Database design of charity running competition

**1. Software and Version**

**Visio**: Design and draw E-R diagram.

**Powerdesigner 16.6**: Design the database and complete the SQL statement.

**Navicat 15.0.9**: It is convenient to control the database for relevant testing and operation.

**MySQL-installer-community-5.7.13.0.msi**

**MySQL Workbrench 8.0**: Database operation with Navicat.

**2. Overall Demand**

Venue, Team’s agent, Team, Athlete, Customer, Race event, Ticket.

**3. Specific demand analysis**

3.1场地表

存储场地编号、工作人员人数、场地名称。由于场地需要提供起点和终点。所以除了场地地址，属性还包括起点地址和终点地址。还要有场馆联系方式和最大游客数量，活动的开始日期。由于是慈善跑步比赛，其中可能包含马拉松等长跑运动。所以需要有活动开始时间和活动的结束时间。还需要有门票数。另外假设慈善跑步比赛中，一个项目只在一个场地举行。

3.2运动员团队表

主键为团队编号，表内包含代理人标号和唯一的团队名称。有团队描述、团队人数。但因为团队可能为15人以下，但并不一定为15人以下，所以不做人数限制。其他还包含有电子邮件，电话号码和其他信息。

3.3比赛项目表

主键为比赛项目编号，表内包含比赛项目名称和比赛项目描述和场地编号。其中场地编号作为外键，从而可以链接与比赛项目之间的关系。

3.4售票表

票单不应具有顾客信息，因为一个顾客可以购买多张票。所以票号作为主键。场地编号为外键。

3.5 顾客表

出于安全性和责任认定等因素考虑，管理人员需要了解具体某一个顾客去了哪一个场馆。顾客编号、票号、场地号作为联合主键，其他属性包括顾客姓名、顾客地址、顾客电话、和其他。

3.6场地工作人员表

员工ID与场地ID作为联合主键，其他属性包括staffname、stafftelephone、jobtitle。并且一个员工必然会在一个场馆工作，也就是说，并不存在员工不工作的情况。

3.7运动员表

AthleteID为主键，其他属性包括venueID，EventID，AgentID，TeamID，AthleteName，Biography。运动员参加比赛，并在场馆比赛。所以团队并不直接去场馆比赛。换句话说，团队与场地和比赛无关。

3.8团队代理人表。

由于一个代理人可以管理多个队伍，所以管理员的信息应在队伍表中出现，所以在代理人表中不出现。AgentID作为主键，其他属性包括AgentName，AgentTelephone。

**4 Data dictionary**

4.1 Data structure（#Represents the primary key and some tables have federated primary keys）

|  |  |  |  |
| --- | --- | --- | --- |
| **Number** | **Data structure name** | **Meaning description** | **Constituent** |
| 1 | Venue | Venue table | #VenueID, EventID, VenueName, VenueTelephone, VenuseAddress, TicketSellNumber, Date, StratTime, FinishTime, MaxCustomerNumber, StaffNumber, StratlineAddress, FinishlineAddress, |
| 2 | Team | Team table | #TeamID, #AgentID, TeamName, TeamTelephone, TeamDescription, TeamPeopleNumber, TeamOther, TeamEmail |
| 3 | RaceEvent | RaceEvent table | #EventID, VenueID, EventName, EventDescription |
| 4 | Ticket | Ticket table | #TicketID, #VenueID |
| 5 | Customer | Customer table | #CustomerID, #VenueID, #TicketID, CustomerName, CustomerAddress, CustomerTelephone, CustomerOther |
| 6 | Staff | Staff table | #StaffID, #VenueID, StaffName, StaffTelephone, JobTitle |
| 7 | Athlete | Athlete table | #AthleteID, VenueID, EventID, AgentID, TeamID, AthleteName, Biography |
| 8 | TeamAgent | TeamAgent table | #AgentID, AgentName, AgentTelephone |

4.2 Relationship between data structures

|  |  |  |  |
| --- | --- | --- | --- |
| **Number** | **Data structure1** | **Data structure2** | **Relationship** |
| 1 | TeamAgent | Team | 1 to many |
| 2 | Team | Athlete | 1 to many |
| 3 | Athlete | RaceEvent | 1 to many |
| 4 | Athlete | Venue | 1 to many |
| 5 | RaceEvent | Venue | 1 to 1 |
| 6 | Venue | Ticket | 1 to many |
| 7 | Ticket | Customer | 1 to many |
| 8 | Staff | Venue | 1 to many |

4.3 Data items

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number** | **Belonging table** | **Data item name** | **storage structure** | **Data item meaning** |
| 1 | TeamAgent | AgentID | char(10) | Team Agent ID |
| 2 | TeamAgent | AgentName | char(50) | Team agent name |
| 3 | TeamAgent | AgentTelephone | Int | Team agent contact information |
| 4 | Team | TeamID | char(10) | Team ID |
| 5 | Team | TeamName | char(20) | Team name |
| 6 | Team | TeamTelephone | Int | Team contact information |
| 7 | Team | TeamDescription | char(100) | Team description information |
| 8 | Team | TeamPeopleNumber | Int | Number of people included in the team |
| 9 | Team | TeamOther | char(100) | Additional content to be added by the team |
| 10 | Team | TeamEmail | char(50) | Team e-mail information |
| 11 | Athlete | AthleteID | char(10) | Athlete ID |
| 12 | Athlete | AthleteName | char(50) | Athlete Name |
| 13 | Athlete | Biography | char(200) | Athlete biography |
| 14 | RaceEvent | EventID | char(10) | Event ID |
| 15 | RaceEvent | EventDescription | char(100) | Event other description |
| 16 | Venue | VenueID | char(10) | Venue ID |
| 17 | Venue | VenueName | char(50) | Venue Name |
| 18 | Venue | VenueTelephone | Int | Venue contact information |
| 19 | Venue | VenuseAddress | char(100) | Venue address |
| 20 | Venue | TicketSellNumber | Int | Number of tickets sold at the venue |
| 21 | Venue | Date | date | The date on which a competition is held at the venue |
| 22 | Venue | StratTime | datatime | The starting time of the competition held at the venue |
| 23 | Venue | FinishTime | datatime | The ending time of the competition held at the venue |
| 24 | Venue | MaxCustomerNumber | Int | Maximum capacity of the people |
| 25 | Venue | StaffNumber | Int | Number of venue staff |
| 26 | Venue | StratlineAddress | char(50) | The starting address of the competition held at the venue |
| 27 | Venue | FinishlineAddress | char(50) | The ending address of the competition held at the venue |
| 28 | Staff | StaffID | char(10) | Staff ID |
| 29 | Staff | StaffName | char(50) | Staff name |
| 30 | Staff | StaffTelephone | int | Staff telephone number |
| 31 | Staff | JobTitle | char(50) | The staff of job title |
| 32 | Ticket | TicketID | char(10) | Ticket ID |
| 33 | Customer | CustomerID | Int | Customer ID |
| 34 | Customer | CustomerName | char(20) | Customer name |
| 35 | Customer | CustomerAddress | char(50) | The address of customer |
| 36 | Customer | CustomerTelephone | int | The telephone of customer |
| 37 | Customer | CustomerOther | char(100) | Other information about customer |

**5. SQL statement**

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

/\* DBMS name: MySQL 5.7 \*/

/\* Created on: 2021/10/6 22:58:22 \*/

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

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

/\*Create Database\*/

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

drop database if exists race;

create database race;

use race;

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

/\* Table: Athlete \*/

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

create table Athlete

(

VenueID char(10) not null comment '',

EventID char(10) not null comment '',

AgentID char(10) not null comment '',

TeamID char(10) not null comment '',

AthleteID char(10) not null comment '',

AthleteName char(50) not null comment '',

Biography char(200) not null comment '',

primary key (AthleteID)

);

INSERT INTO `athlete` VALUES ('V1', 'E1', '1', 'N1', 'Ac001', 'JIAORUIPENG', 'Mr.nobody');

INSERT INTO `athlete` VALUES ('V1', 'E1', '2', 'N3', 'Ac052', 'Dennisjiao', 'Mr.right');

INSERT INTO `athlete` VALUES ('V2', 'E4', '3', 'N5', 'Am100', 'SuBingtian', 'Greatman');

INSERT INTO `athlete` VALUES ('V2', 'E4', '4', 'N4', 'Am105', 'Jackson', 'UUS');

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

/\* Table: Customer \*/

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

create table Customer

(

VenueID char(10) not null comment '',

TicketID char(20) not null comment '',

CustomerID int not null comment '',

CustomerName char(20) not null comment '',

CustomerAddress char(50) not null comment '',

CustomerTelephone int not null comment '',

CustomerOther char(100) comment '',

primary key (VenueID, TicketID, CustomerID)

);

INSERT INTO `customer` VALUES ('V1', 'TV001', 546, 'jackson', 'NE1 1TT', 451313513, '');

INSERT INTO `customer` VALUES ('V1', 'TV002', 13, 'DAJIDA', 'NE1 1TT', 435131, NULL);

INSERT INTO `customer` VALUES ('V2', 'TN001', 20, 'dawd', 'NE1 1AD', 4863, NULL);

INSERT INTO `customer` VALUES ('V2', 'TN002', 123, 'ADAWD', 'NE1 1TT', 54684, 'VIP');

INSERT INTO `customer` VALUES ('V2', 'TV005', 7, 'QWDA', 'NE1 11M', 515543, NULL);

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

/\* Table: RaceEvent \*/

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

create table RaceEvent

(

EventID char(10) not null comment '',

VenueID char(10) not null comment '',

EventName char(100) not null comment '',

EventDescription char(100) not null comment '',

primary key (EventID)

);

INSERT INTO `raceevent` VALUES ('E1', 'V1', 'Men\'s Marathon','This is MEN race event');

INSERT INTO `raceevent` VALUES ('E2', 'V2', 'Women\'s Marathon','This is WOMEN race event');

INSERT INTO `raceevent` VALUES ('E4', 'V4', '100 Meters','This is 100 Meter race event');

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

/\* Table: Staff \*/

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

create table Staff

(

VenueID char(10) not null comment '',

StaffID char(10) not null comment '',

StaffName char(50) not null comment '',

StaffTelephone int not null comment '',

JobTitle char(50) not null comment '',

primary key (StaffID)

);

INSERT INTO `staff` VALUES ('V1', 'S12', 'StaffNO1', 1135431, 'Highlevel');

INSERT INTO `staff` VALUES ('V2', 'S123', 'john', 16549, 'Mid');

INSERT INTO `staff` VALUES ('V1', 'S32', 'sno2', 13532, 'low');

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

/\* Table: Team \*/

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

create table Team

(

AgentID char(10) not null comment '',

TeamID char(10) not null comment '',

TeamName char(20) not null comment '',

TeamTelephone int not null comment '',

TeamDescription char(100) not null comment '',

TeamPeopleNumber int not null comment '',

TeamOther char(100) not null comment '',

TeamEmail char(50) not null comment '',

primary key (AgentID, TeamID)

);

INSERT INTO `team` VALUES ('1', 'N1', 'RNG', 123123, 'OK', 32113, '123DAD', '123DA');

INSERT INTO `team` VALUES ('1', 'N2', 'OMG', 32151, 'Nice', 123123, 'asd123', 'dawd1');

INSERT INTO `team` VALUES ('2', 'N3', 'IG', 123546, 'GREAT', 131215, 'AWD1', '12EDA');

INSERT INTO `team` VALUES ('3', 'N5', 'FPX', 456123, 'TEST', 15656, 'DAW12', '12DAWD');

INSERT INTO `team` VALUES ('4', 'N4', 'EDG', 654123, 'FINE', 54654, 'DASD123', '124A');

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

/\* Table: TeamAgent \*/

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

create table TeamAgent

(

AgentID char(10) not null comment '',

AgentName char(50) not null comment '',

AgentTelephone int not null comment '',

primary key (AgentID)

);

INSERT INTO `teamagent` VALUES ('1', 'Kiven', 123123);

INSERT INTO `teamagent` VALUES ('2', 'John', 123232);

INSERT INTO `teamagent` VALUES ('3', 'Mike', 323121);

INSERT INTO `teamagent` VALUES ('4', 'Jack', 123123);

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

/\* Table: Ticket \*/

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

create table Ticket

(

VenueID char(10) not null comment '',

TicketID char(20) not null comment '',

primary key (VenueID, TicketID)

);

INSERT INTO `ticket` VALUES ('V1', 'TV001');

INSERT INTO `ticket` VALUES ('V1', 'TV002');

INSERT INTO `ticket` VALUES ('V1', 'TV003');

INSERT INTO `ticket` VALUES ('V1', 'TV004');

INSERT INTO `ticket` VALUES ('V2', 'TN001');

INSERT INTO `ticket` VALUES ('V2', 'TN002');

INSERT INTO `ticket` VALUES ('V2', 'TV005');

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

/\* Table: Venue \*/

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

create table Venue

(

EventID char(10) not null comment '',

VenueID char(10) not null comment '',

VenueName char(50) not null comment '',

VenueTelephone int not null comment '',

VenueAddress char(40) not null comment '',

TicketSellNumber int not null comment '',

Date date not null comment '',

StratTime datetime not null comment '',

FinishTime datetime not null comment '',

MaxCustomerNumber int not null comment '',

StaffNumber int not null comment '',

StratlineAddress char(50) not null comment '',

FinishlineAddress char(50) not null comment '',

CHECK (staffNumber<=5),

primary key (VenueID)

);

INSERT INTO `venue` VALUES ('E1', 'V1', 'NCL', 1512315618, 'address1', 500, '2021-10-06', '2021-10-07 23:26:32', '2021-10-08 23:26:37', 1000, 2, 'strataddress', 'finishaddress');

INSERT INTO `venue` VALUES ('E2', 'V2', 'NCL001', 153153, 'address2', 530, '2021-10-04', '2021-10-04 09:00:00', '2021-10-04 12:00:00', 2000, 1, 'strataddress1', 'finishaddress1');

alter table Athlete add constraint FK\_ATHLETE\_ADMINISTR\_TEAM foreign key (AgentID, TeamID)

references Team (AgentID, TeamID) on delete restrict on update restrict;

alter table Athlete add constraint FK\_ATHLETE\_MATCH\_RACEEVEN foreign key (EventID)

references RaceEvent (EventID) on delete restrict on update restrict;

alter table Athlete add constraint FK\_ATHLETE\_MATCH2\_VENUE foreign key (VenueID)

references Venue (VenueID) on delete restrict on update restrict;

alter table Customer add constraint FK\_CUSTOMER\_SELL\_TICKET foreign key (VenueID, TicketID)

references Ticket (VenueID, TicketID) on delete restrict on update restrict;

alter table Staff add constraint FK\_STAFF\_ADMINISTR\_VENUE foreign key (VenueID)

references Venue (VenueID) on delete restrict on update restrict;

alter table Team add constraint FK\_TEAM\_REPRESENT\_TEAMAGEN foreign key (AgentID)

references TeamAgent (AgentID) on delete restrict on update restrict;

alter table Ticket add constraint FK\_TICKET\_SUPPLY\_VENUE foreign key (VenueID)

references Venue (VenueID) on delete restrict on update restrict;

alter table Venue add constraint FK\_VENUE\_MATCH3\_RACEEVEN foreign key (EventID)

references RaceEvent (EventID) on delete restrict on update restrict;

SELECT \* from athlete;

SELECT \* from customer;

SELECT \* from raceevent;

SELECT \* from staff;

SELECT \* from team;

SELECT \* from teamagent;

SELECT \* from ticket;

SELECT \* from venue;

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