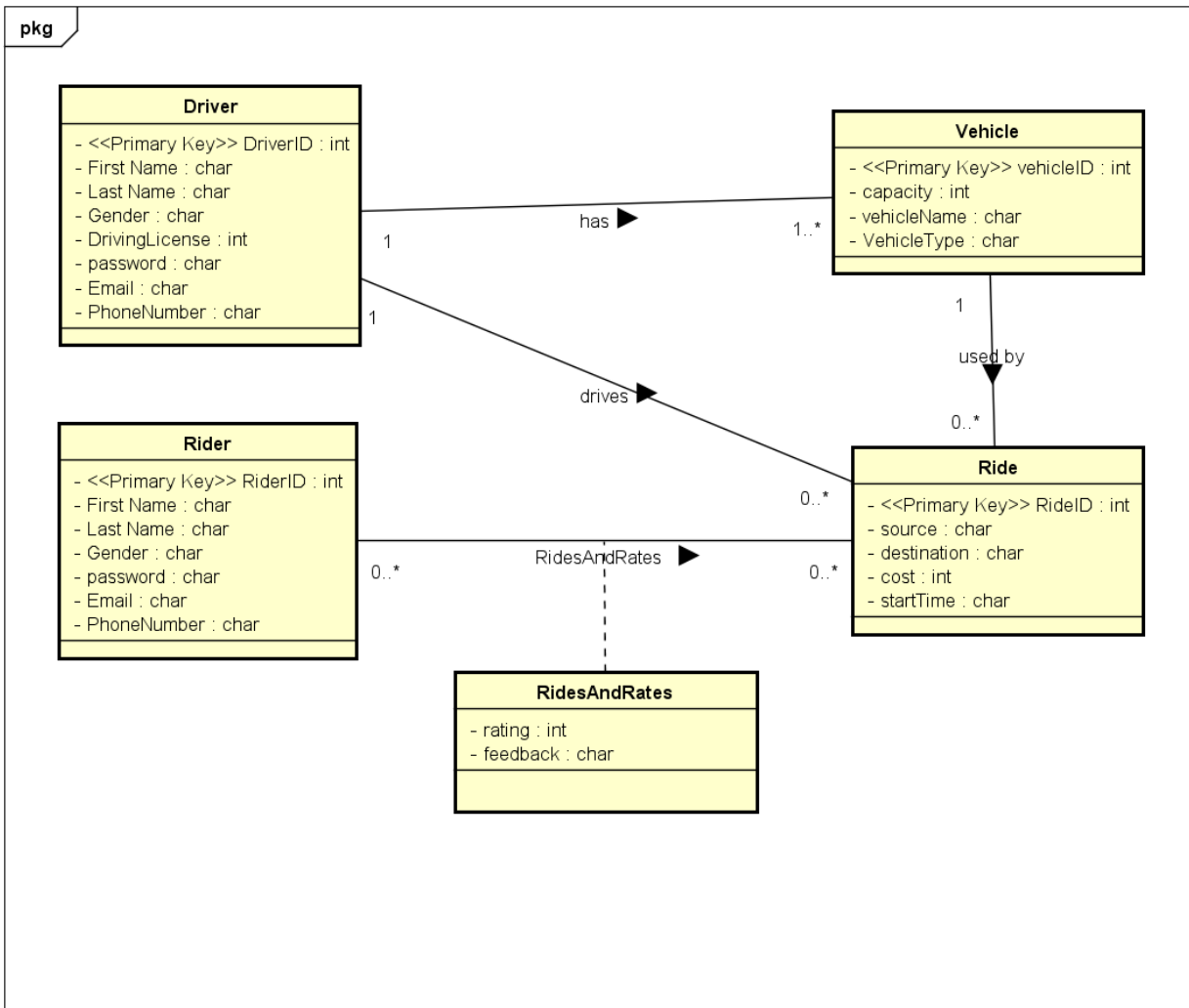


UML



Relational Model:

Drivers (DriverID, FirstName, LastName, Gender, Email, DrivingLicense, Password, Email, PhoneNumber)

Vehicle (VehicleID, Capacity, VehicleName, VehicleType, [DriverID](#))

Rider (RiderID, FirstName, LastName, Gender, Email, Password, Email, PhoneNumber)

Ride (RideID, source, destination, cost, startTime, [DriverID](#), [VehicleID](#))

RidesAndRatings([RideID](#), [RiderID](#), Rating, Feedback)

Functional Dependencies

Did \longrightarrow Dfname, Dlname, Dgender, Demail, DphoneNumber, Dlicense, Dpwd

RiderId \longrightarrow Rfname, Rlname, Rgender, Rpwd, Remail, RphoneNumber

Vid \longrightarrow Vname, Vtype, Capacity, Did

RideId \longrightarrow Source, Destination, Cost, Vid, StartTime

RideId, Rid \longrightarrow Rating, Feedback

Notes:

Rid = RiderID

D_Attributes = Dfname, Dlname, Dgender, Demail, DphoneNumber, Dlicense, Dpwd

R_Attributes = Rfname, Rlname, Rgender, Rpwd, Remail, RphoneNumber

BCNF Tree

Did, Dnamef, DnameL, Dgender, Dpwd, Dpno, Dlicense, Vid, Capacity, Vtype, Vname, RiderID, Rfname, Rlname, Rgender, Rpwd, Rpno, Remail, RideID, Source, Destination, Cost, StartTime, Rating, Feedback

Did -> D_Attributes

Did, D_Attributes

Did, Vid, Capacity, Vtype, Vname, RiderID, R_Attributes, RideID, Source, Destination, Cost, StartTime, Rating, Feedback

RiderID -> R_Attributes

RiderID, R_Attributes

Did, Vid, Capacity, Vtype, Vname, RiderID, RideID, Source, Destination, Cost, StartTime, Rating, Feedback

Vid -> Vtype, Vname, Cap, Did

Vid, Cap, Vtype, Vname, Did

Vid, RiderID, RideID, Source, Destination, StartTime, Cost, Rating, Feedback

RideID -> Source, Destination, Cost, ViD, StartTime

RideID, Source, Destination, Cost, Vid, StartTime

RideID, RiderID, Rating, Feedback

BCNF Model

Did, D_Attributes

RiderID, R_Attributes

Vid, Cap, Vtype, Vname, Did

RideID, Source, Destination, Cost, Vid, StartTime

RideID, RiderID, Rating, Feedback

Comparison with RM: Same number of tables, but no Did in Ride table.

3NF Synthesis

1. Merge FDs with same LHS

Did \longrightarrow Dfname, Dlname, Dgender, Demail, DphoneNumber, Dlicense, Dpwd

RiderId \longrightarrow Rfname, Rlname, Rgender, Rpwd, Remail, RphoneNumber

Vid \longrightarrow Vname, Vtype, Capacity, Did

RideId \longrightarrow Source, Destination, Cost, Vid, StartTime

RideId, Rid \longrightarrow Rating, Feedback

2. Form tables from the FDs

R1 = Did, Dfname, Dlname, Dgender, Demail, DphoneNumber, Dlicense, Dpwd

R2 = RiderId, Rfname, Rlname, Rgender, Rpwd, Remail, RphoneNumber

R3 = Vid, Vname, Vtype, Capacity, Did

R4 = RideId, Source, Destination, Cost, Vid, StartTime

R5 = RideId, Rid, Rating, Feedback

3. Remove Fully Contain subschemas.

No fully contain schemas.

4. Make sure its lossless.

$(R5)^+$ gives everything.

3NF Model

Did, D_Attributes

RiderID, R_Attributes

Vid, Cap, Vtype, Vname, Did

RideID, Source, Destination, Cost, Vid, StartTime

RideID, RiderID, Rating, Feedback

Comparison with BCNF: 3NF schema is same as BCNF

4NF Model:

Rules for 4NF synthesis are:

1. Should be in 3NF.
2. Should not have any multivalued dependencies.

Since we have 3NF **and** all our tables are determined by a unique primary key we do not have any multivalued dependencies.

Hence, we would say that we have a 4NF synthesis done on our schema. So, our 4NF is same as BCNF and 3NF.

We used?

UML based schema. UML, BCNF, 3NF and 4NF were almost same, except in UML we have **DriverID** in Rider Table too. Though, we have this redundant column, it makes computations less complex.