

第二章作业答案

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Current Section

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12. Consider the relational database of Figure 2.14. Give an expression in the relational algebra to express each of the following queries:

employee (*person_name*, *street*, *city*)
works (*person_name*, *company_name*, *salary*)
company (*company_name*, *city*)

Figure: Figure 2.14

a. Find the names of all employees who work for “First Bank Corporation” .

answer: $\Pi_{person-name}(\sigma_{company-name='FirstBankCorporation'}(works))$

b. Find the names and cities of residence of all employees who work for “First Bank Corporation” .

- 先查询出在 “First Bank Corporation” 工作的员

工: $\sigma_{company-name='FirstBankCorporation'}(works)$;

- 再用自然连接得到这些员工的employee信

息: $(\sigma_{company-name='FirstBankCorporation'}(works)) \bowtie employee$;

- 最后投影出题目要求的

列: $\Pi_{person-name, city}((\sigma_{company-name='FirstBankCorporation'}(works)) \bowtie employee)$.

c. Find the names, street address, and cities of residence of all employees who work for “First Bank Corporation” and earn more than ¥10,000.

与上一小题类似

answer:

$\Pi_{person-name, street, city}((\sigma_{company-name='FirstBankCorporation' \wedge salary > 10000}(works)) \bowtie employee).$

Current Section

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13. Consider the bank database of Figure 2.15. Give an expression in the relational algebra for each of the following queries:

branch(*branch_name*, *branch_city*, *assets*)
customer (*customer_name*, *customer_street*, *customer_city*)
loan (*loan_number*, *branch_name*, *amount*)
borrower (*customer_name*, *loan_number*)
account (*account_number*, *branch_name*, *balance*)
depositor (*customer_name*, *account_number*)

Figure: Figure 2.15

a. Find all loan numbers with a loan value greater than ¥10,000.

answer: $\Pi_{loan-number}(\sigma_{amount>10000}(loan))$.

b. Find the names of all depositors who have an account with a value greater than ¥6,000.

第一步：在account表筛选出"balance > 6000"的行

$$\sigma_{balance>6000}(account)$$

第二步：自然连接得到第一步结果对应的 depositor 信息

$$\sigma_{balance>6000}(account) \bowtie depositor$$

第三步：投影

$$\Pi_{customer-name}(\sigma_{balance>6000}(account) \bowtie depositor)$$

c. Find the names of all depositors who have an account with a value greater than ¥6,000 at the “Uptown” branch.

在b小题答案的基础上，在第一步增加筛选条件branch-name='Uptown'

answer:

$$\Pi_{customer-name}(\sigma_{balance > 6000 \wedge branch-name = 'Uptown'}(account) \bowtie depositor)$$