

Email Table

| EmailNum | Date      | Message  | Student Number |
|----------|-----------|--|----------------|
| 1        | 2/1/2012  | For homework 1, do you want us to provide notes on our references? | 1325           |
| 2        | 3/15/2012 | My group consists of Swee Lau and Stuart Nelson.                   | 1325           |
| 3        | 3/15/2012 | Could you please assign me to a group?                             | 1644           |

Student Table

| Student Number | Student Name   | HW1 | HW2 | MidTerm |
|----------------|----------------|-----|-----|---------|
| 1325           | BAKER, ANDREA  | 88  | 100 | 78      |
| 1644           | LAU, SWEE      | 75  | 90  | 90      |
| 2881           | NELSON, STUART | 100 | 90  | 98      |
| 3007           | FISCHER, MAYAN | 95  | 100 | 74      |
| 3559           | TAM, JEFFREY   |     | 100 | 88      |
| 4867           | VERBERRA, ADAM | 70  | 90  | 92      |
| 5265           | VALDEZ, MARIE  | 80  | 90  | 85      |
| 8009           | ROGERS, SHELLY | 95  | 100 | 98      |

Office\_Visit Table

| VisitID | Date      | Notes  | Student Number |
|---------|-----------|--|----------------|
| 2       | 2/13/2012 | Andrea had questions about using IS for raising barriers to entry.             | 1325           |
| 3       | 2/17/2012 | Jeffrey is considering an IS major. Wanted to talk about career opportunities. | 3559           |
| 4       | 2/17/2012 | Will miss class Friday due to job conflict.                                    | 4867           |

row in a table. *Student Number* is the key of the *Student* table. Given a value of *Student Number*, you can determine one and only one row in *Student*. Only one student has the number 1325, for example.

Every table must have a key. The key of the *Email* table is *EmailNum*, and the key of the *Office\_Visit* table is *VisitID*. Sometimes more than one column is needed to form a unique identifier. In a table called *City*, for example, the key would consist of the combination of columns (*City, State*), because a given city name can appear in more than one state.

*Student Number* is not the key of the *Email* or the *Office\_Visit* tables. We know that about *Email* because there are two rows in *Email* that have the *Student Number* value 1325. The value 1325 does not identify a unique row, therefore *Student Number* cannot be the key of *Email*.

Nor is *Student Number* a key of *Office\_Visit*, although you cannot tell that from the data in Figure 5-6. If you think about it, however, there is nothing to prevent a student from visiting a professor more than once. If that were to happen, there would be two rows in *Office\_Visit* with the same value of *Student Number*. It just happens that no student has visited twice in the limited data in Figure 5-6.

In both *Email* and *Office\_Visit*, *Student Number* is a key, but it is a key of a different table, namely *Student*. Hence, the columns that fulfill a role like that of *Student Number* in the *Email* and *Office\_Visit* tables are called **foreign keys**. This term is used because such columns are keys, but they are keys of a different (foreign) table than the one in which they reside.

Before we go on, databases that carry their data in the form of tables and that represent relationships using foreign keys are called **relational databases**. (The term *relational* is used because another, more formal name for a table like those we're discussing is **relation**.) You'll learn about another kind of database, or data store, in Q8 and in Case Study 5.

Figure 5-6  
Example of Relationships  
Among Rows