

To represent an $N:M$ relationship, we need to create a third table, as shown in Figure 5-26 (c). The third table has two columns, *AdvisorName* and *StudentNumber*. Each row of the table means that the given adviser advises the student with the given number.

As you can imagine, there is a great deal more to database design than we have presented here. Still, this section should give you an idea of the tasks that need to be accomplished to create a database. You should also realize that the database design is a direct consequence of decisions made in the data model. If the data model is wrong, the database design will be wrong as well.

Q7 What Is the Users' Role in the Development of Databases?

As stated, a database is a model of how the users view their business world. This means that the users are the final judges as to what data the database should contain and how the records in that database should be related to one another.

The easiest time to change the database structure is during the data modeling stage. Changing a relationship from one-to-many to many-to-many in a data model is simply a matter of changing the $1:N$ notation to $N:M$. However, once the database has been constructed, loaded with data, and application forms, reports, queries, and application programs have been created, changing a one-to-many relationship to many-to-many means weeks of work.

You can glean some idea of why this might be true by contrasting Figure 5-25 (c) with Figure 5-26 (c). Suppose that instead of having just a few rows, each table has thousands of rows; in that case, transforming the database from one format to the other involves considerable work. Even worse, however, is that someone must change application components as well. For example, if students have at most one adviser, then a single text box can be used to enter *AdvisorName*. If students can have multiple advisers, then a multiple-row table will need to be used to enter *AdvisorName* and a program will need to be written to store the values of *AdvisorName* into the *Advisor_Student_Intersection* table. There are dozens of other consequences, consequences that will translate into wasted labor and wasted expense.

Thus, *user review of the data model is crucial*. When a database is developed for your use, you must carefully review the data model. If you do not understand any aspect of it, you should ask for clarification until you do. *Entities must contain all of the data you and your employees need to do your jobs, and relationships must accurately reflect your view of the business*. If the data model is wrong, the database will be designed incorrectly, and the applications will be difficult to use, if not worthless. Do not proceed unless the data model is accurate.

As a corollary, when asked to review a data model, take that review seriously. Devote the time necessary to perform a thorough review. Any mistakes you miss will come back to haunt you, and by then the cost of correction may be very high with regard to both time and expense. This brief introduction to data modeling shows why databases can be more difficult to develop than spreadsheets.



Q8 2022?

With ever cheaper data storage and data communications, we can be sure that the volume of database data will continue to grow, probably exponentially, through 2022. All that data contains patterns that can be used to conceive information to help businesses and organizations achieve their strategies, as you'll learn when you study business intelligence in Chapter 9. Furthermore, as databases become bigger and bigger, they're more attractive as targets for theft or mischief, a subject you'll consider in Chapter 12.