CSCI 585, Fall 2015, Assignment 3

Due date: 11:59pm 10-16-2015

1 Problem

For each problem, list all functional dependencies for the relation described. State whether or not it satisfies each of the first three normal forms and explains why in each case. Finally, normalize the relation into 3NF.

Note: please refer to the submission instructions in Section 2. Following the submissions instructions is required towards getting full credit.

a. when the grocery store manager buys the products from the suppliers, she records certain information in the table below. The supplier column has both the supplier unique IDs and their names concatenated using " - ". The product column has the product unique codes and corresponding names too. The cost is the unit price that the grocery store manager pays to the suppliers. Every product is assigned to only one department. For each product, the grocery store only buys it once per day (it may buy it from multiple suppliers).

Supplier	Product	ImportDate	Quantity	Cost	Unit of Measure	Dept Code
21 – Very Veggie	4108 – tomatoes	2015-10-01	100	1.89	lb	1
32 – Fab Fruits	4081 – bananas	2015-10-01	100	0.20	ea	1
32 – Fab Fruits	4027 – grapefruit	2015-10-01	100	0.45	lb	1
08 – Meats R Us	331100 – chicken wings	2015-10-01	100	0.50	lb	2
08 – Meats R Us	331105 – lean ground beef	2015-10-02	100	0.60	lb	2
08 – Meats R Us	332110 – boneless chicken breasts	2015-10-02	100	2.50		2

b. Different departments have different products to sell. The

departments have unique codes, which are the same as the "Dept Code" in the first table. Each department has its name in the second column. The products sold in each department are represented using the "ProductCode" that is the same as the produce code in the first table. The "List price" is the unit-selling price for the product for that day. "Quantity" column shows the amounts of different products sold at the end of the day.

Dept	DeptName	ProductCode	List Price	Quantity	Date	Unit of Measure
1	Fruit&Vegatables	4081	0.35	200	2015-10-01	lb
1	Fruit&Vegatables	4027	0.90	36	2015-10-01	ea
1	Fruit&Vegatables	4108	1.99	300	2015-10-01	lb
2	Butcher	331100	5.00	100	2015-10-01	lb
2	Butcher	331105	2.40	200	2015-10-01	lb

c. Each transaction at the store has a receipt and each receipt has its unique ID. Each customer has a unique ID. The table also has the customer names and member status. Based on their status, they have different discount rates. The table also has the product code (same as previous tables), quantities of these products and the total payments for each transaction. The table also records the dates and times of these transactions. The final price is calculated using the formula:
actual_price = quantity*List_price_for_the_product_of_the_day*(1-discount_in_decimal_format)

Receipt ID	custID	Cust Name	Membership Status	Discount	Quantity	DateandTime	Product Code	Actual Price
1	101	Produce	Gold	10%	1	2015-10-01 11:00	4081	0.315
2	1	Produce	Silver	5%	1	2015-10-01 12:00	4027	0.855
3	2	Butcher	Standard	0%	1	2015-10-01 15:00	331100	5.00
3	2	Butcher	Standard	0%	1	2015-10-01 15:00	331105	2.4

2 Submission Instructions

Submit your solutions as a single PDF file. Your name, ID number, and

your solutions to each problem should be included. It is suggested, but not required, that you type your solutions (LATEX and Google Docs are popular ways to do this that include the ability to output your work as a PDF). If you choose to handwrite and scan your work, it must be such that the grader can read what you wrote - illegible submissions aren't distinguishable from missing ones.

Please adhere to the following format to provide an answer for each problem. An answer would explicitly consist of three parts as shown below:

- List of functional dependencies: A -> B, representing B that depends on A
- State whether or not the provided table satisfies each of the first three normal forms. For example, you might write, "This satisfies 1NF but not 2NF or 3NF."
- Normalize the relation into 3NF. You DO NOT need to show what the data for the resulting tables end up being (although you do need to show the final schema). You also are not required to show your work, although you may want to do so if you believe it will help the grader understand your submission.