F1 TEAM PERFORMANCE TRACKER

MILESTONE: RELATIONAL MODEL

GROUP 14

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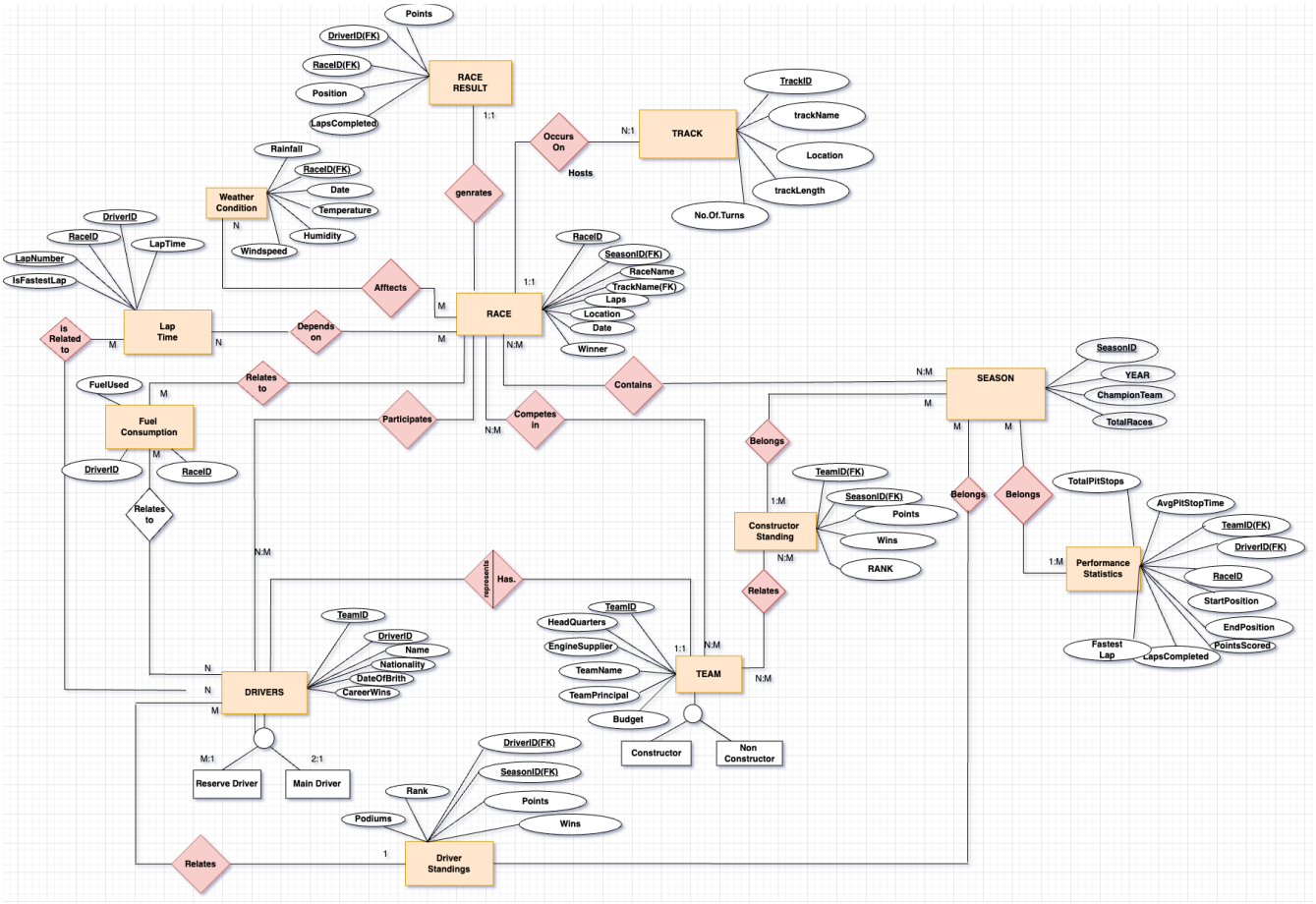
F1 Team Performance Data Management System –Relational Model



EER Diagram of F1 Team Performance Tracker based on the entities and attributes listed above

Relational Model – Primary keys are underlined, and foreign keys are in italics.

Team (TeamID, TeamName, HeadQuarters, TeamPrincipal, EngineSupplier, Budget)

Constructor Team(*C_TeamId,* TeamName)

C_teamId, is a foreign key which points to the TeamID in the realtion Team; NULL NOT ALLOWED.

Non Constructor Team (NC_TeamID, TeamName)

NC_TeamID is a foreign key which points to the teamID in the relation Team; NULL NOT ALLOWED

Driver (DriverID, *TeamID*, DriverName, DateOfBirth, Nationality,

CareerWins/WorldChampionships)

TeamID is a foreign key which points to the teamID of relation team. Each driver should belong to a team; NULL NOT ALLOWED.

ReserveDriver(TeamID, *R_DriverID,* DriverName)

R_DriverID is a foreign key which is pointing to the DriverID in relation Driver; NULL ALLOWED; A team might not have reserve driver

TeamID is a foreign key which is pointing to TeamID in relation Team; NULL NOT ALLOWED; A driver should always be mapped to team

MainDriver (*TeamID*, *M_DriverID*, DriverName)

TeamID is a foreign key which is pointing to TeamID in relation Team; NULL NOT ALLOWED; A driver should always be mapped to team

M_DriverID is foreign key which is pointing to DriverID of relation Driver; NULL NOT ALLOWED because every team should atleast 1 main driver and atmost 2 main driver

RACE (RaceID, *SeasonID,* RaceName, *TrackID*, Location, Date, *Winner*)

SeasonID is a foreign key that points to SeasonID of relation Season; NULL NOT ALLOWED

TrackID is a foreign key that points to trackID of relation Track; NULL NOT ALLOWED since all race happens on a track

Winner is a foreign key which points to driverID of relation Driver; NULL NOT ALLOWED, since every race has winner

Season (SeasonId, year, championship team, totalRace)

belongs(*TeamId,seasonid*)((season-->constructor standings)

Seasonid sis a foreign key which points to seasonid of the relation season; NULL NOT ALLOWED

Teamid is a foreign key which points to teamid of the relation team; NULL NOT ALLOWED

Belongs (*raceid, seasonid*)((season-->race)

RaceId is a foreign key which points to RaceId of the relation race; NULL NOT ALLOWED

TeamId is a foreign key which points to TeamId of the relation team; NULL NOT ALLOWED

CompetesIn (R*aceid, seasonId, TeamID)(race-->team)*

Raceids is a foreign key which points to raceidof the relation race; NULL NOT ALLOWED

Seasonid is a foreign key which points to seasonid of the relation season; NULL NOT ALLOWED

Teamid is a foreign key which points to teamid of the relation team; NULL ALLOWED

RaceResult (*RaceID, DriverID,* EndPosition, LapsCompleted, Points)

RaceID is a foreign key which points to RaceID of relation Race; NULL NOT ALLOWED

DriverID is a foreign key where the foregin key points to DriverID of relation Driver; NULL ALLOWED; A driver might not participate in a race

Track (*Trackid, RaceId, Seasonid* Trackname, location, track length, noOfTurns,)

RaceId is a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

Seasonid is a foreign key which points to seasonid of the relation season; NULL NOT ALLOWED

DriverStandings (*DriverID*, *SeasonID*, Points, Rank, Wins, Podiums)

DriverID is a foreign key which points to DriverID of relation Driver; NULL NOT ALLOWED

SeasonID is a foreign key which points to SeasonID of relation Season; NULL NOT ALLOWED

PerformanceStatistics (*DriverID*, *TeamID*, *RaceID*, StartPositon, EndPosition, FastestLap, LapsCompleted TotalPitStops, AvgPitStopTime, PointsScored)

DriverId is a foreign key which points to driverID of the relation Driver; NULL NOT ALLOWED

TeamID is a foreign key which points to teamID of relation Team; NULL NOT ALLOWED

RaceID is a foreign key which points to RaceID of relation Race; NULL NOT ALLOWED

LapTime (*DriverId*, *RaceID*, LapNumber, LapTime, IsFastestLap)

DriverId is a foreign key which points to driverID of the relation Driver; NULL NOT ALLOWED

RaceId is a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

IsRelatedTo (*driveriD,RaceId,LapNumber,TeamId*) (laptime-->drivers)

DriverId is a foreign key which points to driverID of the relation Driver; NULL NOT ALLOWED

RaceIdis a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

Lapnumber is a foreign key which points to Lapnumber of the relation Laptime; NULL NOT ALLOWED

TeamId is a foreign key which points to TeamId of the relation Team; NULL NOT ALLOWED

DependsON (*Raceid,driverid,lapnumber,seasonid*)(laptime-->race)

DriverId is a foreign key which points to driverID of the relation Driver; NULL NOT ALLOWED

RaceIdis a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

Lapnumber is a foreign key which points to Lapnumber of the relation Laptime; NULL NOT ALLOWED

Seasonid is a foreign key which points to seasonid of the relation Team; NULL NOT ALLOWED

FuelConsumption (Fuelused, *driverId*, *RaceId*)

DriverId is a foreign key which points to driverID of the relation Driver; NULL NOT ALLOWED

RaceIdis a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

WeatherCondition (*RaceId* , Date, Rainfall, temprature, humidity, windspeed)

RaceId is a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

Affects (*SeasonId,RaceId*)((weathercondition-->race)

SeasonId is a foreign key which points to SeasonId of the relation Driver; NULL NOT ALLOWED

RaceId is a foreign key which points to RaceId of the relation Race; NULL NOT ALLOWED

ConstructorStandings (*TeamId, seasonId*, points, ranks, wins)

Seasonid is a foreign key which points to seasonid of the relation season; NULL NOT ALLOWED

Teamid is a foreign key which points to teamid of the relation team; NULL NOT ALLOWED

Semantics Lost in the Mapping to the Relational Model

- The relational model does not inherently support complex inheritance, making it difficult to represent multiple levels of specialization directly (e.g., subclassing beyond one level, such as MainDriver and ReserveDriver under Driver).
- Some constraints, like ensuring unique combinations of certain attributes across tables or enforcing dependent rules (e.g., the winner's nationality depending on the driver's team affiliation), are difficult to implement directly in a relational model.
- Historical data (like tracking changes in Team budget or driver statistics over seasons) is typically not captured in standard relational schemas without versioning tables or additional historical tracking, which isn't specified here.

Semantics Mapped to Relational Model

- The model includes relationships such as *one-to-many* and *many-to-many* through foreign keys, successfully mapping relationships between entities like Team, Driver, Race, and Season.
- Relationships like *Team-Driver*, *Season-Race*, and *Driver-PerformanceStatistics* are mapped, with constraints ensuring each driver is associated with a team and each race belongs to a specific season.
- The use of primary keys uniquely identifies each record within tables.
- Foreign keys enforce referential integrity, ensuring that entities like Driver, Race, and Season are linked appropriately (e.g., TeamID in Driver references the Team table).

- Specific constraints reflect business rules, like ensuring every race has a winner or that each team has at least one main driver but no more than two. These constraints add robustness and enforce consistency in the data.