

4.4 a.

A	B
1	2

r

B	C
1	1

s

B	D
2	1

t

(r natural left outer join s)

natural left outer join t

结果为

A	B	C	D
1	2	null	1

b. 不存在, 因为 s 与 t 先做左外连接, 而左外连接不可能导致 C 为 null 而 D 不为 null, 因此整体来看不存在

4.7

create table employee (

ID numeric (5,0),

person\_name varchar (20),

street varchar (20),

city varchar (20),

primary key (ID))

create table works (  
ID numeric (5,0),  
company\_name varchar(20),  
salary numeric (10,0),  
check (salary >= 0),  
primary key (ID),  
foreign key (company\_name)  
references company  
foreign key (ID)  
references employee)

create table company (  
company\_name varchar(20),  
city varchar(20),  
primary key (company\_name)

create table managers (

ID numeric (5,0),  
manager\_id numeric (5,0),  
primary key (ID),  
foreign key (ID)  
references employee,  
foreign key (manager\_id)  
references employee (ID))

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select ID  
from student natural left outer join  
takes  
where takes.course\_id is null;