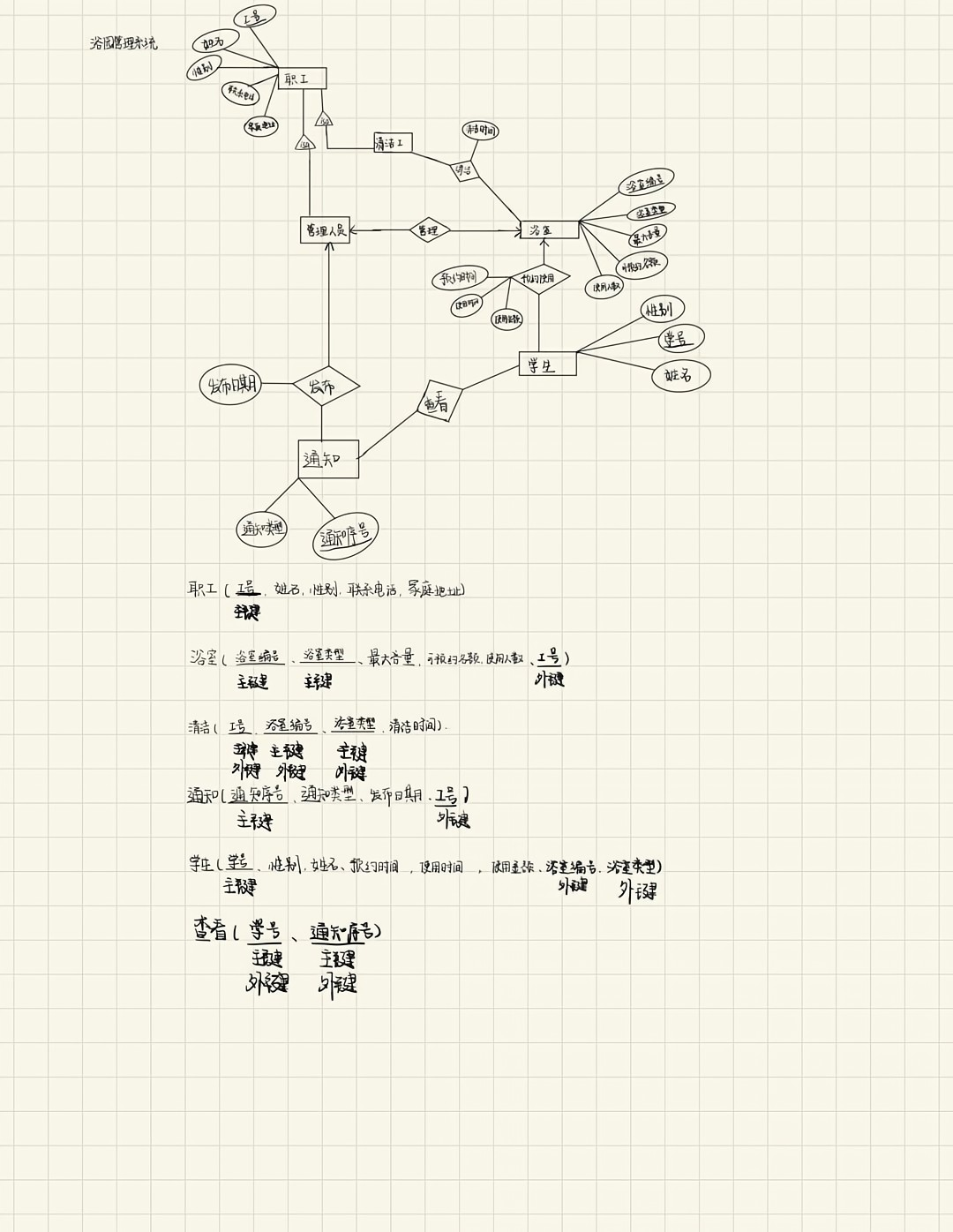
**浴园数据库设计**

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1. **概念模型ER图及关系模式**



1. **SQL语句创建关系模式**

drop table if exists Worker;

drop table if exists Washroom;

drop table if exists Clean;

drop table if exists Notice;

drop table if exists Student;

drop table if exists see;

create table Worker

(

Wno char(10) not null,

Wname char(10) not null,

Wsex char(2) not null,

Wcallno char(15) not null,

Wadd char(20),

primary key (Wno)

);

create table Washroom

(

Washno char(10) not null,

Washtype char(10) not null,

Wash\_max\_contain int not null,

Wash\_book\_no int not null,

Wash\_using\_no int,

Wno char(10),

primary key (Washno, Washtype)

);

create table Clean

(

Washno char(10) not null,

Washtype char(10) not null,

Wno char(10) not null,

Clean\_time datetime not null,

primary key (Washno, Washtype, Wno)

);

create table Notice

(

Noticeno char(10) not null,

Noticetype char(15),

public\_date datetime not null,

Wno char(10);

primary key (Noticeno)

);

create table Student

(

Sno char(10) not null,

Ssex char(2) not null,

Sname char(10) not null,

book\_time datetime,

use\_time datetime,

use\_price int,

Washno char(10).

Washtype char(10),

primary key (Sno)

);

create table see

(

Sno char(10) not null,

Noticeno char(10) not null,

primary key (Sno, Noticeno)

);

alter table Washroom add constraint FK\_manage2 foreign key (Wno)

references Worker (Wno);

alter table clean add constraint FK\_clean foreign key (Washno, Washtype)

references Washroom (Washno, Washtype);

alter table clean add constraint FK\_clean2 foreign key (Wno)

references Washworker (Wno);

alter table Notice add constraint FK\_public foreign key (Wno)

references Worker (Wno);

alter table Student add constraint FK\_book\_use foreign key (Washno, Washtype)

references Washroom (Washno, Washtype);

alter table see add constraint FK\_see foreign key (Sno)

references Student (Sno);

alter table see add constraint FK\_see2 foreign key (Noticeno)

references Notice (Noticeno);

1. **5个查询语句样例**
2. 单表查询：

查找性别为女生的学生的信息：select \* from Student where Ssex=’girl’;

1. 多表连接查询：

查找姓名为张三的清洁工打扫的浴室编号为：select Washno from Worker natural join Clean where Wname=’张三’;

1. 多表嵌套查询

查找所以看过通知序号大于5的同学的姓名：select Sname from Student where Sno

In（select Sno from see where Noticeno>5);

1. Exists查询

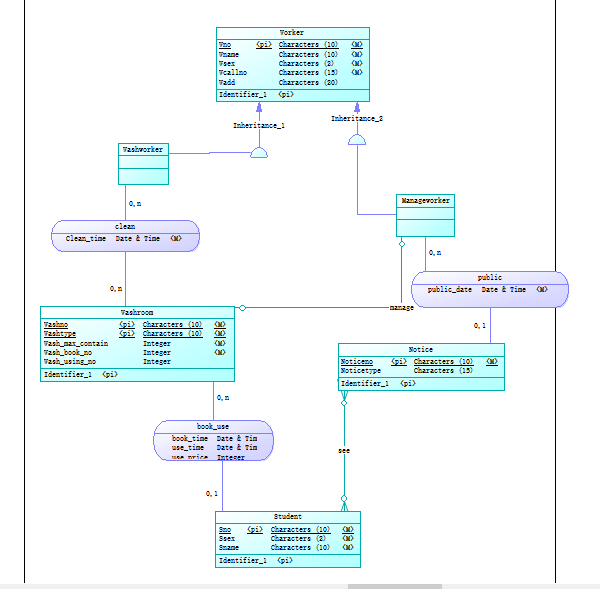
查找发布1号通知的管理人员姓名：select Wname from Worker if exists（select \* from Notice where Wno=Notcie.Wno AND Noticeno=’1’);

1. 聚合操作查询

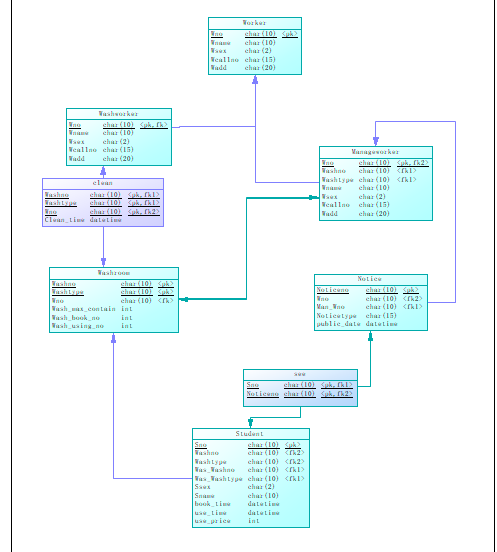
查找学生总人数：select count(\*) from Student;

1. **用PowerDesigner工具实现设计**

**ER图：**



**关系模式图：**



**SQL语句：**

/\*==============================================================\*/

/\* DBMS name: MySQL 5.0 \*/

/\* Created on: 2023/4/13 9:52:42 \*/

/\*==============================================================\*/

drop table if exists Manageworker;

drop table if exists Notice;

drop table if exists Student;

drop table if exists Washroom;

drop table if exists Washworker;

drop table if exists Worker;

drop table if exists clean;

drop table if exists see;

/\*==============================================================\*/

/\* Table: Manageworker \*/

/\*==============================================================\*/

create table Manageworker

(

Wno char(10) not null,

Washno char(10),

Washtype char(10),

Wname char(10) not null,

Wsex char(2) not null,

Wcallno char(15) not null,

Wadd char(20),

primary key (Wno)

);

/\*==============================================================\*/

/\* Table: Notice \*/

/\*==============================================================\*/

create table Notice

(

Noticeno char(10) not null,

Wno char(10),

Man\_Wno char(10) not null,

Noticetype char(15),

public\_date datetime not null,

primary key (Noticeno)

);

/\*==============================================================\*/

/\* Table: Student \*/

/\*==============================================================\*/

create table Student

(

Sno char(10) not null,

Washno char(10),

Washtype char(10),

Was\_Washno char(10) not null,

Was\_Washtype char(10) not null,

Ssex char(2) not null,

Sname char(10) not null,

book\_time datetime,

use\_time datetime,

use\_price int,

primary key (Sno)

);

/\*==============================================================\*/

/\* Table: Washroom \*/

/\*==============================================================\*/

create table Washroom

(

Washno char(10) not null,

Washtype char(10) not null,

Wno char(10),

Wash\_max\_contain int not null,

Wash\_book\_no int not null,

Wash\_using\_no int,

primary key (Washno, Washtype)

);

/\*==============================================================\*/

/\* Table: Washworker \*/

/\*==============================================================\*/

create table Washworker

(

Wno char(10) not null,

Wname char(10) not null,

Wsex char(2) not null,

Wcallno char(15) not null,

Wadd char(20),

primary key (Wno)

);

/\*==============================================================\*/

/\* Table: Worker \*/

/\*==============================================================\*/

create table Worker

(

Wno char(10) not null,

Wname char(10) not null,

Wsex char(2) not null,

Wcallno char(15) not null,

Wadd char(20),

primary key (Wno)

);

/\*==============================================================\*/

/\* Table: clean \*/

/\*==============================================================\*/

create table clean

(

Washno char(10) not null,

Washtype char(10) not null,

Wno char(10) not null,

Clean\_time datetime not null,

primary key (Washno, Washtype, Wno)

);

/\*==============================================================\*/

/\* Table: see \*/

/\*==============================================================\*/

create table see

(

Sno char(10) not null,

Noticeno char(10) not null,

primary key (Sno, Noticeno)

);

alter table Manageworker add constraint FK\_Inheritance\_2 foreign key (Wno)

references Worker (Wno);

alter table Manageworker add constraint FK\_manage foreign key (Washno, Washtype)

references Washroom (Washno, Washtype);

alter table Notice add constraint FK\_public foreign key (Wno)

references Manageworker (Wno);

alter table Notice add constraint FK\_public2 foreign key (Man\_Wno)

references Manageworker (Wno);

alter table Student add constraint FK\_book\_use foreign key (Washno, Washtype)

references Washroom (Washno, Washtype);

alter table Student add constraint FK\_book\_use2 foreign key (Was\_Washno, Was\_Washtype)

references Washroom (Washno, Washtype);

alter table Washroom add constraint FK\_manage2 foreign key (Wno)

references Manageworker (Wno);

alter table Washworker add constraint FK\_Inheritance\_1 foreign key (Wno)

references Worker (Wno);

alter table clean add constraint FK\_clean foreign key (Washno, Washtype)

references Washroom (Washno, Washtype);

alter table clean add constraint FK\_clean2 foreign key (Wno)

references Washworker (Wno);

alter table see add constraint FK\_see foreign key (Sno)

references Student (Sno);

alter table see add constraint FK\_see2 foreign key (Noticeno)

references Notice (Noticeno);

1. **对比**
2. 有差异，对于isa关系的ER图转化为关系模式时，我选择的是the Null Value Approach，而power design选择的是the OO Approach，两种方式各有优劣，the Null Value Approach 创建表更少，查询时表间转换所花费时间更少，而且因为两个子类的属性相同，所以出现Null值可能性低，但对于如果查询单个Washworker和Manageworker的信息时，可能也会查询更多元组。
3. 使用PowerDesigner生成SQL语句结构清楚明了并且添加了大量的注释方便阅读，并且还出现了一些附加语句，来更规范的创建数据库。PowerDesigner会在生成SQL语句时生成删除所要创建的表，这是为了防止数据库中已经存在了我们要创建的表。PowerDesigner会在生成SQL语句时创建主键索引，用来提高查询的效率。PowerDesigner还添加了外键约束，以确保约束的完整性。