**Relational Schema**

# Minimal FDs & proof that relations are in BCNF

**F1: The Complete Database**

# Database Management Systems Project Assigned by: Prof. P M Jat



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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