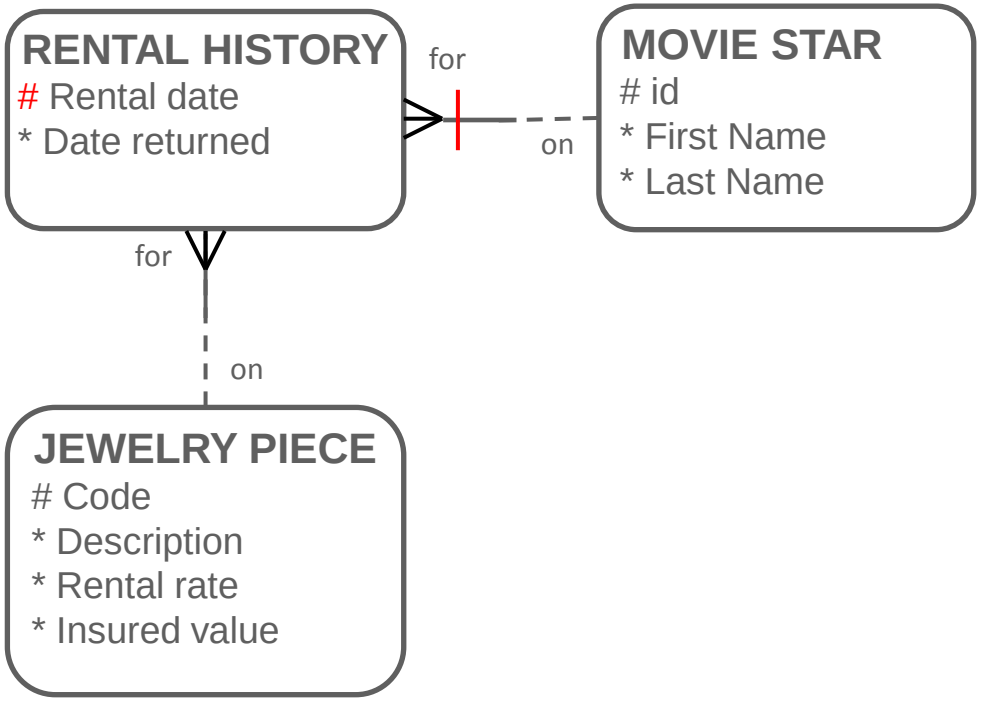
Determine UID

- Option 2: Barred relationship and Rental Date.
- Adding rental date to the UID would allow a MOVIE STAR to rent the same JEWELRY PIECE on different dates, but would also permit different MOVIE STARS to rent the same JEWELRY PIECE on the same date!



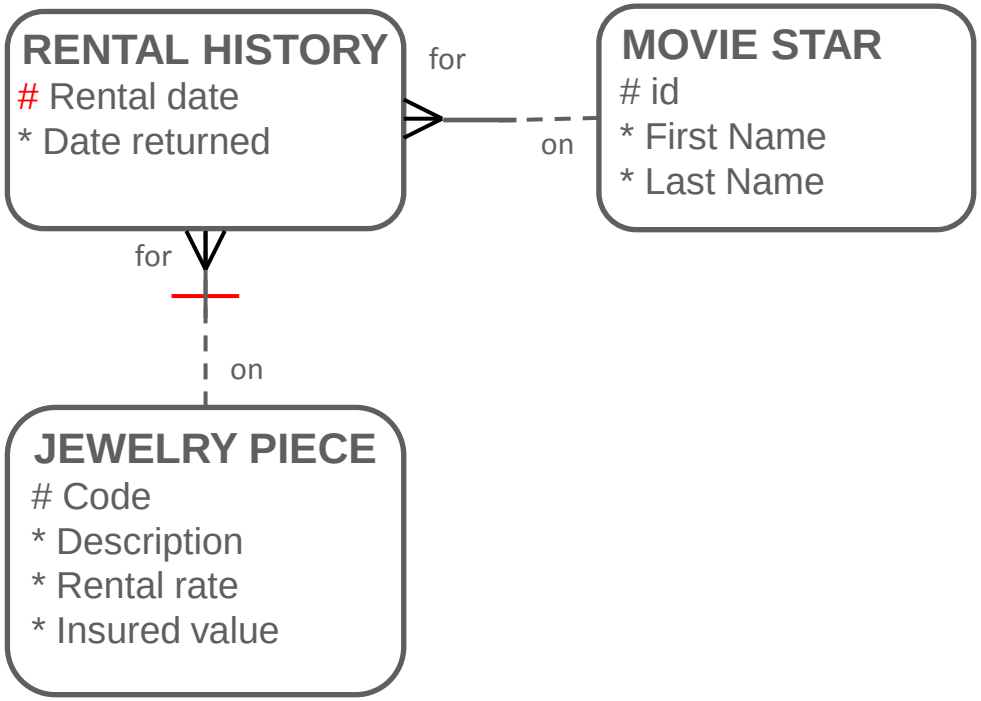
Determine UID

- Option 3: Barred relationship between MOVIE STAR and RENTAL HISTORY with Rental Date.
- This model would not permit the same MOVIE STAR to rent more than one JEWELRY PIECE on a given day.



Determine UID

- Option 4: Barred relationship between JEWELRY PIECE and RENTAL HISTORY with Rental Date.
- This model says that a JEWELRY PIECE can be rented only once on the same date.



Terminology

Key terms used in this lesson included:

- Audit trail
- Historical data

Summary

In this lesson, you should have learned how to:

- Identify the need to track data that changes over time
- Construct ERD models that incorporate elements of “data over time”
- Identify the UID of an entity that stores historical data; explain and justify the choice of UID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