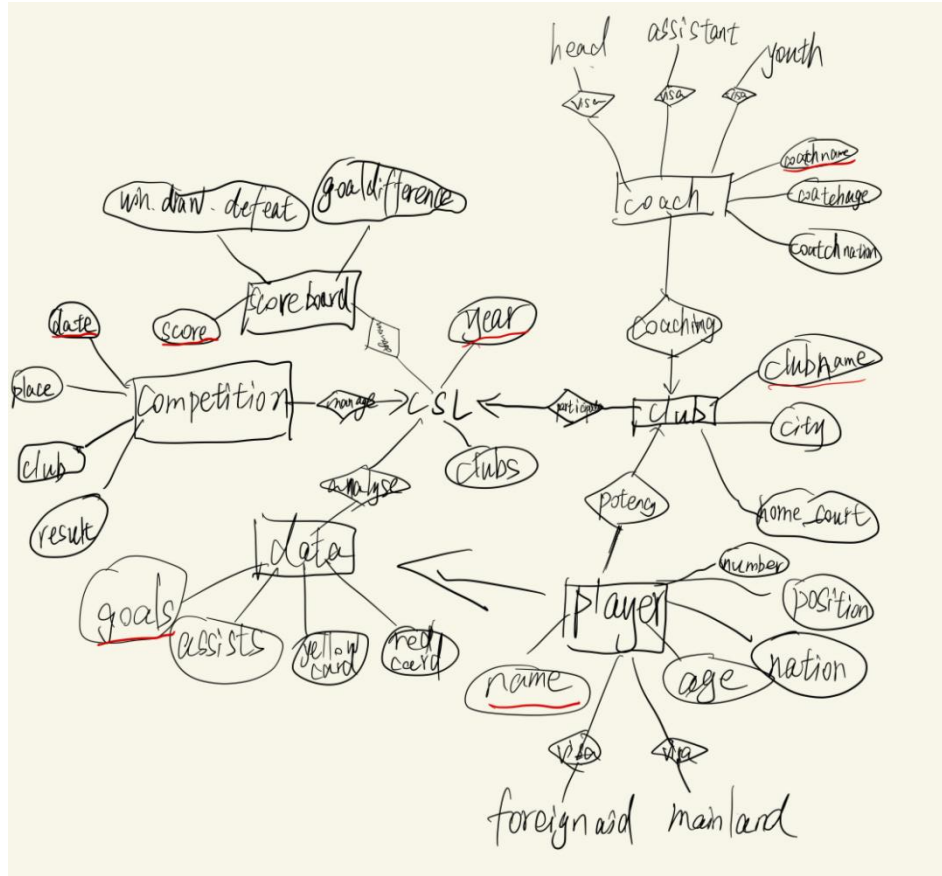


中国足球协会超级联赛 (CSL)

1. 概念模型 ER 图



2. 关系模型

CSL (year, clubs)

Club (clubname, city, homecourt)

Player (name, nation, age, position, number)

Coach (coachname, coachnation, coachage)

Competition (club, date, place, result)

Data (goals, assists, yellow card, red card)

Scoreboard (score, win & draw & defeat, goaldifference)

coachname (coachname, head, assistant, youth)

3. 用 SQL 语句创建关系模型

```

-- 创建 CSL 表
CREATE TABLE CSL (
    year INTEGER NOT NULL,
    clubs INTEGER NOT NULL,
    PRIMARY KEY (year)
);

-- 创建 Club 表
CREATE TABLE Club (
    clubname CHAR(256) NOT NULL,
    city CHAR(256),
    homecourt CHAR(256),
    PRIMARY KEY (clubname)
);

-- 创建 Player 表
CREATE TABLE Player (
    name CHAR(256) NOT NULL,
    nation CHAR(256),
    age CHAR(256),
    position CHAR(256),
    number CHAR(256) NOT NULL,
    PRIMARY KEY (name)
);

-- 创建 Coatch 表
CREATE TABLE Coatch (
    coatchname CHAR(256) NOT NULL,
    coatchnation CHAR(256),
    coatchage INTEGER,
    PRIMARY KEY (coatchname)
);

-- 创建 Competition 表
CREATE TABLE Competition (
    club CHAR(256) NOT NULL,
    date CHAR(256) NOT NULL,
    place CHAR(256),
    result CHAR(256),
    PRIMARY KEY (club)
);

-- 创建 Data 表
CREATE TABLE Data (
    goals INTEGER NOT NULL,
    assists INTEGER,
    "yellow card" INTEGER,
    "red card" INTEGER,
    PRIMARY KEY (goals)
);

-- 创建 Scoreboard 表
CREATE TABLE Scoreboard (
    score INTEGER NOT NULL,
    "win&draw&defeat" CHAR(256),
    goaldifference INTEGER,
    PRIMARY KEY (score)
);

-- 创建 Cotchname 表
CREATE TABLE Cotchname (
    coatchname CHAR(256) NOT NULL,
    head CHAR(256),
    assistant CHAR(256),
    youth CHAR(256),
    PRIMARY KEY (coatchname)
);

```

4. 五个查询语句样例

单表查询：查询 CSL 表中所有的年份和俱乐部数量。

sqlCopy code

```
SELECT year, clubs FROM CSL;
```

多表连接查询：查询 Competition 表中比赛的日期、地点、结果以及俱乐部名称及城市。

sqlCopy code

```
SELECT Competition.date, Competition.place, Competition.result, Club.clubname, Club.city
```

```
FROM Competition
```

```
JOIN Club ON Competition.club = Club.clubname;
```

多表嵌套查询：查询所有年龄大于30岁的球员的名字、国籍和年龄。

sqlCopy code

```
SELECT name, nation, age
```

```
FROM Player
```

```
WHERE age > 30;
```

EXISTS查询：查询是否存在年份为2023的比赛记录。

sqlCopy code

```
SELECT *
```

```
FROM Competition
```

```
WHERE EXISTS (
```

```
    SELECT 1
```

```
    FROM CSL
```

```
    WHERE CSL.year = 2023
```

```
);
```

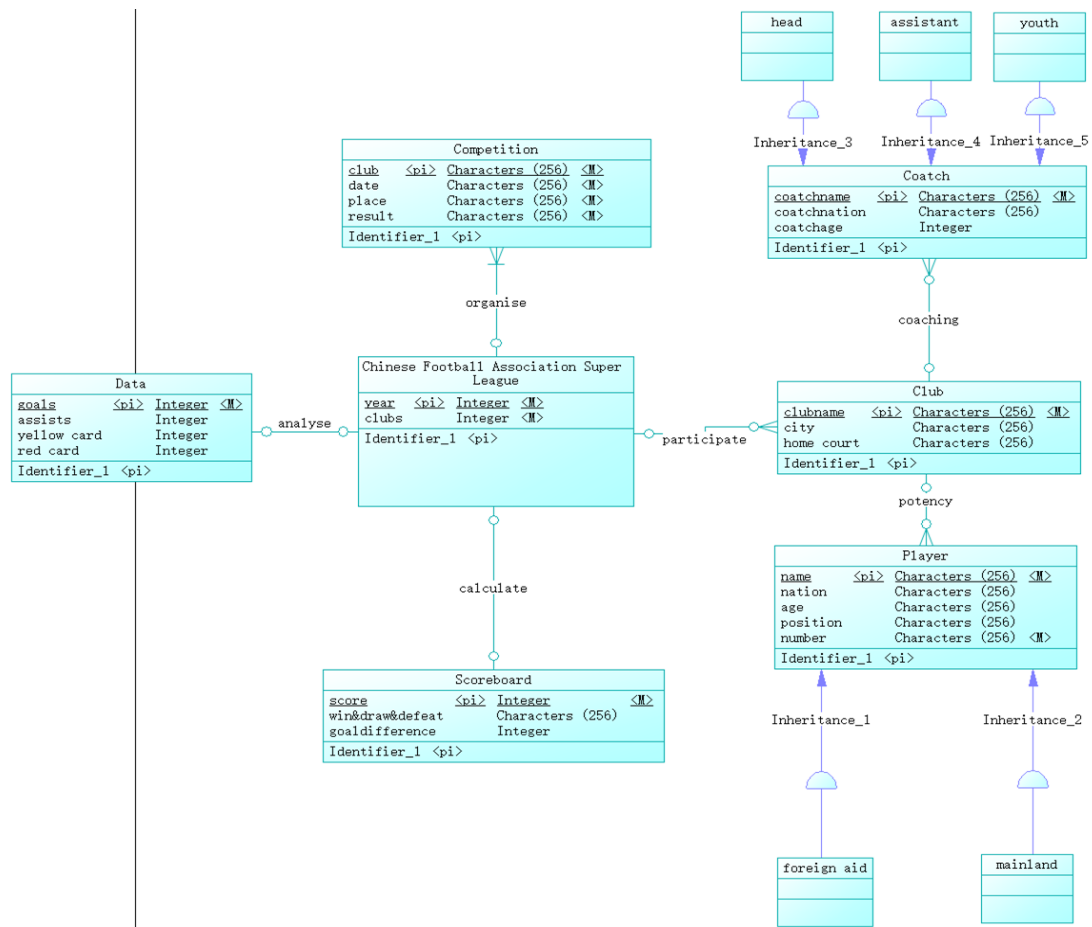
聚合操作查询：查询 CSL 表中所有年份的俱乐部数量的总和。

sqlCopy code

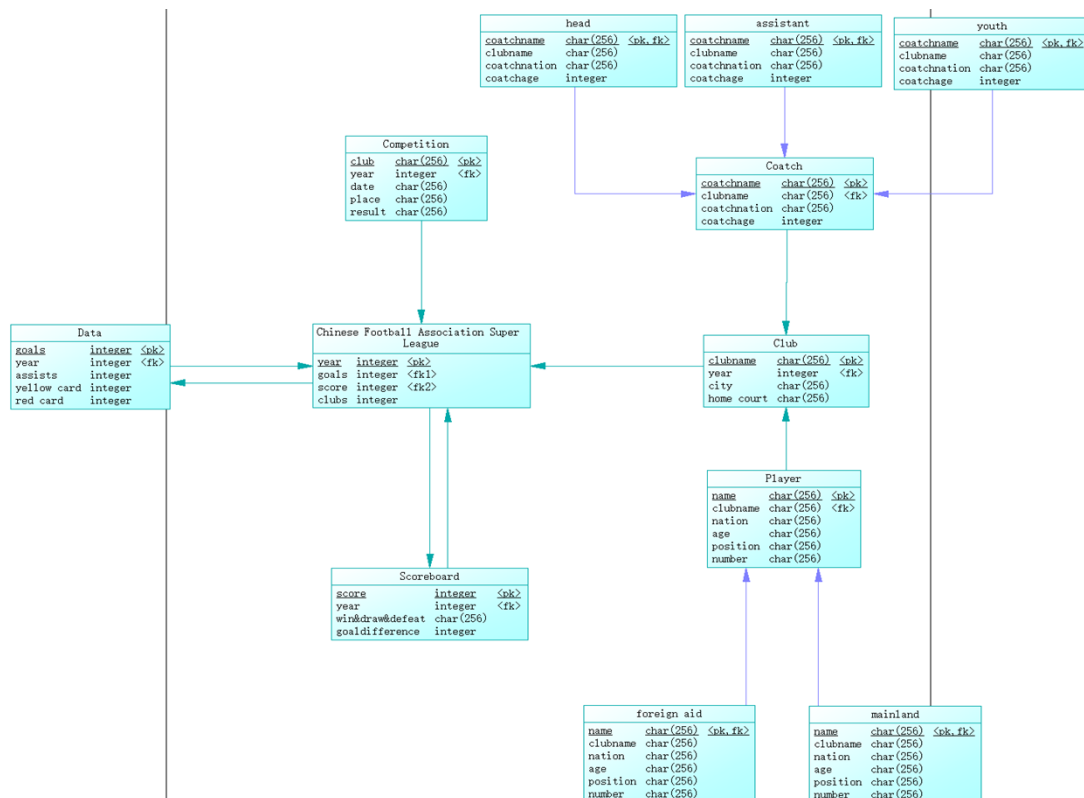
```
SELECT SUM(clubs) AS total_clubs
```

```
FROM CSL;
```

5. power designer 画 ER 图



6.power designer 画关系模型



7.power designer 生成创建数据库的 SQL 语句

```
/*=====*/  
/* DBMS name:      Sybase SQL Anywhere 12          */  
/* Created on:     2024/4/15 19:54:43              */  
/*=====*/
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_CHINESE _ANALYSE2_DATA') then  
    alter table "Chinese Football Association Super League"  
        delete foreign key "FK_CHINESE _ANALYSE2_DATA"  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_CHINESE _CALCULATE_SCOREBOA') then  
    alter table "Chinese Football Association Super League"  
        delete foreign key "FK_CHINESE _CALCULATE_SCOREBOA"  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_CLUB_PARTICIPA_CHINESE') then  
    alter table Club  
        delete foreign key FK_CLUB_PARTICIPA_CHINESE  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_COATCH_COACHING_CLUB') then  
    alter table Coatch  
        delete foreign key FK_COATCH_COACHING_CLUB  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_COMPETIT_ORGANISE_CHINESE') then  
    alter table Competition  
        delete foreign key FK_COMPETIT_ORGANISE_CHINESE  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_DATA_ANALYSE_CHINESE') then  
    alter table Data  
        delete foreign key FK_DATA_ANALYSE_CHINESE  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_PLAYER_POTENCY_CLUB') then  
    alter table Player  
        delete foreign key FK_PLAYER_POTENCY_CLUB  
end if;
```

```
if exists(select 1 from sys.sysforeignkey where role='FK_SCOREBOA_CALCULATE_CHINESE') then  
    alter table Scoreboard  
        delete foreign key FK_SCOREBOA_CALCULATE_CHINESE
```

```

end if;

if exists(select 1 from sys.sysforeignkey where role='FK_ASSISTAN_INHERITAN_COATCH') then
    alter table assistant
        delete foreign key FK_ASSISTAN_INHERITAN_COATCH
end if;

if exists(select 1 from sys.sysforeignkey where role='FK_FOREIGN_INHERITAN_PLAYER') then
    alter table "foreign aid"
        delete foreign key "FK_FOREIGN_INHERITAN_PLAYER"
end if;

if exists(select 1 from sys.sysforeignkey where role='FK_HEAD_INHERITAN_COATCH') then
    alter table head
        delete foreign key FK_HEAD_INHERITAN_COATCH
end if;

if exists(select 1 from sys.sysforeignkey where role='FK_MAINLAND_INHERITAN_PLAYER') then
    alter table mainland
        delete foreign key FK_MAINLAND_INHERITAN_PLAYER
end if;

if exists(select 1 from sys.sysforeignkey where role='FK_YOUTH_INHERITAN_COATCH') then
    alter table youth
        delete foreign key FK_YOUTH_INHERITAN_COATCH
end if;

drop index if exists "Chinese Football Association Super League".calculate_FK;

drop index if exists "Chinese Football Association Super League".analyse2_FK;

drop index if exists "Chinese Football Association Super League"."Chinese Football Association
Super League_PK";

drop table if exists "Chinese Football Association Super League";

drop index if exists Club.participate_FK;

drop index if exists Club.Club_PK;

drop table if exists Club;

drop index if exists Coatch.coaching_FK;

```

drop index if exists Coatch.Coatch_PK;

drop table if exists Coatch;

drop index if exists Competition.organise_FK;

drop index if exists Competition.Competition_PK;

drop table if exists Competition;

drop index if exists Data.analyse_FK;

drop index if exists Data.Data_PK;

drop table if exists Data;

drop index if exists Player.potency_FK;

drop index if exists Player.Player_PK;

drop table if exists Player;

drop index if exists Scoreboard.calculate2_FK;

drop index if exists Scoreboard.Scoreboard_PK;

drop table if exists Scoreboard;

drop index if exists assistant.assistant_PK;

drop table if exists assistant;

drop index if exists "foreign aid"."foreign aid_PK";

drop table if exists "foreign aid";

drop index if exists head.head_PK;

drop table if exists head;

drop index if exists mainland.mainland_PK;

drop table if exists mainland;

```
drop index if exists youth.youth_PK;
```

```
drop table if exists youth;
```

```
/*=====*/
```

```
/* Table: "Chinese Football Association Super League" */
```

```
/*=====*/
```

```
create table "Chinese Football Association Super League"
```

```
(
```

```
    year                integer                not null,
```

```
    goals               integer                null,
```

```
    score               integer                null,
```

```
    clubs               integer                not null,
```

```
    constraint "PK_CHINESE FOOTBALL ASSOCIATIO" primary key (year)
```

```
);
```

```
/*=====*/
```

```
/* Index: "Chinese Football Association Super League_PK" */
```

```
/*=====*/
```

```
create unique index "Chinese Football Association Super League_PK" on "Chinese Football Association Super League" (
```

```
year ASC
```

```
);
```

```
/*=====*/
```

```
/* Index: analyse2_FK */
```

```
/*=====*/
```

```
create index analyse2_FK on "Chinese Football Association Super League" (
```

```
goals ASC
```

```
);
```

```
/*=====*/
```

```
/* Index: calculate_FK */
```

```
/*=====*/
```

```
create index calculate_FK on "Chinese Football Association Super League" (
```

```
score ASC
```

```
);
```

```
/*=====*/
```

```
/* Table: Club */
```

```
/*=====*/
```

```
create table Club
```

```
(
```

```
    clubname            char(256)            not null,
```



```

        year                integer                null,
        city                 char(256)              null,
        "home court"        char(256)              null,
        constraint PK_CLUB primary key (clubname)
    );

/*=====*/
/* Index: Club_PK */
/*=====*/
create unique index Club_PK on Club (
clubname ASC
);

/*=====*/
/* Index: participate_FK */
/*=====*/
create index participate_FK on Club (
year ASC
);

/*=====*/
/* Table: Coatch */
/*=====*/
create table Coatch
(
    coatchname                char(256)                not null,
    clubname                  char(256)                null,
    coatchnation              char(256)                null,
    coatchage                 integer                  null,
    constraint PK_COATCH primary key (coatchname)
);

/*=====*/
/* Index: Coatch_PK */
/*=====*/
create unique index Coatch_PK on Coatch (
coatchname ASC
);

/*=====*/
/* Index: coaching_FK */
/*=====*/
create index coaching_FK on Coatch (
clubname ASC

```

```

);

/*=====*/
/* Table: Competition */
/*=====*/
create table Competition
(
    club            char(256)        not null,
    year            integer           null,
    "date"          char(256)        not null,
    place           char(256)        not null,
    result          char(256)        not null,
    constraint PK_COMPETITION primary key (club)
);

/*=====*/
/* Index: Competition_PK */
/*=====*/
create unique index Competition_PK on Competition (
club ASC
);

/*=====*/
/* Index: organise_FK */
/*=====*/
create index organise_FK on Competition (
year ASC
);

/*=====*/
/* Table: Data */
/*=====*/
create table Data
(
    goals           integer           not null,
    year            integer           null,
    assists         integer           null,
    "yellow card"   integer           null,
    "red card"      integer           null,
    constraint PK_DATA primary key (goals)
);

/*=====*/
/* Index: Data_PK */
/*=====*/

```

```

/*=====*/
create unique index Data_PK on Data (
goals ASC
);

```

```

/*=====*/
/* Index: analyse_FK */
/*=====*/
create index analyse_FK on Data (
year ASC
);

```

```

/*=====*/
/* Table: Player */
/*=====*/
create table Player
(
    name                char(256)          not null,
    clubname            char(256)          null,
    nation              char(256)          null,
    age                char(256)          null,
    position            char(256)          null,
    number              char(256)          not null,
    constraint PK_PLAYER primary key (name)
);

```

```

/*=====*/
/* Index: Player_PK */
/*=====*/
create unique index Player_PK on Player (
name ASC
);

```

```

/*=====*/
/* Index: potency_FK */
/*=====*/
create index potency_FK on Player (
clubname ASC
);

```

```

/*=====*/
/* Table: Scoreboard */
/*=====*/
create table Scoreboard

```

```

(
    score            integer            not null,
    year             integer            null,
    win&draw&defeat   char(256)         null,
    goaldifference    integer            null,
    constraint PK_SCOREBOARD primary key (score)
);

/*=====*/
/* Index: Scoreboard_PK                                */
/*=====*/
create unique index Scoreboard_PK on Scoreboard (
score ASC
);

/*=====*/
/* Index: calculate2_FK                                */
/*=====*/
create index calculate2_FK on Scoreboard (
year ASC
);

/*=====*/
/* Table: assistant                                    */
/*=====*/
create table assistant
(
    coachname        char(256)          not null,
    clubname         char(256)          null,
    coachnation      char(256)          null,
    coachage         integer            null,
    constraint PK_ASSISTANT primary key clustered (coachname)
);

/*=====*/
/* Index: assistant_PK                                */
/*=====*/
create unique clustered index assistant_PK on assistant (
coachname ASC
);

/*=====*/
/* Table: "foreign aid"                                */
/*=====*/

```

```

create table "foreign aid"
(
    name                char(256)                not null,
    clubname            char(256)                null,
    nation              char(256)                null,
    age                 char(256)                null,
    position            char(256)                null,
    number              char(256)                not null,
    constraint "PK_FOREIGN AID" primary key clustered (name)
);

/*=====*/
/* Index: "foreign aid_PK" */
/*=====*/
create unique clustered index "foreign aid_PK" on "foreign aid" (
name ASC
);

/*=====*/
/* Table: head */
/*=====*/
create table head
(
    coachname          char(256)                not null,
    clubname            char(256)                null,
    coachnation        char(256)                null,
    coachage            integer                null,
    constraint PK_HEAD primary key clustered (coachname)
);

/*=====*/
/* Index: head_PK */
/*=====*/
create unique clustered index head_PK on head (
coachname ASC
);

/*=====*/
/* Table: mainland */
/*=====*/
create table mainland
(
    name                char(256)                not null,
    clubname            char(256)                null,

```

```

        nation            char(256)            null,
        age               char(256)            null,
        position          char(256)            null,
        number            char(256)            not null,
        constraint PK_MAINLAND primary key clustered (name)
    );

/*=====*/
/* Index: mainland_PK */
/*=====*/
create unique clustered index mainland_PK on mainland (
name ASC
);

/*=====*/
/* Table: youth */
/*=====*/
create table youth
(
    coatchname            char(256)            not null,
    clubname              char(256)            null,
    coatchnation          char(256)            null,
    coachage              integer              null,
    constraint PK_YOUTH primary key clustered (coatchname)
);

/*=====*/
/* Index: youth_PK */
/*=====*/
create unique clustered index youth_PK on youth (
coatchname ASC
);

alter table "Chinese Football Association Super League"
    add constraint "FK_CHINESE _ANALYSE2_DATA" foreign key (goals)
        references Data (goals)
        on update restrict
        on delete restrict;

alter table "Chinese Football Association Super League"
    add constraint "FK_CHINESE _CALCULATE_SCOREBOA" foreign key (score)
        references Scoreboard (score)
        on update restrict
        on delete restrict;

```

alter table Club

add constraint FK_CLUB_PARTICIPA_CHINESE foreign key (year)
references "Chinese Football Association Super League" (year)
on update restrict
on delete restrict;

alter table Coatch

add constraint FK_COATCH_COACHING_CLUB foreign key (clubname)
references Club (clubname)
on update restrict
on delete restrict;

alter table Competition

add constraint FK_COMPETIT_ORGANISE_CHINESE foreign key (year)
references "Chinese Football Association Super League" (year)
on update restrict
on delete restrict;

alter table Data

add constraint FK_DATA_ANALYSE_CHINESE foreign key (year)
references "Chinese Football Association Super League" (year)
on update restrict
on delete restrict;

alter table Player

add constraint FK_PLAYER_POTENCY_CLUB foreign key (clubname)
references Club (clubname)
on update restrict
on delete restrict;

alter table Scoreboard

add constraint FK_SCOREBOA_CALCULATE_CHINESE foreign key (year)
references "Chinese Football Association Super League" (year)
on update restrict
on delete restrict;

alter table assistant

add constraint FK_ASSISTAN_INHERITAN_COATCH foreign key (coatchname)
references Coatch (coatchname)
on update restrict
on delete restrict;

alter table "foreign aid"

```
add constraint "FK_FOREIGN_INHERITAN_PLAYER" foreign key (name)
references Player (name)
on update restrict
on delete restrict;
```

alter table head

```
add constraint FK_HEAD_INHERITAN_COATCH foreign key (coachname)
references Coach (coachname)
on update restrict
on delete restrict;
```

alter table mainland

```
add constraint FK_MAINLAND_INHERITAN_PLAYER foreign key (name)
references Player (name)
on update restrict
on delete restrict;
```

alter table youth

```
add constraint FK_YOUTH_INHERITAN_COATCH foreign key (coachname)
references Coach (coachname)
on update restrict
on delete restrict;
```

8.两种关系模式的设计存在的差异：

属性约束：第一种只能显示多对多关系的约束和具有其他属性的约束。

会对后期实验产生一些影响，比如数据一致性、SQL 查询语句的编写等。

9.PowerDesigner 生成的 SQL 语句具有规范性、完整性、可读性和自动化等特点，能够有效地帮助开发人员快速生成符合要求的数据库对象定义和操作语句，提高了数据库设计和开发的效率和质量。

PowerDesigner 生成的 SQL 语句中可能会出现一些附加语句，例如创建表之前可能会先删除已存在的同名表，或者创建外键之前会先删除已存在的同名外键等。这些附加语句的作用主要是为了保证生成的 SQL 能够在目标数据库上正确执行，避免出现重复对象或约束的情况，确保数据库的一致性和完整性。