Relational Schema

Minimal FDs & proof that relations are in BCNF

F1: The Complete Database

Database Management Systems Project
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Team

Attributes: T_Name, Nationality, Budget, Debut Year, Driver 1 Id, Driver 2 Id, Engine Supplier, Team Base, Points, G_Year, W_Year

Minimal FD set: T_Name → (Nationality, Budget, Debut Year, Driver 1 Id, Driver 2 Id, Engine Supplier, Team Base, Points, G_Year, W_Year Points)

{T_Name}$^+$= { T_Name , Nationality, Budget, Debut Year, Driver 1 Id, Driver 2 Id, Engine Supplier, Team Base, Points, G_Year, W_Year }

The closure of T_Name includes all attributes so **T_Name** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Employee

Attributes: Employee_Id, Name, Date of Birth, Team Name
Minimal FD set: Employee_Id → (Name, Date of Birth, Team Name)

{Employee_Id}$^+$= { Employee_Id, Name, Date of Birth, Team Name }

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Driver

Attributes: Driver Number, Team Name, Debut, Nationality, Points, G_Year, W_Year, Employee_Id, Position
Minimal FD set: (Employee_Id) → (Driver Number, Team Name, Debut, Nationality, Points , G_Year, W_Year, Position)

{ Employee_Id}$^+$= { Driver Number, Team Name, Debut, Nationality, Points, G_Year, W_Year, Employee_Id, Position }

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Pit Crew Member

Attributes: Team Name, Fastest Pit Stop Time(s), Employee Id
Minimal FD set: Employee_Id → (Team Name, Fastest Pit Stop Time(s))

{ Employee_Id **}**$^{+}$ = **{** Employee_Id , Team Name, Fastest Pit Stop Time(s **}**

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Team Principle

Attributes: Team Name, Employee Id
Minimal FD set: Employee_Id → (Team Name)

{ Employee_Id **}**$^{+}$ = **{** Employee_Id , Team Name **}**

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Technician

Attributes: Team Name, Employee Id
Minimal FD set: Employee_Id → (Team Name)

{ Employee_Id **}**$^{+}$ = **{** Employee_Id , Team Name **}**

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF

Analyst

Attributes: Team Name, Employee Id
Minimal FD set: Employee_Id → (Team Name)

{ Employee_Id **}**$^{+}$ = **{** Employee_Id , Team Name **}**

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Strategist

Attributes: Team Name, Employee Id
Minimal FD set: Employee_Id → (Team Name)

{ Employee_Id }$^{+}$ = { Employee_Id , Team Name }

The closure of Employee_Id includes all attributes so **Employee_Id** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF

Race Track

Attributes: Nation, Turns, RC_Name, Length, Crowd Capacity, Nearest City, Position_D, Day or Night
Minimal FD set: Position_D → (Turns, Name, Length, Crowd Capacity, Nearest City, Day or Night)
{ Position_D }$^{+}$ = { Nation, Turns, Position_D, Name, Length, Crowd Capacity, Nearest City, Day or Night }

The closure of Position_D includes all attributes so **Position_D** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Sponsor

Attributes: S_Name, Devoted Money, Devoted Employees
Minimal FD set: S_Name → (, Devoted Money, Devoted Employees)
{ S_Name }$^{+}$ = { S_Name, , Devoted Money, Devoted Employees }

The closure of S_Name includes all attributes so **S_Name** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Weather

Attributes: RaceTrack Name, Position, Type
Minimal FD set: RaceTrack Name→ (Position, Type)
{ RaceTrack Name }$^{+}$ = { RaceTrack Name, Position, Type }

The closure of Racetrack Name includes all attributes so **RaceTrack Name** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF

Records

Attributes: Record_ID, Type, Value
Minimal FD set: Record_ID → (Type, Value)
{ Record_ID}$^+$= { Record_ID, Type, Value }

The closure of Record_ID includes all attributes so **Record_ID** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF

Strategy

Attributes: St_Name, Average Laps, Racetrack Name
Minimal FD set: St_Name → (, Average Laps, Racetrack Name)
{ St_Name }$^+$= { St_Name, Average Laps, Racetrack Name }

The closure of St_Name includes all attributes so **St_Name** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF

Tyres

Attributes: Tyre_Name, Speed Delta, Manufacturer, Longetivity, Optimal Temperature(F)
Minimal FD set: Tyre_Name → (Tyre_Name, Speed Delta, Manufacturer, Longetivity, Optimal Temperature(F))
{ Tyre_Name }$^+$= { Tyre_Name, Speed Delta, Manufacturer, Longetivity, Optimal Temperature(F) }

The closure of Tyre_Name includes all attributes so **Tyre_Name** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF

Engine

Attributes: Engine Number, Capacity, Horse Power
Minimal FD set: Engine Number→ (Capacity, Horse Power)
{Engine Number}$^+$= { Engine Number, Capacity, Horse Power }

The closure of Engine Number includes all attributes so **Engine Number**, is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Grand Prix Points

Attributes: Maximum Grand Prix Points, G_Year
Minimal FD set: G_Year → Maximum Grand Prix Points
{ G_Year }$^{+}$ = { Maximum Grand Prix Points, G_Year }

The closure of Year includes all attributes in **G_Year**, is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Dependents

Attributes: Name, Employee_Id, Sex, Date of Birth, RelationShip
Minimal FD set: Name, Employee_Id → (Sex, Date of Birth, RelationShip)
{ Name, Employee_Id }$^{+}$ = { Name, Employee_Id, Sex, Date of Birth, RelationShip }

The closure of Name, Employee_Id includes all attributes so **Name, Employee_Id**, is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

World Championship Points

Attributes: W_Year
Minimal FD set: No Functional Dependancy

So this relation is in BCNF.

Contributes to

Attributes: G_Year, W_Year, Maximum Points
Minimal FD set: G_Year, W_Year → (Maximum Points)
{ G_Year, W_Year }$^{+}$ = { G_Year, W_Year, Maximum Points }

The closure of G_Year, W_Year includes all attributes so **G_Year, W_Year** is key.

The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Manages

Attributes: Employee Id Engine Number
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Formulates

Attributes: Employee Id, St_Name
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Supplies

Attributes: T_Name, Engine Number
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Previous Team of Employees

Attributes: Employee_Id, Previous Team
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Achieves 2

Attributes: T_Name, Record Id
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Achieves 1

Attributes: Employee Id, Record Id, Position
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Influences

Attributes: St_Name, Tyre Name
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Finances 2

Attributes: S_Name, T_Name
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Finances 1

Attributes: S_Name, Position_D
Minimal FD set: No Functional Dependancy

So this relation is in BCNF

Drives In

Attributes: Employee Id, Position, Position_D
Minimal FD set: No Functional Dependancy

So this relation is in BCNF