cardinalities can be used to specify constraints on what relationships are permitted in the real world.

In the E-R diagram notation, we indicate cardinality constraints on a relationship by drawing either a directed line ($\rightarrow$) or an undirected line ($-$) between the relationship set and the entity set in question. Specifically, for the university example:

- **One-to-one**. We draw a directed line from the relationship set to both entity sets. For example, in Figure 6.11a, the directed lines to *instructor* and *student* indicate that an instructor may advise at most one student, and a student may have at most one advisor.
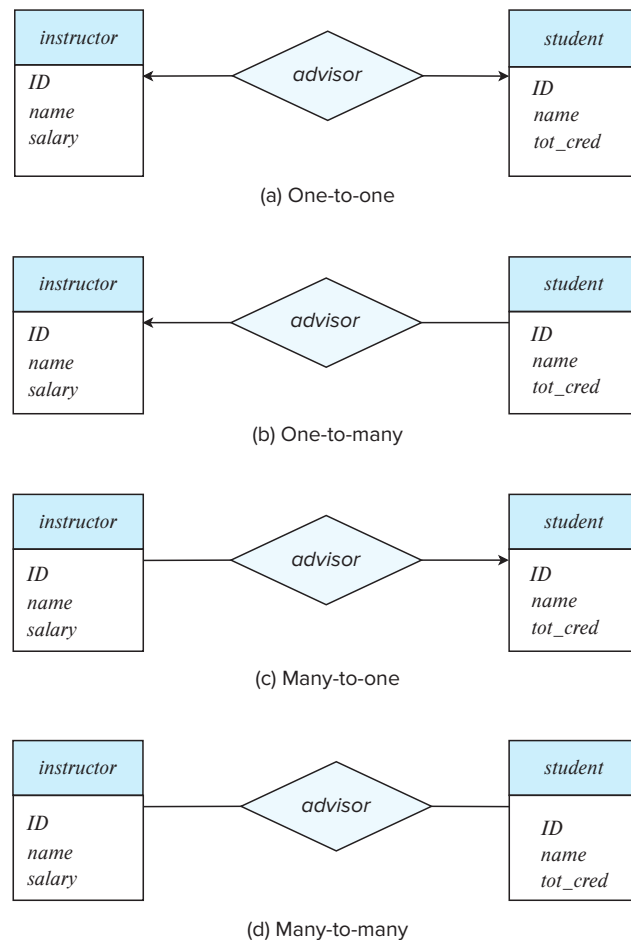

(a) One-to-one

(b) One-to-many

(c) Many-to-one

(d) Many-to-many

Figure 6.11 Relationship cardinalities.