

## 数据库系统原理第三次作业

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4.7 Consider the employee database of Figure 4.12. Give an SQL DDL definition of this database. Identify referential-integrity constraints that should hold, and include them in the DDL definition.

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*employee* (ID, person\_name, street, city)  
*works* (ID, company\_name, salary)  
*company* (company\_name, city)  
*manages* (ID, manager\_id)

---

**Figure 4.12** Employee Database.

*Solution:*

```
create table employee
(
    ID char(10) not null,
    person_name varchar(50) not null,
    street varchar(50) not null,
    city varchar(50) not null,
    primary key (ID)
);

create table works
(
    ID char(10) not null,
    company_name varchar(50) not null,
    salary numeric(10, 2) not null,
    primary key (ID),
    foreign key (ID) references employee (ID),
    foreign key (company_name) references company (company_name)
);

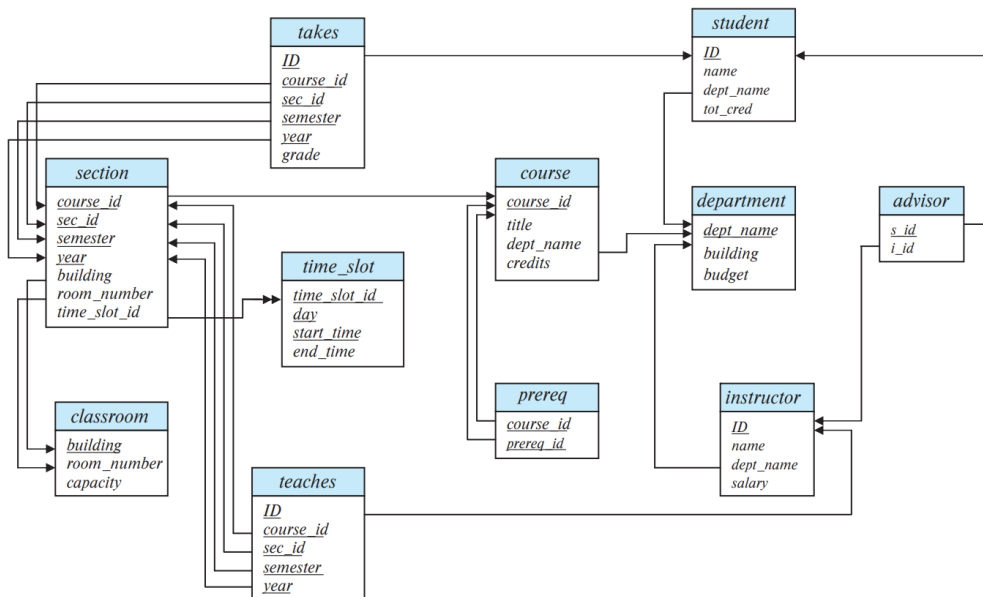
create table company
(
    company_name varchar(50) not null,
    city varchar(50) not null,
    primary key (company_name),
);
```

```

create table manages
(
    ID char(10) not null,
    manager_id char(10) not null
    primary key (ID),
    foreign key (ID) references employee (ID),
    foreign key (manager_id) references employee (ID)
);

```

**4.16** Write an SQL query using the university schema to find the ID of each student who has never taken a course at the university. Do this using no subqueries and no set operations (use an outer join).



**Solution:**

```

select ID
from student left outer join takes
    on student.ID = takes.ID
where takes.ID is null;

```