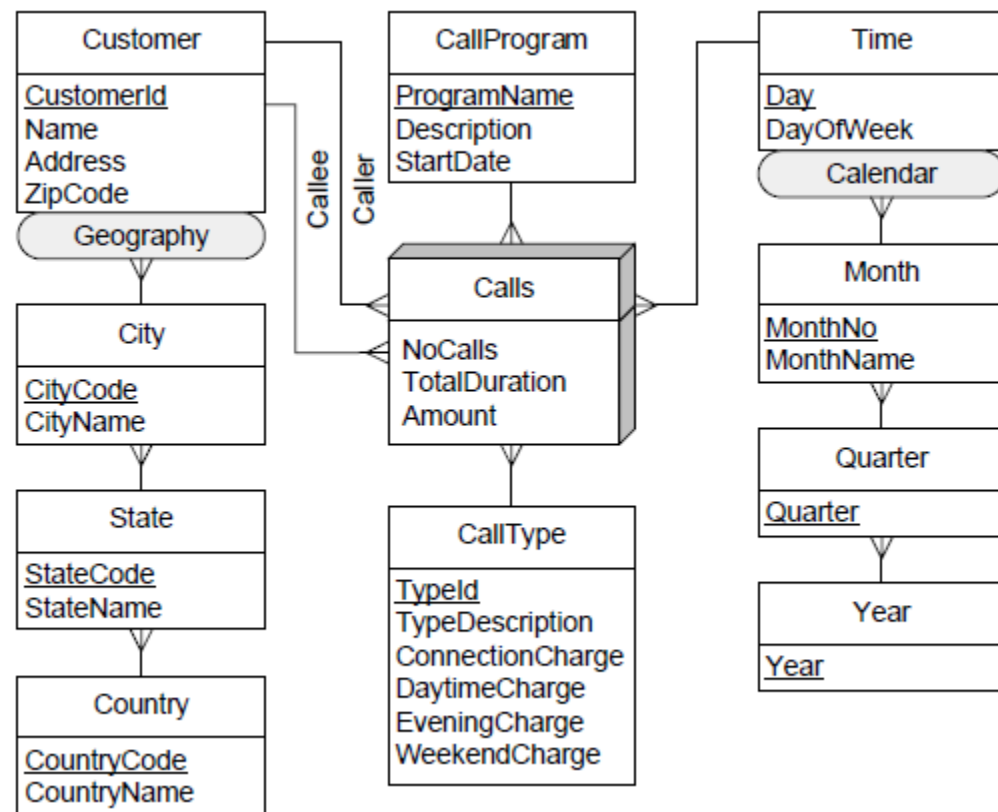# Exercises

1. A data warehouse of a telephone provider consists of five dimensions, namely, caller customer, callee customer, time, call type, and call program, and three measures, namely, number of calls, duration, and amount.
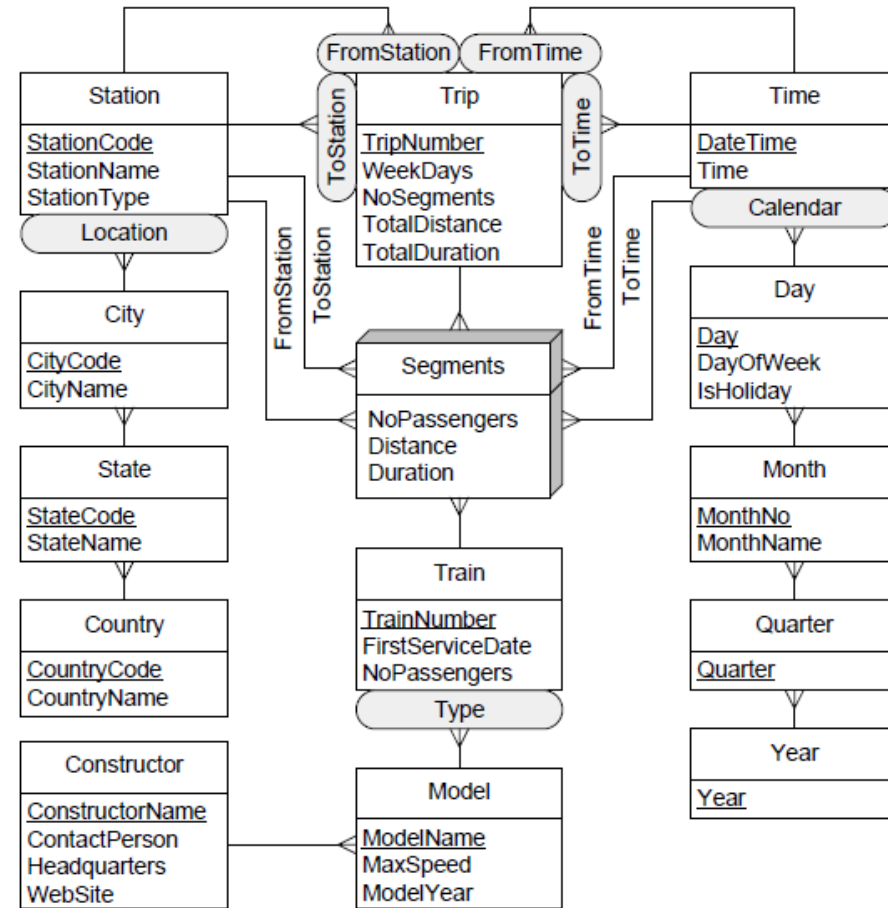
   Design a MultiDim schema for the given problem.

Customer

__CustomerId__
Name
Address
ZipCode

Geography

CallProgram

__ProgramName__
Description
StartDate

Time

__Day__
DayOfWeek

Calendar

City

__CityCode__
CityName

Calls

NoCalls
TotalDuration
Amount

Month

__MonthNo__
MonthName

State

__StateCode__
StateName

CallType

__TypeId__
TypeDescription
ConnectionCharge
DaytimeCharge
EveningCharge
WeekendCharge

Quarter

__Quarter__

Country

__CountryCode__
CountryName

Year

__Year__

Callee

Caller

Exercises

2. A data warehouse of a train company contains information about train segments. It consists of six dimensions, namely, departure station, arrival station, trip, train, arrival time, and departure time, and three measures, namely, number of passengers, duration, and number of kilometers.

   Design a MultiDim schema for the given problem.

Station
StationCode
StationName
StationType

Location

City
CityCode
CityName

State
StateCode
StateName

Country
CountryCode
CountryName

Constructor
ConstructorName
ContactPerson
Headquarters
WebSite

FromStation — ToStation

Trip
TripNumber
WeekDays
NoSegments
TotalDistance
TotalDuration

FromStation — ToStation

FromTime — ToTime

Segments
NoPassengers
Distance
Duration

Train
TrainNumber
FirstServiceDate
NoPassengers

Type

Model
ModelName
MaxSpeed
ModelYear

FromTime — ToTime

Time
DateTime
Time

Calendar

Day
Day
DayOfWeek
IsHoliday

Month
MonthNo
MonthName

Quarter
Quarter

Year
Year

Exercises

3. Consider the data warehouse of a university that contains information about teaching and research activities. On the one hand, the information about teaching activities is related to dimensions department, professor, course, and time, the latter at a granularity of academic semester. Measures for teaching activities are number of hours and number of credits. On the other hand, the information about research activities is related to dimensions professor, funding agency, project, and time, the latter twice for the start date and the end date, both at a granularity of day. In this case, professors are related to the department to which they are affiliated. Measures for research activities are the number of person months and amount.

   Design a MultiDim schema for the given problem.

Department

DepartmentID
DepartmentName
Address
DeanName
NoStudents

Affiliation

Professor

ProfessorID
ProfessorName
Status
HiringDate

FundingAgency

AgencyName
ContactPerson
Address
City
State
Country

Teaching

NoHours
NoCredits

Year

Year

Month

Month

Calendar

Time

Day
DayOfWeek

Academic Calendar

StartDate   EndDate

Research

PersonMonths
Amount

Course

CourseID
CourseName
CreditsTheory
CreditsExercises
Description
Homepage

Academic Semester

SemesterNumber

Academic Year

AcadYearNumber

Project

ProjectID
ProjectAcronym
ProjectName
ProjectType
TotalPersonMonths
TotalAmount