SCHOOL OF DATA
by Springboard

Data Science Career Track
Introduction to Entity-Relationship Diagrams

Entity-Relationship Diagrams

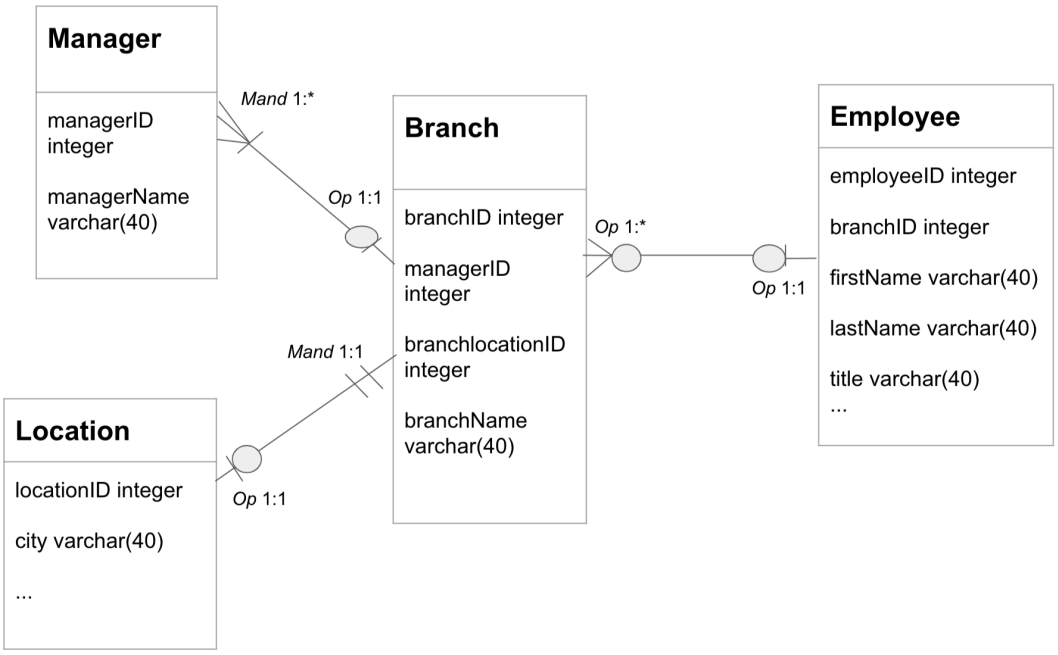
One of the wonderful things about relational databases is that we can precisely specify the *relationships* between the constituent tables/entities to make our system crystal clear to us and its users. An entity-relationship diagram does this perfectly.

Suppose we have a database containing tables for *Mangers, Branches, Employees,* and *Locations*, and these tables relate to one another in very specific ways:

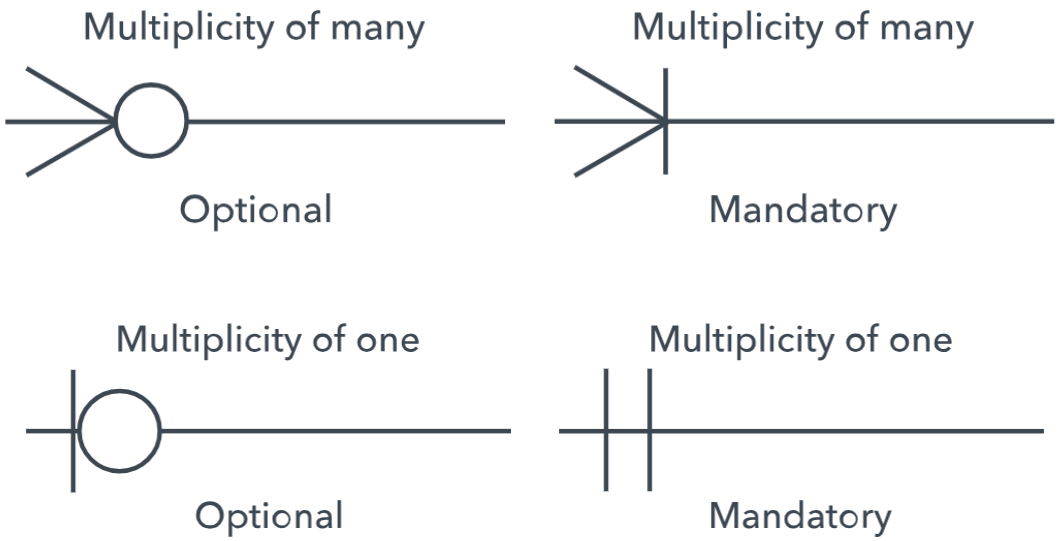
- A given employee may not work at any branch, but if they do, they'll work at just one.
- A given location may not have any branch at it, but if it does, it'll have just one.
- A given manager must manage at least one branch, and they may manage multiple branches;
- A given branch may not be managed by any manager, but if it is, then it will be managed by just one.
- A given branch may have no employees, but if it does, it may have multiple employees.
- A given branch must have just one location.

In fact, relational databases typically have ***schemas*** that constrain updates or changes to the database to ensure that such constraints are continuously met by future users.

We can actually represent the relations between these tables with a diagram called an Entity-Relationship diagram. These are so neat. Check out our diagram:



To help us interpret this, we can use the following key:



See how the diagram captures the descriptions of the specific relationships between the tables? For example, recall that a given employee may not work at any branch, but if they do, they'll work at just one. This accounts for the Optional Multiplicity of One relationship on the far right of our diagram. And since a given branch may have no employees, but if it does, it may have multiple employees, we have an Optional Multiplicity of Many relationships just to the left of the previous one; second from the furthest right.

You won’t have to master Entity-Relationship diagrams in this course. They’re just a cool way to illustrate how relational databases can track complex relationships between the kinds of things we care about, where each kind of thing can be captured in a table.