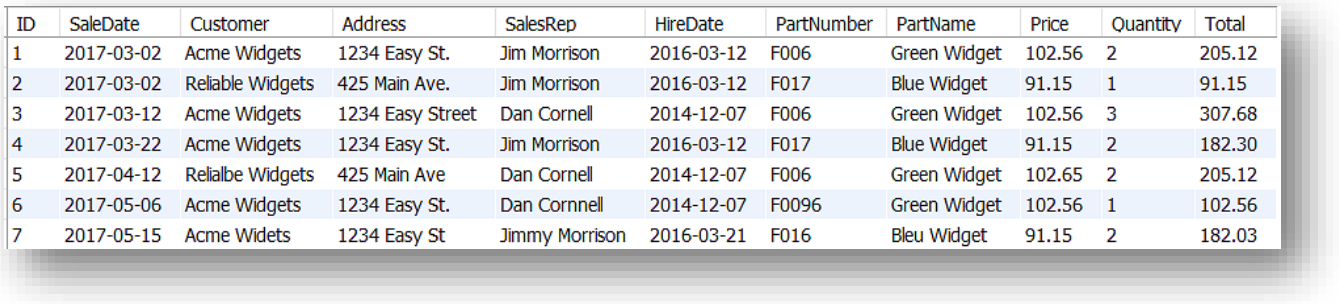
Instructions

Read these instructions all the way through before you start.

Download the answer document. Be sure to put your name at the top of the answer document where that's indicated. Answer the questions below in that document and when you are done, upload it into Blackboard.

Overview

Below is the screen shot of a table in First Normal Form. Each row records the sale of one type of widget to a customer.



ID	SaleDate	Customer	Address	SalesRep	HireDate	PartNumber	PartName	Price	Quantity	Total
1	2017-03-02	Acme Widgets	1234 Easy St.	Jim Morrison	2016-03-12	F006	Green Widget	102.56	2	205.12
2	2017-03-02	Reliable Widgets	425 Main Ave.	Jim Morrison	2016-03-12	F017	Blue Widget	91.15	1	91.15
3	2017-03-12	Acme Widgets	1234 Easy Street	Dan Cornell	2014-12-07	F006	Green Widget	102.56	3	307.68
4	2017-03-22	Acme Widgets	1234 Easy St.	Jim Morrison	2016-03-12	F017	Blue Widget	91.15	2	182.30
5	2017-04-12	Relialbe Widgets	425 Main Ave	Dan Cornell	2014-12-07	F006	Green Widget	102.65	2	205.12
6	2017-05-06	Acme Widgets	1234 Easy St.	Dan Cornnell	2014-12-07	F0096	Green Widget	102.56	1	102.56
7	2017-05-15	Acme Widets	1234 Easy St	Jimmy Morrison	2016-03-21	F016	Bleu Widget	91.15	2	182.03

And here's the definitions of the fields.

Field	Definition
ID	The Primary Key of the row.
SaleDate	The date the sale was made to the customer.
Customer	The name of the customer.
Address	The customer's address.
SalesRep	The name of the sales person who made the sale to the customer.
DateHired	The date the sales person was hired.
PartNumber	The part number of the widget that was sold in the sale.
PartName	The name of the widget that was sold in the sale.
Price	The price of the model of widget that was sold.
Quantity	The number of widgets sold in the sale.
Total	The Price times the Quantity.

Tips

- This is a teaching example so it's not completely realistic. For example, this design permits only one type of widget in a sale. That's not realistic, but it's okay. It's important to keep these examples manageable in size. Except for primary and foreign keys, don't add any new fields.
- Go to the instructions for the Semester Project and in the section titled **Tips for Avoiding Pitfalls**, read the sections **Be careful not to Gold Plate**, **Keep your Design Simple and Relentlessly Consistent**, and **Deleting Entities from your Model.** You'll need to follow them for the project and they'll help you here too.

Steps

Your job in this assignment is to take the First Normal Form table and turn it into Third Normal Form design, complete with primary and foreign keys.

1. [5] One of the major practical problems with designs that are not in at least Third Normal Form is inconsistencies inevitably creep into the data. Look closely at the data in the rows of the table above and list at least four inconsistencies in the data.

2. [20] List the tables that you'll need to when you convert this table into a Third Normal Form design. Tip: I've given you more rows in the answer document than you'll need for the tables in your design. (Giving you the correct number of rows would take too much fun out of the assignment.)

3. [20] For each of the tables in your Third Normal Form design, list the fields including primary key and foreign keys. Tip: I've given you more tables and, for each table, more rows in the answer document than you'll need.