**Team Project - Chapter 6**

Normalizing the Relational Model for the Team Project and Creating a Normalized Oracle Database

**Chapter 6 – Team Project: Normalizing the Relational Model for the Team Project and Creating a Normalized Oracle Database**

Read the sample project steps for this chapter and apply the same techniques to the team project that you are developing. For the team project, do the following:

**Step 6.1 - Begin with the list of the tables that the entities and relationships from the E-R diagram mapped to naturally, from the sample project section at the end of chapter 4.**

For each table on the list, identify functional dependencies and normalize the relation to BCNF. Then decide whether the resulting tables should be implemented in that form. If not, explain why.

1. **CarAd**

***Original:***

CarAd(placedin, intialDate,totalCost,frequency,contactPerson,areaCode,phoneNumber)

***Normalized:***

CarAd(placedin,intialDate,contact person, intialDate,totalCost,frequency)

AdManDetails(areaCode, phoneNumber, intialDate,contact person)

1. **Customer**

***Original:***

Costomer (custId , *placedin*, firstName, lastName, street, city, state, zip, areaCode, phoneNumber, driversLicNo, referredBy, adSeen)

***Normalized:***

Costomer (custId , *placedin*, firstName, lastName, street, Zips, areaCode, phoneNumber, driversLicNo, referredBy, adSeen)

Zips(zip, city, state)

1. **NewCar**

***Original:***

newCar(newCarVIN, make, model, listPrice, dateManufactured, placeManufactured, cylinders, doors, weight, capacity, color, delDate, delMiles)

**This table is already normalized.**

1. **CarOptionsMenu**

***Original:***

carOptionMenu(carOption, price)

**This table is already normalized.**

1. **NewCarOptions**

***Original:***

NewCarOption(*newCarVIN*, *CarOption*)

**This table is already normalized.**

1. **CustomizationMenu**

***Original:***

CustomizationMenu(customItem, price)

**This table is already normalized.**

1. **Salesperson**

***Original:***

Salesperson(empId, firstName, lastName, street, city, state, zip, homeAreaCode, homePhoneNumber, officeAreaCode, officePhoneNumber, cellAreaCode, cellPhoneNumber, date Hired )

***Normalized:***

SalesPerson(empId, firstName, lastName, street, PhoneNumber, Zips, dateHired )

PhoneNumber(cellAreaCode, cellPhoneNumbe, homePhoneNumber, cellAreaCode, officePhoneNumber, homeAreaCode, officeAreaCode )

Zips(zip, city, state)

1. **CarRegistration**

***Original:***

CarRegistration(registrationNo,plateNo,fee)

***This table is already normalized***

1. **CarInsurance**

***Original:***

CarInsurance(insPolicyNo,companyName,street,city,state,zip,AreaCode,PhoneNumber,startDate, endDate)

***Normalized:***

CarInsurance(InsPolicyNo,InscompanyName,street,Zips,AreaCode,PhoneNumber,startDate,

endDate)

Zips(zip, city, state)

1. **Financing**

***Original:***

Financing(FinPolicyNo, inscompanyName, street, city, state, zip, AreaCode, PhoneNumber, StartDate, amountFinanced, rate, numberMonths)

***Normalized:***

Financing(FinPolicyNo, companyName, street,Zips, AreaCode, PhoneNumber, StartDate, AmountFinaced)

AmountFinaced(amountFinanced, rate, numberMonths)

Zips(zip, city, state)

1. **CarWarrantee**

***Original***:

CarWarrantee(warType, cost, period)

***This table is already normalized***

1. **CarUsedCar**

***Orignal:***

CarUsedCar(VIN, make, Models, modelYear, mileage, bookValue, cylinders, doors, weight, capacity, color)

***This table is already normalized***

1. **CarUsedCarFeatures**

***Orignal:***

CarUsedCarFeatures(tradeinVIN, usedcarVIN, feature)

**This table is already normalized.**

1. **CarSales**

***Orignal:***

CarSales(invoiceNo, saleDate, salePrice, tax, registrationFee, tradeInAmount, financedAmount, amountPaid, amountDue, commission, saleMiles, custId, registrationNo, usedCarVIN, newCarVIN, wartype,finPolNo,finCoName,insoName,inspollNo,empid,tradeinVIN)

***Normalized:***

CarSales(invoiceNo, saleDate, salePrice, tax, registrationFee, tradeInAmount, financedAmount, commission, saleMiles, custId, registrationNo, usedCarVIN, newCarVIN, wartype, finPolNo, finCoName, insoName, inspollNo, empid, tradeinVIN)

paymentsamountdetails(amountPaid, amountDue)

1. **CarSurvey**

***Orignal:***

CarSurvey(surveyNumber, dealershipRating, carRating, salespersonRating, invoiceNo)

**This table is already normalized.**

1. **Sale\_CustomItems**

***Orignal:***

Sale\_CustomItems(*invoiceNo, CustomItem*)

**Step 6.2- Update the data dictionary and list of assumptions as needed.**

|  |
| --- |
| **Placedin:** |
| **initialDate:** |
| **totalCost:** |
| **Frequency:** |
| **contactPerson:** |
| **areaCode:** |
| **phoneNumber:** |
| **custId:** |
| **placedin:** |
| **firstName:** |
| **lastName:** |
| **street:** |
| **city:** |
| **state:** |
| **zip:** |
| **areaCode:** |
| **phoneNumber:** |
| **driversLicNo:** |
| **referredBy:** |
| **adSeen:** |
| **VIN:** |
| **make:** |
| **model:** |
| **listPrice:** |
| **dateManufactured:** |
| **placeManufactured:** |
| **cylinders:** |
| **doors:** |
| **weight:** |
| **capacity:** |
| **color:** |
| **delDate:** |
| **delMiles:** |
| **carOption:** |
| **price:** |
| **VIN:** |
| **CarOption:** |
| **customItem:** |
| **price:** |
| **empId:** |
| **firstName:** |
| **lastName:** |
| **street:** |
| **city:** |
| **state:** |
| **zip:** |
| **homeAreaCode:** |
| **homePhoneNumber:** |
| **office AreaCode:** |
| **officePhoneNumber:** |
| **cellAreaCode:** |
| **cellPhoneNumber:** |
| **date Hired:** |
| **registrationNo:** |
| **plateNo:** |
| **fee:** |
| **InsPolicyNo:** |
| **companyName:** |
| **street:** |
| **city:** |
| **state:** |
| **zip:** |
| **AreaCode:** |
| **PhoneNumber:** |
| **startDate:** |
| **endDate:** |
| **FinPolicyNo:** |
| **companyName:** |
| **street:** |
| **city:** |
| **state:** |
| **zip:** |
| **AreaCode:** |
| **PhoneNumber:** |
| **startDate:** |
| **amountFinanced:** |
| **rate:** |
| **numberMonths:** |
| **warType:** |
| **cost:** |
| **period:** |
| **VIN:** |
| **make:** |
| **model:** |
| **cylinders:** |
| **doors:** |
| **weight:** |
| **capacity:** |
| **color:** |
| **modelYear:** |
| **mileage:** |
| **bookValue:** |
| **tradeinVIN:** |
| **usedcarVIN:** |
| **feature:** |
| **invoiceNo:** |
| **saleDate:** |
| **salePrice:** |
| **tax:** |
| **registrationFee:** |
| **tradeInAmount:** |
| **Amountfinanced:** |
| **amountPaid:** |
| **amountDue:** |
| **commission:** |
| **saleMiles:** |
| **custId:** |
| **registrationNo:** |
| **usedCarVIN:** |
| **newCarVIN:** |
| **wartype:** |
| **finPolNo:** |
| **finCoName:** |
| **inscoName:** |
| **inspollNo:** |
| **Empid:** |
| **tradeinVIN:** |
| **surveyNumber:** |
| **dealershipRating:** |
| **carRating:** |
| **salespersonRating:** |
| **invoiceNo:** |

**Step 6.3 - For each table, write the table name and write out the names, data types, and sizes of all the data items.**

Table CarAD

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
|  |  |  |  |
| placedin | NUMBER | 10 | Primary key |
| initialDate | VARCHAR | 20 |  |
| totalCost | NUMBER | 20,2 |  |
| frequency | VARCHAR | 20 |  |
| contactPerson | VARCHAR | 20 |  |
| areaCode | NUMBER | 20 |  |
| phoneNumber | NUMBER | 15 |  |

Table CarCustomer

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
| custId | NUMBER | 20 | Primary Key |
| placedin | NUMBER | 10 | Foreign Key |
| firstName | VARCHAR | 20 |  |
| lastName | VARCHAR | 20 |  |
| street | VARCHAR | 20 |  |
| city | VARCHAR | 20 |  |
| state | VARCHAR | 20 |  |
| zip | NUMBER | 20 |  |
| areaCode | NUMBER | 20 |  |
| phoneNumber | NUMBER | 15 |  |
| driversLicNo | VARCHAR | 20 |  |
| referredBy | VARCHAR | 20 |  |
| adSeen |  |  |  |

Table CarNewCar

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEY TYPE |
|  |  |  |  |
| VIN | VARCHAR | 12 | Primary Key |
| make | VARCHAR | 80 |  |
| model | VARCHAR | 20 |  |
| listPrice | NUMBER | 10,2 |  |
| dateManufactured | DATE |  |  |
| placeManufactured | VARCHAR | 15 |  |
| cylinders | NUMBER | 20 |  |
| doors | NUMBER | 20 |  |
| weight | NUMBER | 20 |  |
| capacity | NUMBER | 20 |  |
| color | VARCHAR | 20 |  |
| delDate | DATE |  |  |
| delMiles | NUMBER | 18 |  |

Table CarOptionsMenu

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEY TYPE |
|  |  |  |  |
| carOption | VARCHAR | 20 | Primary Key |
| price | NUMBER | 15,2 |  |

Table CarNew-Options

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEY TYPE |
|  |  |  |  |
| VIN | NUMBER | 12 | Foreign key |
| CarOption | VARCHAR | 20 | Foreign key |

Table CarCustomizationMenu

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEY TYPE |
|  |  |  |  |
| customItem | NUMBER | 20 | Primary Key |
| price | NUMBER | 20,2 |  |

Table SalesPerson

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
|  |  |  |  |
| empId | NUMBER | 20 | Primary Key |
| firstName | VARCHAR | 20 |  |
| lastName | VARCHAR | 20 |  |
| street | VARCHAR | 20 |  |
| city | VARCHAR | 20 |  |
| state | VARCHAR | 20 |  |
| zip | NUMBER | 20 |  |
| homeAreaCode | NUMBER | 20 |  |
| homePhoneNumber | NUMBER | 15 |  |
| office AreaCode | NUMBER | 20 |  |
| officePhoneNumber | NUMBER | 15 |  |
| cellAreaCode | NUMBER | 20 |  |
| cellPhoneNumber | NUMBER | 15 |  |
| date Hired | VARCHAR | 20 |  |

Table CarRegistration

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
|  |  |  |  |
| registrationNo | NUMBER | 15 | Primary Key |
| plateNo | VARCHAR | 15 |  |
| fee | NUMBER | 20,2 |  |

Table CarInsurance

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
|  |  |  |  |
| InsPolicyNo | NUMBER | 10 | Primary Key |
| companyName | VARCHAR | 20 | Primary Key |
| street | VARCHAR | 20 |  |
| city | VARCHAR | 20 |  |
| state | VARCHAR | 20 |  |
| zip | NUMBER | 20 |  |
| AreaCode | NUMBER | 20 |  |
| PhoneNumber | NUMBER | 20 |  |
| startDate | DATE |  |  |
| endDate | DATE |  |  |

Table Financing

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
|  |  |  |  |
| FinPolicyNo | NUMBER | 10 | Primary Key |
| companyName | VARCHAR | 20 | Primary Key |
| street | VARCHAR | 20 |  |
| city | VARCHAR | 20 |  |
| state | VARCHAR | 20 |  |
| zip | NUMBER | 20 |  |
| AreaCode | NUMBER | 20 |  |
| PhoneNumber | NUMBER | 20 |  |
| startDate | DATE |  |  |
| amountFinanced | NUMBER | 15,2 |  |
| rate | NUMBER | 20,2 |  |
| numberMonths | NUMBER | 20 |  |

Table CarWarrantee

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
| warType | NUMBER | 15 | Primary Key |
| cost | NUMBER | 20,2 |  |
| period | VARCHAR | 20 |  |

Table CarUsedCar

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATATYPE | SIZE | KEYTYPE |
| VIN | NUMBER | 12 | Primary Key |
| make | VARCHAR | 20 |  |
| model | VARCHAR | 20 |  |
| cylinders | NUMBER | 20,0 |  |
| doors | NUMBER | 20,0 |  |
| weight | NUMBER | 20,3 |  |
| capacity | NUMBER | 20,3 |  |
| color | VARCHAR | 20 |  |
| modelYear | NUMBER | 20 |  |
| mileage | NUMBER | 20,2 |  |
| bookValue | NUMBER | 20,2 |  |

Table CarUsedCarFeatures

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATATYPE | SIZE | KEYTYPE |
| tradeinVIN | NUMBER | 12 | Primary Key |
| usedcarVIN | NUMBER | 12 | Foreign key |
| feature | VARCHAR | 20 |  |

Table CarSale

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATA TYPE | SIZE | KEYTYPE |
| invoiceNo | NUMBER | 10 | Primary Key |
| saleDate | DATE |  |  |
| salePrice | NUMBER | 30 |  |
| tax | NUMBER | 30,2 |  |
| registrationFee | NUMBER | 30,2 |  |
| tradeInAmount | NUMBER | 30,2 |  |
| financedAmount | NUMBER | 30,2 |  |
| amountPaid | NUMBER | 30 |  |
| amountDue | NUMBER | 30 |  |
| commission | NUMBER | 30 |  |
| saleMiles | NUMBER | 20 |  |
| custId | NUMBER | 10 | Foreign key |
| registrationNo | NUMBER | 10 | Foreign key |
| usedCarVIN | NUMBER | 30 | Foreign key |
| newCarVIN | NUMBER | 12 | Foreign key |
| wartype | NUMBER | 15 | Foreign key |
| finPolNo | NUMBER | 10 | Foreign key |
| finCoName | VARCHAR | 20 | Foreign key |
| inscoName | VARCHAR | 20 | Foreign key |
| inspollNo | NUMBER | 10 | Foreign key |
| empid | NUMBER | 20,0 | Foreign key |
| tradeinVIN | NUMBER | 12 | Foreign key |

Table CarSurvey

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATATYPE | SIZE | KEYTYPE |
| surveyNumber | NUMBER | 10 | Primary Key |
| dealershipRating | NUMBER | 20,2 |  |
| carRating | NUMBER | 20,2 |  |
| salespersonRating | NUMBER | 20,2 |  |
| invoiceNo | NUMBER | 20 | Foreign key |

PersonalPhoneNumber

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATATYPE | SIZE | KEYTYPE |
| cellAreaCode | NUMBER | 3 | Foreign key |
| cellPhoneNumber | NUMBER | 7 | Foreign key |

WorkplaceNumber

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATATYPE | SIZE | KEYTYPE |
| officeAreaCode | NUMBER | 3 | Foreign Key |
| officePhoneNumber | NUMBER | 7 | Foreign Key |

HomeLandlineNunber

|  |  |  |  |
| --- | --- | --- | --- |
| ATTRIBUTE | DATATYPE | SIZE | KEYTYPE |
| homeAreaCode | NUMBER | 3 | Foreign Key |
| homePhoneNumber | NUMBER | 7 | Foreign Key |