

Example of Entity-Relationship Modeling

The following case study describes the data requirements for a video rental company that operates stores where customers rent DVD's.

- The video rental company has several branches throughout the United States. The data held on each branch is the branch address (street, city, state, and zip code) and telephone number. Each branch is given a branch number, which is unique throughout the company.
- Each branch is allocated staff. The data held on each staff member is name, position, and salary. Each member of staff is given a staff number, which is unique throughout the company.
- Each branch has exactly one staff member designated as its manager.
- Each branch has a stock of DVD's. The data held on a DVD is the catalog number, video number, title, category, daily rental fee, status, the names of the main actors, and the name of the director. The catalog number uniquely identifies a video title. However, in most cases, there are several copies of each video title at a branch, and the individual copies are identified using the video number. The video number uniquely identifies a physical DVD. The status indicates whether or not the specific copy of the DVD is available for rent.
- Before renting a video from the company, a customer must first register as a member of a local branch. The date that the member registers at the branch is recorded.
- Once registered, a member is allowed to rent DVD's. The data recorded for each DVD rental is the rental number, the date the DVD is rented, and the date the DVD is returned. The rental number is unique throughout the company. Each member is allowed to rent a maximum of 10 DVD's at a time.

Design an ER diagram that models the enterprise described above.

Use the following steps to guide your design process:

- a. Identify the main entity types of the DVD rental company.
- b. Identify the main relationship types between the entity types described in (a) and represent each relationship as an ER diagram.
- c. Determine the multiplicity constraints for each relationship described in (b). Represent the multiplicity for each relationship in the ER diagrams created in (b).
- d. Identify attributes and associate them with entity or relationship types. Determine candidate and primary key attributes for each strong entity type.
- e. Using your answers to (a) through (d), represent the data requirements of the DVD rental company as a single ER diagram. State any assumptions necessary to support your design.