

# CHAPTER 4



## Intermediate SQL

In this chapter, we continue our study of SQL. We consider more complex forms of SQL queries, view definition, transactions, integrity constraints, more details regarding SQL data definition, and authorization.

### 4.1 Join Expressions

In all of the example queries we used in Chapter 3 (except when we used set operations), we combined information from multiple relations using the Cartesian product operator. In this section, we introduce a number of “join” operations that allow the programmer to write some queries in a more natural way and to express some queries that are difficult to do with only the Cartesian product.

<i>ID</i>	<i>name</i>	<i>dept_name</i>	<i>tot_cred</i>
00128	Zhang	Comp. Sci.	102
12345	Shankar	Comp. Sci.	32
19991	Brandt	History	80
23121	Chavez	Finance	110
44553	Peltier	Physics	56
45678	Levy	Physics	46
54321	Williams	Comp. Sci.	54
55739	Sanchez	Music	38
70557	Snow	Physics	0
76543	Brown	Comp. Sci.	58
76653	Aoi	Elec. Eng.	60
98765	Bourikas	Elec. Eng.	98
98988	Tanaka	Biology	120

Figure 4.1 The *student* relation.