

Exercises

- 2.10** Describe the differences in meaning between the terms *relation* and *relation schema*.
- 2.11** Consider the *advisor* relation shown in the schema diagram in Figure 2.9, with *s_id* as the primary key of *advisor*. Suppose a student can have more than one advisor. Then, would *s_id* still be a primary key of the *advisor* relation? If not, what should the primary key of *advisor* be?
- 2.12** Consider the bank database of Figure 2.18. Assume that branch names and customer names uniquely identify branches and customers, but loans and accounts can be associated with more than one customer.
- What are the appropriate primary keys?
 - Given your choice of primary keys, identify appropriate foreign keys.
- 2.13** Construct a schema diagram for the bank database of Figure 2.18.
- 2.14** Consider the employee database of Figure 2.17. Give an expression in the relational algebra to express each of the following queries:
- Find the ID and name of each employee who works for “BigBank”.
 - Find the ID, name, and city of residence of each employee who works for “BigBank”.
 - Find the ID, name, street address, and city of residence of each employee who works for “BigBank” and earns more than \$10000.
 - Find the ID and name of each employee in this database who lives in the same city as the company for which she or he works.
- 2.15** Consider the bank database of Figure 2.18. Give an expression in the relational algebra for each of the following queries:
- Find each loan number with a loan amount greater than \$10000.
 - Find the ID of each depositor who has an account with a balance greater than \$6000.
 - Find the ID of each depositor who has an account with a balance greater than \$6000 at the “Uptown” branch.
- 2.16** List two reasons why null values might be introduced into a database.
- 2.17** Discuss the relative merits of imperative, functional, and declarative languages.
- 2.18** Write the following queries in relational algebra, using the university schema.
- Find the ID and name of each instructor in the Physics department.