Formula One Data Base

Database Overview

A formula one data base was made for this project. The formula one industry consists of many competing teams, each team has a two or more drivers. The team is managed by a Team Principle and every driver/team has a race engineers. Each of the teams in Formula One have a pit crew and a range of engineers they are in charge of a number of jobs: building and designing the car, repairing it, calculating the correct time to take a pit, what strategy is the best given the racing conditions etc.

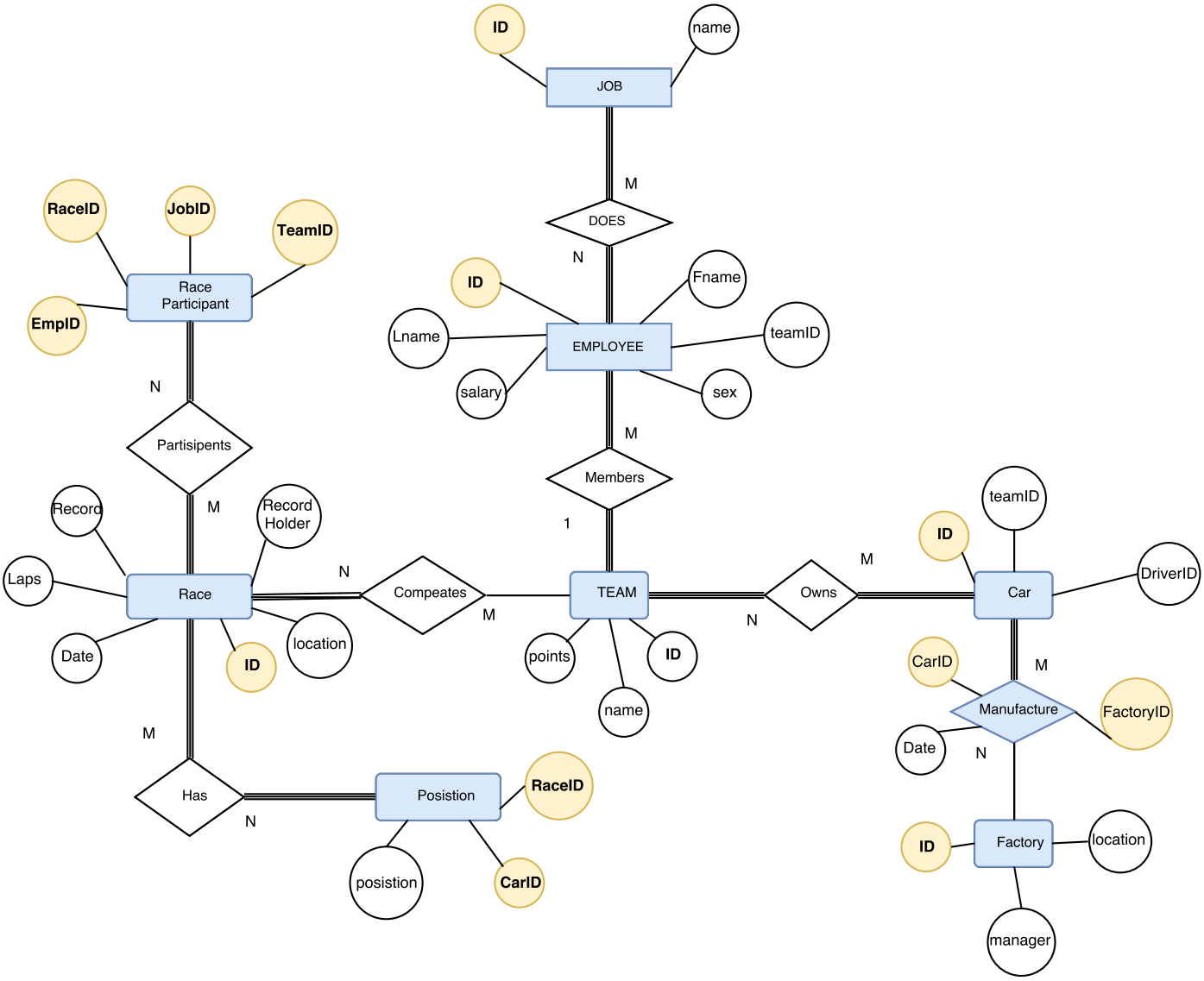
The teams have two cars. These cars are driven by the team drivers.
There is a league that all the teams compete in. There is a separate team league and an individual driver league.

The teams compete in a number of races. A team may not compete in every race, the same applies to the drivers and the teams' employees.
At each race there is a set amount of laps. Each driver and team that participated in the race get points and a position. The points are built up during the season and the team and driver with the most points wins the constructers(team league) and the championship(individual league) respectively.

The database I have build does not model this completely. This database will gather points no matter how many races there are, thus it does not keep tack of the league unless they are reset every season, this can be done by the Race Director Charlie Whiting as you will be in the security section in which case the database will keep track of the team league.

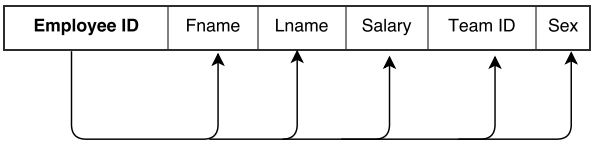
This data base consists of 9 relation tables. These tables cover the teams employees and their roles within the team. It holds information on the drivers points and the teams points. It contains what drivers drive or each team and there cars. The data base keep track of where the cars where made and manufactured. It holds the information on each race and what position each driver came in the race.

Relation Diagram

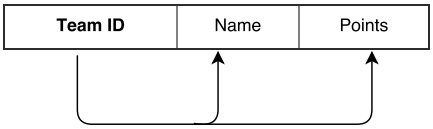


Functional Dependancy

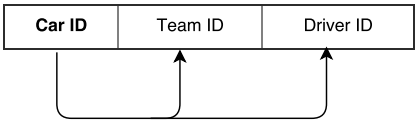
EMPLOYEES



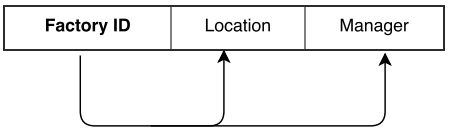
TEAM



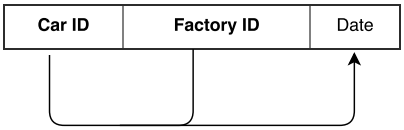
CAR



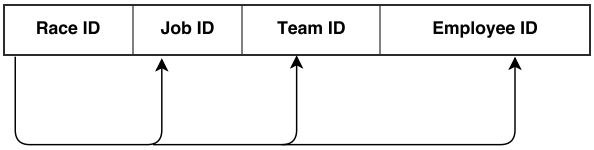
FACTORY



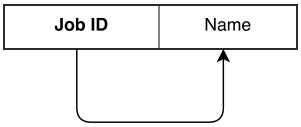
MANUFACTER



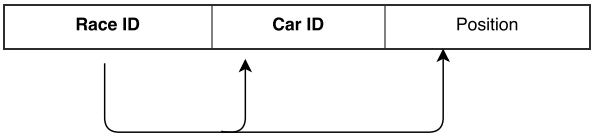
RACE PLACMENT



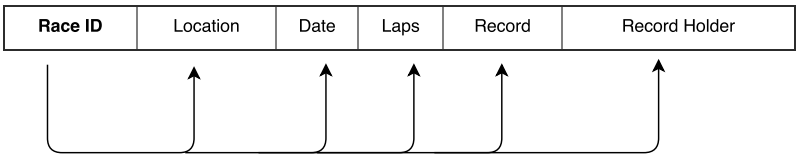
JOB



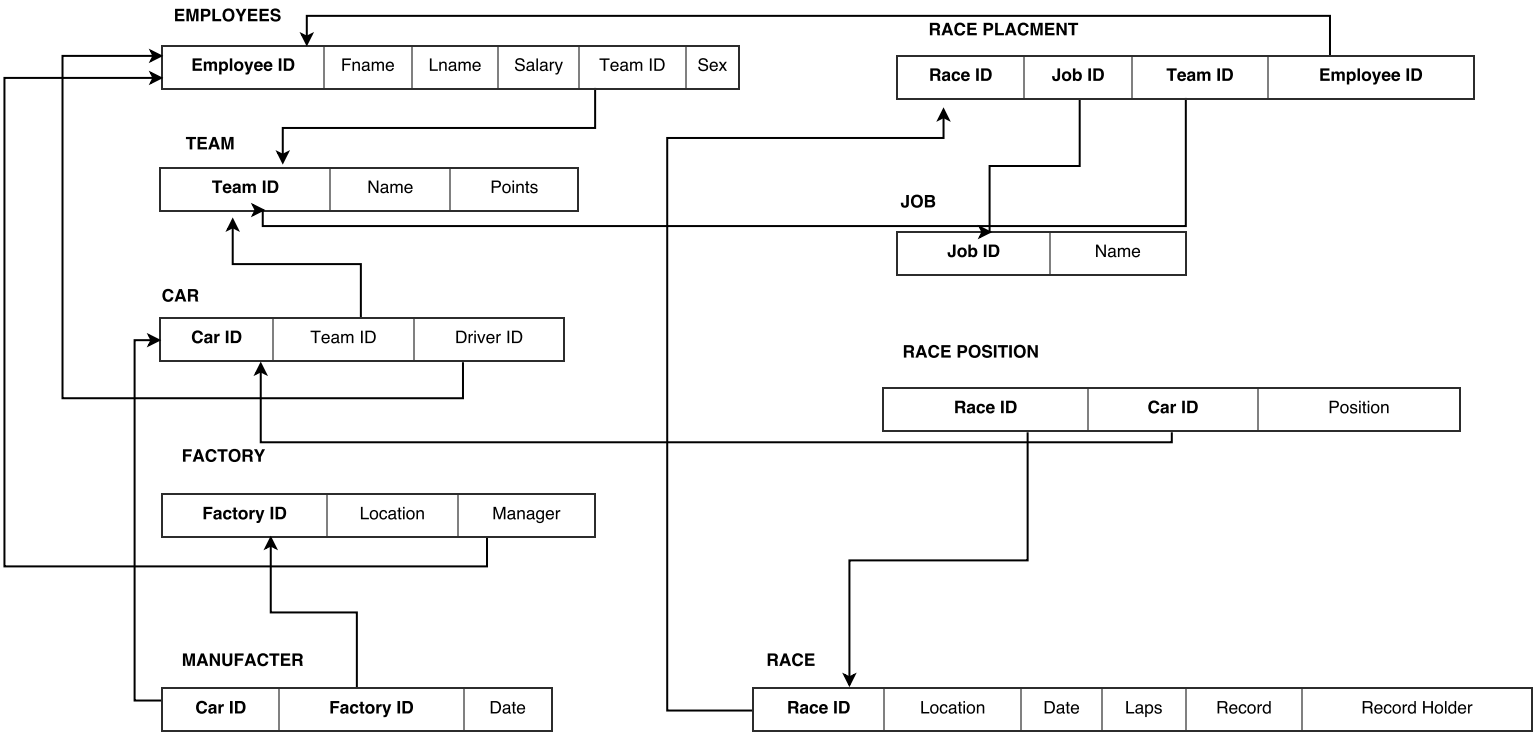
RACE POSITION



RACE



Relation Schema Diagram



Appendix

```
set linesize 3200

drop table Employees;
create table Employees (
    Employee_ID number(10) not null,
    Fisrt_Name varchar(25) not null,
    Last_Name varchar(25) not null,
    Salary number(15),
    Team_ID number(10), not null,
    Sex varchar(4),
    primary key (Employee_ID)
);

create seqence Empl_seq start with 1;

drop table Job;
create table Job(
    Job_ID number(10) not null,
    Name varchar2(20) not null,
    primary key (Job_ID)
);

create seqence job_seq start with 1;

drop table Team;
create table Team(
    Team_ID number(10) not null,
    Name varchar2(25) not null,
    Points number (3),
    primary key (Team_ID)
);

create seqence team_seq start with 1;

drop table Car;
create table Car(
    Car_ID number(10) not null,
    Team_ID varchar2(25) not null,
    Driver_ID number(10) not null,
    primary key(Car_ID, Team_ID )
);

create seqence Car_seq start with 1;
```

```
drop table Factory;
create table Factory (
    Factory_ID number(10) not null,
    Location varchar2(20) not null,
    Manager_ID number(10),
    primary key (Factory_ID)
);

create sequence Factory_seq start with 1;

drop table Manufacturer;
create table Manufacturer(
    Car_ID number(10) not null,
    Factory_ID number(10) not null,
    date_manufactured number(10),
    primary key (Car_ID, Team_ID)
);

drop table Race;
create table Race(
    Race_ID number(10) not null,
    Location varchar2(25),
    Date_of_race date,
    Number_of_Laps number(3),
    Lap_Record time,
    Record_holder number(10),
    primary key (Race_ID )
);

create seqence Race_seq  start with 1;

drop table Race_Position;
create table Race_Position(
    Race_ID number(10) not null,
    Car_ID number(10) not null,
    Position number(1),
    primary key (Race_ID, Car_ID )
);

drop table Race_Participents;
create table Race_Participents(
    Race_ID number(10) not null,
    Job_ID number(10) not null,
    Team_ID number(10) not null,
    Employee_ID number(10) not null,
    primary key (Race_ID,Job_ID,Team_ID,Employee_ID )
);
```

```
-- importing data into database --


-- Employes --
-- Change some of the salaries! --
insert into Employees values('Lewis', 'Hamilton', 400000,
1,'male')
insert into Employees values('Ste', 'Kelehan',5400000, 1,'male')
insert into Employees values('Sebastian', 'Vettel', 300000,
1,'male')
insert into Employees values('kimi', 'Raikkonen', 404000,
1,'male')
insert into Employees values('Daniel', 'Ricciardo', 500000,
1,'male')
insert into Employees values('Max', 'Verstappen', 480000,
1,'male')
insert into Employees values('Sergio', 'Perez', 900000, 1,'male')
insert into Employees values('Esteban', 'Ocon', 490000, 1,'male')
insert into Employees values('Carlos', 'Sainz', 4009000, 1,'male')
insert into Employees values('Nico', 'Hulkenberg', 400000,
1,'male')
insert into Employees values('Felipe', 'Massa', 400000, 1,'male')
insert into Employees values('Lance', 'Stroll', 400000, 1,'male')
insert into Employees values('Romain', 'Grosjean', 400000,
1,'male')
insert into Employees values('Kevin', 'Magnussen', 400000,
1,'male')
insert into Employees values('Fernando', 'Alonso', 400000,
1,'male')
insert into Employees values('Stoffel', 'Vandoorne', 400000,
1,'male')
insert into Employees values('Pascal', 'Wehrlein', 400000,
1,'male')
insert into Employees values('Danii', 'Kvyat', 400000, 1,'male')
insert into Employees values('Marcus', 'Ericsson', 400000,
1,'male')
insert into Employees values('Pierre', 'Gasly', 400000, 1,'male')
insert into Employees values('Antonio', 'Giovinazzi', 400000,
1,'male')
insert into Employees values('Brendon', 'Hartley', 400000,
1,'male')
insert into Employees values('Toto', 'Wolff', 400000, 8,'male')
insert into Employees values('Christian', 'Horner', 400000,
8,'male')
insert into Employees values('Maurizio', 'Arrivabene', 400000,
8,'male')
insert into Employees values('Vijay','Mallya', 400000, 8,'male')
insert into Employees values('Frank', 'Williams', 400000,
8,'male')
insert into Employees values('Eric', 'Boullier', 400000, 8,'male')
insert into Employees values('Framz', 'Tost', 400000, 8,'male')
```

```
insert into Employees values('Guenther', 'Steiner', 400000,
8,'male')
insert into Employees values('Jerome', 'Stoll', 400000, 8,'male')
insert into Employees values('Monisha', 'Kaltenborn', 400000,
8,'male')
insert into Employees values('Donal', 'Tuohy', 500000, 4, ‘male')
insert into Employees values('Richie', 'Lynch', 540000, 4, 'male')
insert into Employees values('Alex', 'Mckay', 540000, 4,'female')
insert into Employees values('Jenny', 'Corcoran', 540000, 4,
'female')
insert into Employees values('Adam', 'Dunne', 540000, 4, 'male')
insert into Employees values('Luke', 'McFeeny', 540000, 4, ‘male')
insert into Employees values(‘Charlie’, ‘Whiting’, 120000, null,
male)


-- Jobs –
insert into Jobs values(0, ‘Race Director’)
insert into Jobs values(1, 'Driver')
insert into Jobs values(2, 'Race Engineer')
insert into Jobs values(3, 'Mechanical Engineer')
insert into Jobs values(4, 'Computer Engineer')
insert into Jobs values(5, 'Electrical Engineer')
insert into Jobs values(6, 'Physisit')
insert into Jobs values(7, 'Pit crew')
insert into Jobs values(8, 'Team Principle')
insert into Jobs values(9, 'Data Analyst')
insert into Jobs values(10, 'Statatition')

-- Teams --
insert into Team values(1, 'Mercedes', 668)
insert into Team values(2, 'Ferrari', 522)
insert into Team values(3, 'Red Bull', 368)
insert into Team values(4, 'Force India', 187)
insert into Team values(5, 'Williams', 83)
insert into Team values(6, 'Renault', 57)
insert into Team values(7, 'Toro Rosso', 53)
insert into Team values(8, 'Hass Ferrari', 47)
insert into Team values(9, 'Mclaren Honda', 30)
insert into Team values(10, 'Sauber Ferrari', 5)

-- Cars --
insert into Car values(1,'Mercedes',1)
insert into Car values(2,'Mercedes',2)
insert into Car values(3,'Ferrari',3)
insert into Car values(4,'Ferrari',4)
insert into Car values(5,'Red Bull',2)
insert into Car values(6,'Red Bull',2)
insert into Car values(7,'Force India',2)
insert into Car values(8,'Force India',2)
insert into Car values(9,'Williams',2)
insert into Car values(10,'Williams',2)
```

```
insert into Car values(11,'Toro Rosso',2)
insert into Car values(12,'Toro Rosso',2)
insert into Car values(13,'Haas',2)
insert into Car values(14,'Haas',2)
insert into Car values(15,'Reanult',2)
insert into Car values(16,'Reanult',2)
insert into Car values(17,'McLaren',2)
insert into Car values(18,'McLaren',2)
insert into Car values(19,'Sauber',2)
insert into Car values(20,'Sauber',2)

-- Races --
-- Have to fill in the null vals!! --

insert into Races values(1,'Australia', 26-Mar-2017, 57, null,
null)
insert into Races values(2, 'China', 09-Apr-2017, 56, null, null)
insert into Races values(3, 'Bahrain', 16-Apr-2017, 57, null,
null)
insert into Races values(4, 'Russia', 30-Apr-2017, 52, null,null)
insert into Races values(5, 'Spain', 14-May-2017,66,null,null)
insert into Races values(6, 'Monaco', 28-May-2017,78,null,null)
insert into Races values(7, 'Canada', 11-Jun-2017,null,null)
insert into Races values(8, 'Azernaijan', 25-Jun-2017,null,null)
insert into Races values(9, 'Austria', 09-Jul-2017,null,null)
insert into Races values(10, 'Great Britain', 16-
Jul-2017,null,null)
insert into Races values(11, 'Hungary', 30-Jul-2017,null,null)
insert into Races values(12,'Belgium', 27-Aug-2017,null,null)
insert into Races values(13, 'Italy', 03-Sep-2017,null,null)
insert into Races values(14, 'Singapore', 17-Sep-2017,null,null)
insert into Races values(15, 'Malaysia', 01-Oct-2017,null,null)
insert into Races values(16, 'Japan', 08-Oct-2017,null,null)
insert into Races values(17, 'United States', 22-
Oct-2017,null,null)
insert into Races values(18, 'Mexico', 29-Oct-2017,null,null)
insert into Races values(19, 'Brazil', 12-Nov-2017,null,null)
insert into Races values(20, 'Abu Dhabi', 26-Nov-2017,null,null)

-- Race_Position --

-- Race 1 --
insert into Race_Position values(1, 1, 1)
insert into Race_Position values(1,2, 2)
insert into Race_Position values(1, 4, 3)
insert into Race_Position values(1, 3, 4)
insert into Race_Position values(1, 6, 5)
insert into Race_Position values(1, 5, 6)
insert into Race_Position values(1, 10, 7)
insert into Race_Position values(1, 8, 8)
insert into Race_Position values(1, 9, 9)
insert into Race_Position values(1, 20, 10)
```

```
insert into Race_Position values(1, 11, 11)
insert into Race_Position values(1, 13, 12)
insert into Race_Position values(1, 18, 13)
insert into Race_Position values(1, 14, 14)
insert into Race_Position values(1, 16, 15)
insert into Race_Position values(1, 17, 16)
insert into Race_Position values(1, 12, 17)
insert into Race_Position values(1, 7, 18)
insert into Race_Position values(1, 15, 19)
insert into Race_Position values(1, 19, 20)

-- Race 2 --

insert into Race_Position values(2, 2, 1)
insert into Race_Position values(2,1, 2)
insert into Race_Position values(2, 3, 3)
insert into Race_Position values(2, 5, 4)
insert into Race_Position values(2, 6, 5)
insert into Race_Position values(2, 4, 6)
insert into Race_Position values(2, 10, 7)
insert into Race_Position values(2, 9, 8)
insert into Race_Position values(2, 8, 9)
insert into Race_Position values(2, 20, 10)
insert into Race_Position values(2, 11, 11)
insert into Race_Position values(2, 13, 12)
insert into Race_Position values(2, 18, 13)
insert into Race_Position values(2, 14, 14)
insert into Race_Position values(2, 16, 15)
insert into Race_Position values(2, 7, 16)
insert into Race_Position values(2, 12, 17)
insert into Race_Position values(2, 17, 18)
insert into Race_Position values(2, 15, 19)
insert into Race_Position values(2, 19, 20)

-- Factory --

insert into Factory values(1,'Dublin',33 )
insert into Factory values(2, 'London', 34)
insert into Factory values(3, 'Paris', 35)
insert into Factory values(4, 'Brazil', 36)
insert into Factory values(5, 'Beijing', 37)
insert into Factory values(6, 'Malaga', 38)

-- Manufacturer --

insert into Manufacturer values(1, 1, 2017)
insert into Manufacturer values(2, 1, 2017)
insert into Manufacturer values(3, 2, 2017)
insert into Manufacturer values(4, 2, 2017)
insert into Manufacturer values(5, 2, 2017)
insert into Manufacturer values(6, 2, 2017)
insert into Manufacturer values(7, 2, 2017)
```

```
insert into Manufacturer values(8, 2, 2017)
insert into Manufacturer values(9, 4, 2017)
insert into Manufacturer values(10, 4, 2017)
insert into Manufacturer values(11, 6, 2017)
insert into Manufacturer values(12, 6, 2017)
insert into Manufacturer values(13, 6, 2017)
insert into Manufacturer values(14, 6, 2017)
insert into Manufacturer values(15, 5, 2017)
insert into Manufacturer values(16, 5, 2017)
insert into Manufacturer values(17, 3, 2017)
insert into Manufacturer values(18, 3, 2017)
insert into Manufacturer values(19, 3, 2017)
insert into Manufacturer values(20, 3, 2017)

-- Race_Participents have to put in the engineers! --

-- Race 1 --

-- Drivers --
insert into Race_Participents values(1,1,1,1)
insert into Race_Participents values(1,1,1,2)
insert into Race_Participents values(1,1,2,3)
insert into Race_Participents values(1,1,2,4)
insert into Race_Participents values(1,1,3,5)
insert into Race_Participents values(1,1,3,6)
insert into Race_Participents values(1,1,4,7)
insert into Race_Participents values(1,1,4,8)
insert into Race_Participents values(1,1,5,9)
insert into Race_Participents values(1,1,5,10)
insert into Race_Participents values(1,1,6,11)
insert into Race_Participents values(1,1,6,12)
insert into Race_Participents values(1,1,7,13)
insert into Race_Participents values(1,1,7,14)
insert into Race_Participents values(1,1,8,15)
insert into Race_Participents values(1,1,8,16)
insert into Race_Participents values(1,1,9,17)
insert into Race_Participents values(1,1,9,18)
insert into Race_Participents values(1,1,10,19)
insert into Race_Participents values(1,1,10,20)

-- team principles --
insert into Race_Participents values(1,8,1,23)
insert into Race_Participents values(1,8,2,24)
insert into Race_Participents values(1,8,3,25)
insert into Race_Participents values(1,8,4,26)
insert into Race_Participents values(1,8,5,27)
insert into Race_Participents values(1,8,6,28)
insert into Race_Participents values(1,8,7,29)
insert into Race_Participents values(1,8,8,30)
insert into Race_Participents values(1,8,9,31)
insert into Race_Participents values(1,8,10,32)
```

```
-- Race 2 --

-- Drivers --
insert into Race_Participents values(2,1,1,1)
insert into Race_Participents values(2,1,1,2)
insert into Race_Participents values(2,1,2,3)
insert into Race_Participents values(2,1,2,4)
insert into Race_Participents values(2,1,3,5)
insert into Race_Participents values(2,1,3,6)
insert into Race_Participents values(2,1,4,7)
insert into Race_Participents values(2,1,4,8)
insert into Race_Participents values(2,1,5,9)
insert into Race_Participents values(2,1,5,10)
insert into Race_Participents values(2,1,6,11)
insert into Race_Participents values(2,1,6,12)
insert into Race_Participents values(2,1,7,13)
insert into Race_Participents values(2,1,7,14)
insert into Race_Participents values(2,1,8,15)
insert into Race_Participents values(2,1,8,16)
insert into Race_Participents values(2,1,9,17)
insert into Race_Participents values(2,1,9,18)
insert into Race_Participents values(2,1,10,19)
insert into Race_Participents values(2,1,10,20)

-- Team Princibles --
insert into Race_Participents values(2,8,1,23)
insert into Race_Participents values(2,8,2,24)
insert into Race_Participents values(2,8,3,25)
insert into Race_Participents values(2,8,4,26)
insert into Race_Participents values(2,8,5,27)
insert into Race_Participents values(2,8,6,28)
insert into Race_Participents values(2,8,7,29)
insert into Race_Participents values(2,8,8,30)
insert into Race_Participents values(2,8,9,31)
insert into Race_Participents values(2,8,10,32)]

— shows points in the team league —

create view Team_League
     as select name, points from Team

— charlie is the “ref(race directer)” in F1  —

create role charlie_whiting identified by pass123;
grant create table to charlie_whiting;
grant delete table to charlie_whiting;
revoke create table from charlie_whiting;

create role teams identified by team_pass;
grant select on table Team_League to teams;
```

Constrains

Bellow I have the code for all the constrains theses consist of foreign key constrains and check contains.
Two of the contains bellow insure that certain inputs are only a few values for example a sex of an employee can only be male, female or other and the employees salaries always have to be greater or equal than zero. I added equal to zero as there can be volunteers working at the race track. Finally I have only allowed the positions from 1 to 26 as there has never been more than 26 cars in a race in the history of F1.

```
--- Foreign Keys and check constrains ---

alter table Employees
add constraint FK_Team_ID
foreign key (Team_ID) refrences Team(Team_ID);

alter table Employees
add constraint sex_var
     check (upper(sex) = ‘male’ or
            upper(sex) = ‘female’ or
            upper(sex) = ‘other’) );

alter table Employees
add constraint sal_var
     check ( salary >= 0 ) ;

alter table Car
add constraint FK_Team_ID
foreign key (Team_ID) refrences Team(Team_ID);

alter table Manufacturer
add constraint FK_Car_ID
foreign key (Car_ID) refrences Car(Car_ID);

alter table Manufacturer
add constraint FK_Factory_ID
foreign key (Factory_ID) refrences Factory(Factory_ID);

alter table Races
add constraint FK_Record_holder
foreign key (Record_holder) refrences Employees(Employees_ID);

alter table Race_Position
add constraint FK_Race_ID
foreign key (Race_ID) refrences Race(Race_ID);

alter table Race_Position
add constraint FK_Car_ID
foreign key (Car_ID) refrences Car(Car_ID);
```

```
alter table Race_Position
add constraint racs_pos
     check ( Position between 1 and 26 );

alter table Race_Participents
add constraint FK_Race_ID
foreign key (Race_ID) refrences Race(Race_ID);


alter table Race_Participents
add constraint FK_Job_ID
foreign key (Job_ID) refrences Job(Race_ID);

alter table Race_Participents
add constraint FK_Team_ID
foreign key (Team_ID) refrences Team(Team_ID);

alter table Race_Participents
add constraint FK_Employee_ID
foreign key (Employee_ID) refrences Employees(Employee_ID);
```

Triggers

These triggers where used to increment the ID of the tuples in the relation tables thus removing the possibility of an ID not been created even if one is not entered by user also insuring the ID's uniqueness. In the database I have given all the tables ID's expect the employees (this is not needed with the following triggers the triggers where added after I inputted the data)

```
-- Creaeting Triggers for DB --

-- Auto id incrementation! --
create or replace trigger Emp_ID
before insert on Employees
for each row
    begin
        select Empl_seq.nextval
        into :new.id
        from dual;
    end;
    /


create or replace trigger Job_ID
before insert on Job
for each row
    begin
        select job_seq.nextval
        into :new.id
        from dual;
    end;
    /


create or replace trigger Team_ID
before insert on Team
for each row
    begin
        select team_seq.nextval
        into :new.id
        from dual;
    end;
    /

create or replace trigger Car_ID
before insert on Car
for each row
    begin
        select Car_seq.nextval
        into :new.id
        from dual;
    end;
    /
```

```
create or replace trigger Factory_ID
before insert on Factory
for each row
    begin
        select Factory_seq.nextval
        into :new.id
        from dual;
    end;
    /

create or replace trigger Race_ID
before insert on Race
for each row
    begin
        select Race_seq.nextval
        into :new.id
        from dual;
    end;
    /

—- prints out the salary when it is update and the difference —
create or replace trigger salary_update
before delete or insert or update on employees
for each row
when(new.employee_id > 0)
declare
     sal_diff number;
begin
     sal_diff := :new.salary - :old.salary;
     dbms_output.put('Old Salary: ' || :old.salary)
     dbms_output.put(' New Salary: ' || :new.salary)
     dbms_output.put(' Salary difference: ' || sal_diff)
end;
/
```

Security

To add an element of security to this database Chairlie Whiting was the only person allowed to change the number of points a team accumulated.
This would stop the teams from being able to add more points than they gathered.
The teams where allowed to view this with there password team_pass.
Chairlie Whiting can the edit the data and view the table with his personal password pass123. The code for the following is shown bellow.

```
create role charlie_whiting identified by pass123;
grant create table to charlie_whiting;
grant delete table to charlie_whiting;
revoke create table from charlie_whiting;

create role teams identified by team_pass;
grant select on table Team_League to teams;
```